or dashed blue is the exemplar vehicle?

A Yes. The primary focus I would place on this would be the damage to the bumper reinforcement bar at the rear of the gray.

Q And the gray broken line. What is this purple?

A It's an extension of that general line of damage, the quarter panel. I've got photographs that show where those points were measured.

Q Okay. What else have you got in your file?

A Other than extra diagrams which we just talked about, empty folders and that's all. I have the Analysis file.

Q That's the only one left to look at? Is there anything left in that?

A No.

Q We've cleaned it out. Okay. So what we are left with now is the Analysis file.

A Yes.

Q And tell me about what you have in your Analysis file, please, sir.

A Just generally, first of all, I've got three diagrams showing -- these three diagrams are derived and are smaller black and white versions of the color diagrams of the combined vehicles Exhibits 24, 23, and

22.

Q I have marked the three pieces of paper you handed me as 25A, 25B, and 25C. Tell me which vehicle is B. Is that the --

A Ford. I'm sorry. Is it B or is it A?

Q It's A. You're right.

A It's the Ford.

Q B is the Jeep, and C is the Camry?

A Yes.

Q There is handwriting on these documents. Is it yours or Mr. Brady's or someone else's?

A It's both ours. This is Ken Brady's.

Q "This" being the heading or the data under Ford Thunderbird in a column.

A Yes. Then I computed the C average number. And then up at the right-hand corner I've got KBB, which is his initials but I wrote it, prelim or first cut with respect to Ford crush. In other words, there are different ways of interpreting the crush.

Q And the indications are that there were six stations or points used to measure the crush?

A As shown with the arrow dimensions at the top.

Q And then is the C average the average crush?

A Yes, but it's done not by taking just those six numbers and averaging them. It's by weighting that.

The ends are given half the weight, because in the EDCRASH computer program the portion of the crushed area assigned to the N numbers is only half of the crush area assigned to the C2 through C5 numbers. So computing the average crush you weight them by a factor of 2, or a half actually.

Q And in your handwriting the C average is 27.1 inches?

A Yes.

Q Has that changed since you did this preliminary first cut?

A Oh, I've got probably seven or eight different ways of measuring it, so it does change, yes.

Q Is the same true of the notations on 25B regarding the Jeep?

A No. The Jeep we kept the same because the metal bumper was still very much indicating its post-impact position. The difference with the Ford is that the fiberglass bumper was missing. It had burned and was separated from the vehicle when I saw it, and also the vinyl cover and the energy absorbing material between the vinyl cover and the fiberglass reinforcement bar had burned away.

Q So with regard to the Jeep crush measurements as depicted on 25B, at C1 it was 49.2 inches?

A That's the left end of the bumper, yes.
Q At C2, 42.3 inches?
A Yes.
Q C3, 43.1 inches?
A Yes.
Q C4, 38.3 inches?
A Yes.
Q C5 is 28.5 inches?
A Yes.
Q And C6 is --
A 25.3 inches. All those are shown with dimensions on those points.
Q And then there is also an indication that for the roof C1 through C6 equals zero inches?
A Yes. Those roof numbers weren't used, but it just shows what Ken wrote down with respect to the roof displacement.
Q What's next in your analysis file?
A All right. Then we get into EDCRASH runs, which are damage-based analyses. Each of these -- and let's see how many there are. There are eight of these for the impact between the Ford and the Jeep. And there are eight of them because I show apparently eight different ways of measuring the damage.
Let me back up a minute. If the front bumper

was still on the vehicle, and if the vinyl was still on there, if all the frontal components were still there, then one would simply measure to those components, assuming everything is pushed back tightly. If not, you'd have to make some allowance for any loose vinyl so you would be sure to get the full crush. But the crash-tested vehicle from which the stiffness coefficients are derived has been measured from the original locations of the front vinyl to the post-impact locations of the front vinyl. So what we are having to do is to artificially reconstruct the vehicle and say, well, if that bumper had still been here and if that vinyl and energy-absorbing material had still been here, what would the bumper profile have looked like; in other words, what would the C dimensions, the crush dimensions, have been.

And so what I did was to look at it from the standpoint of what's the most anyone might say and what's a reasonable number. And so I'll go through each of those -- well, I suppose you want me to go through each of these and tell you the basis for each of these computer runs which result in generally a delta V for the Jeep being between approximately 30 and 35 miles per hour. There is one here 39 miles per hour, but that's obviously too much and I'll tell you why. But again,

realizing that those components weren't on the front, I just reconstructed it in terms of some drawings and then measured it in different ways.

Q Is the vinyl gone from the front of the Thunderbird because of the fire or because of impact damage?

A It could be either one, but certainly the fire would burn it away.

Q You didn't find any remnants of it or any indication that it was found in the road?

A That's a good question. I know I photographed some components at Weil Wrecker showing the Ford. And if there is something left, I think I'll have it here. That didn't answer your question about the roadway. Let me check these photographs first of all.

Q C I think is the vehicles. A and B is the scene. This is the Futo's.

A Here it is. That photograph illustrates the remnants of the fiberglass bumper and apparently the front vinyl, although I can't be certain that vinyl came from this vehicle.

Q Okay. I'm going to mark the photograph that you've handed me as Exhibit 27 on the back. And for the record, can you just tell us that's from roll?

A I.

Q And negative number?

A 8A.

Q Thank you.

Q Let's go through your EDCRASH runs. What I've done, I've made exhibit labels 26A through H for the eight EDCRASH runs which you've got, and just maybe to make it easier, I'll come over there and put them on and you can just start with --

A May I make a recommendation?

Q They are numbered.

A Well, I've got A through F. Why don't we go ahead and put the same exhibit numbers on them.

Q That will work.

MR. FRYHOFER: Could we take about a five-minute break, Diane. We've been going about an hour since lunch.

MS. OWENS: Absolutely.

(Recess)

BY MS. OWENS:

Q All right, Mr. Kirk. Right before the break we had marked the eight EDCRASH runs you had done. Based on those EDCRASH runs, have you come up with a range for the delta Vs of the vehicles?

A Yes, I have.

Q Did you use any other -- also in your file,

which I looked at while we were on break, there are two M-SMAC runs?

A There are two but one accident. Since there is a secondary collision, we ran a separate run. Those M-SMAC runs are preliminary.

Q Do you use these EDCRASH runs to do your speeds?

A Primarily what the M-SMAC runs tell me is that a separation speed of around 45 miles per hour does produce the required spin-outs. When you have a collision which is essentially collineal, you can get a separation speed of 45 miles per hour with lots of different speeds, but I wanted to make sure that the EDCRASH runs I had were consistent with or did provide whatever closing speed necessary to produce whatever separation speeds necessary for the vehicles to travel as they did after the first impact.

Q Let me make sure I'm understanding you. You knew what the post-impact trajectory and distances were?

A Yes.

Q And you tried to correlate your EDCRASH runs to give you the speed to do that?

A No. The first thing I did was to calculate the approximate delta V of the Jeep, which of course provides also the approximate delta V of the Ford. It's

just an inverse mass ratio that determines the relationship of the delta Vs.

Q How did you go about calculating the delta V of the Jeep?

A I calculated the range based upon these EDCRASH runs. In each of these EDCRASH runs, I use the one measured Jeep profile on Exhibit 25B but I use a variety of methods of measuring the Ford crush profile because it cannot be as directly measured.

Q So the constant in the eight runs is the Jeep crush profile?

A That is correct. That's one constant, yes. Weights are also constants, of course.

Q What about the --

A Stiffness coefficients?

Q Yes.

A The stiffness coefficient for the Ford was kept the same. To balance forces, the stiffness of the Jeep was varied. In other words, the four primary components on establishing the delta V based upon damage are the stiffnesses of each vehicle and the crush of each vehicle. The crush of the Jeep we know. The crush of the Ford we define in these eight different ways of doing it. The stiffness of the Ford we have from Neptune based upon crash tests, and all crash tests

which they've used provide essentially the same stiffness coefficients.

What we have left is the stiffness coefficients, that is, coefficients A and B for the Jeep. We can't use one from the crash test because the crash test, at least the ones I have, the one I have which is the Neptune publication, is a 301 test apparently, which involves from roof level on down. It involves substantially less crush than we have in the Jeep. So in the EDCRASH runs, once we define the crush to the Jeep, excuse me, yes, the crush to the Jeep, the crush to the Ford, and the stiffness of the Ford, we balance the force by varying the stiffness of the Jeep.

Q Okay. Tell me what your range of delta Vs for the Jeep is.

A Well, I'll say 30 to 35 miles per hour is a range. I would indicate I think probably towards the lower end of that range for a couple reasons. I think that's the most justifiable way of measuring the crush, and also the delta V of the Ford was almost as much. I think generally it's about 2 miles per hour less, 2 or 3 miles per hour less because its mass is greater. I also know that the Ford occupants were not injured badly at all -- that's my understanding anyway -- which would tend to push the delta V lower. I'm not using their

injuries as a direct determination of delta V but I'm saying I'm getting, even with the 30-mile-per-hour delta V of the Jeep, I'm getting a delta V of the Ford of probably 32 or so. I'm sorry. The Ford is a bit less. About a 30-mile-per-hour of the Jeep I get about a 28-mile-per-hour of the Ford because it weighs more.

Q So the range would be somewhere between 28 and 33?

A For the Jeep?

Q No. For the Ford. Sorry.

A Approximately, yes. I haven't really focused on that but that would be approximately correct. Whatever the range is for the Jeep you multiply times the ratio, inverse ratio of the mass. It's 3750 pounds divided by 3500 pounds. Take 3.75 over 3.5, multiply that times the delta V. Let me back up a minute. You take 3.5 over 3.75. Multiply that times the delta V of the Jeep to get the delta V of the Ford.

Q Okay.

A So the delta V of the Jeep, although there are some measurement techniques here that result in a higher delta V than 35 for the Jeep, I think those are not acceptable measurement techniques. I did it just to see what would happen if we had what I believe to be more crush measure than actually existed. I think 30 to 35

miles per hour is the range of delta V I would have for the Jeep, probably towards the lower end of that.

Q All right. And that is the change of velocity from the Jeep experience from the impact with the Ford?

A That's correct.

Q Then you told me about separation speed.

A Yes.

Q Have you calculated a separation speed of either the Jeep or the Ford from the initial impact?

A Well, I've assumed that the coefficient of restitution was approximately zero, because there is underride and there is a lot of crush. And if you give it maybe five hundredths or so, that is, if you establish a coefficient of restitution of five hundredths or so, you may subtract a mile per hour or so from the Ford and add a mile per hour or so for the Jeep, but I don't think it's significant since we are talking about an approximate damage-based analysis anyway. So I've used the same separation speed -- I would use the same separation speed for each. And I do have some calculations which examine that.

Q The SMAC runs?

A Actually, it's the manual calculations. The M-SMAC runs simply are a first cut at trying to duplicate the rest positions.

Q You handed me a set of handwritten pages that are headed Preliminary I'll mark as composite Exhibit 28. When did you make these notes?

A Earlier this week.

Q And why is it labeled still Preliminary?

A Well, there is a wide range of numbers here. At the time I did these I hadn't really chosen anything.

Q Have you chosen now?

A I've chosen ranges, yes, yes.

Q Okay.

A There are six pages here, but I think it has to be preliminary to one extent because I realize there may be, for example, relevant crash test data produced. I'm not sure it's going to happen but it may happen. I don't know that Chrysler's done any vehicle-to-vehicle crash tests on the Jeep, but that would be something that has some potential usage. It may be that I'll discover some crash tests by some other source. I don't know that. But it's preliminary from the standpoint this could be refined with more information, but it's not preliminary from the standpoint that I think this is not correct. I think it is correct, but I do have some ranges here.

Q If you get additional information, you reserve the right to redefine or refine what you've done?

A And let me say something else regarding what the M-SMAC runs address. Although we've got the impact position of the Ford and the T Bird established very well, we have the rest positions of all vehicles established very well, what are not established very well are post-impact tire marks to rest of all the vehicles, that is, the post-impact paths of all the vehicles. Those aren't established with precision. And in my opinion the left side of the Jeep contacted the rear of the Camry, but I don't know exactly where that occurred.

Now, that can be established perhaps through some physical evidence which was documented by somebody else. I doubt that's going to happen. It might also be established by some witness, but knowing how witnesses testify and what variability you get in their testimony, that may not be precisely done also. One way to do it, that is, to establish the impact position between the Jeep and the Camry, would be to make some M-SMAC runs and see about where it had to be. But that's sort of backing into what I would normally prefer to do, and that is to have physical evidence on the roadway and then make the M-SMAC runs match that physical evidence, rather than have the M-SMAC runs telling me where the physical evidence should have been. So there is a

possibility additional M-SMAC runs may help to refine the impact speed and delta V a little bit more.

Q Returning to my question as to what you believe the separation speeds were of the Jeep and Ford from the impact.

A Approximately 45 miles per hour.

Q Each?

A Yes. That happens to -- the M-SMAC runs certainly support that. But again, you can get that separation speed by lots of combinations of speeds. In other words, if both vehicles are going 45 miles per hour at impact, or close to it, then they are going to separate at about 45 miles per hour. If one is going 90 and the other one is going zero and they weigh the same, they can separate at about 45 miles per hour.

Q How fast do you believe the Jeep was going before the impact?

A Well, again, not based upon what any witness says, but I think the Jeep was probably going approximately 10 to 15 miles per hour, probably close to 15 miles per hour but in the range of 10 to 15 miles per hour; in other words, not zero to 5, not 15 to 20, but probably 10 to 15 miles per hour.

Q What do you believe the Ford Thunderbird speed was before impact?

A Let's say at impact first of all. At impact it was probably going in the 70s, probably 75 plus or minus 2 or 3.

Q And did you do a calculation of the Ford speed before the braking marks?

A Yes, I did.

Q What was that?

A I did various combinations of speeds, and what I should do now is to tell you that -- let's pick out a specific speed. Let's say, for example, the Ford was going 75 miles per hour at impact. Then with 67 feet of pre-impact tire marks, its speed is about 84 miles per hour. Now, if I look specifically at the 30-mile-per-hour delta V of the Jeep on page 4 of Exhibit 28 and a separation speed of 15 miles per hour, that indicates a speed of 73 miles per hour for the Ford at impact, which would give you a speed at start of braking very close to 80 miles per hour.

Q Okay. What do you have as the principal direction of force for the Ford?

A Approximately zero, 12 o'clock.

Q And what about for the Jeep?

A Approximately 180 degrees or 6 o'clock.

Q And is there a total overlap of the Ford on the Jeep or is it biased to one side or the other?

A The centerlines, that is, the centerline of the Ford was slightly left of the centerline of the Jeep. I haven't really calculated that, but I could probably do it by using the deformation profiles I've drawn up. But preliminarily I'd say the offset was probably a foot or less, probably somewhat less than a foot, that is, the centerline of the Ford offset less than a foot to the left of the centerline of the Jeep.

Q Was the orientation straight on essentially?

A Essentially, I think. I can't tell you whether there may not have been a total difference of 10 degrees or so, but essentially straight on. I just don't have a way to tell you more precisely than that.

Q Do you believe the Jeep was braking at the time of impact?

A I don't know. I believe that the Ford certainly was.

Q Do you believe that the orientation of the Jeep on the Z axis at the time of impact was normal? Was the back end lower or higher than normal?

A You're talking about the pitch axis.

Q Yes.

A I don't know. I know that the Ford front end was pitching downward, of course, because of braking, and there was some underride; but what the Jeep was

doing I don't know. Now, I say I don't know. I'm not saying it cannot be determined. Perhaps measuring exemplar vehicles and assuming certain pitch amounts for both vehicles might answer that question for you.

Q Have you done anything to determine what the relative heights of the Ford front bumper and the Jeep rear bumper are?

A No. No, I haven't. It may be in some of the vehicle specifications data, but I probably wouldn't rely upon that. I probably would rely at least in a supplementary fashion upon measuring actual vehicles, exemplar vehicles.

Q And was that one of the measurements that was made of the exemplar vehicles?

A No.

Q What about the Camry? Where was it hit and by what?

A It was hit in the rear. Of course, the more damage was to the right rear. The left rear was pushed forward essentially zero; the right rear roughly a foot as shown in Exhibit 25C. And that was struck by the left side of the Jeep as the Jeep spun clockwise after the initial impact.

Q All right. So the Ford hits the Thunderbird, and after that the Jeep spins counterclockwise?

A Clockwise.

Q I'm sorry. Clockwise. And continues to move --

A Southward.

Q -- down the road?

A Yes.

Q And the Camry is in which lane?

A In the HOV lane. I don't have any direct physical evidence on the roadway of that, but that's the testimony, and that seems to be consistent with the spin-out trajectories.

Q And the Jeep and the Ford are in which lane when they impact?

A The HOV lane.

Q Do you know what the speed of rotation was in the Jeep or what the rate of rotation was?

A No. M-SMAC will show you what resulted from that particular run, but I would say that's preliminary. I wouldn't want to answer that question based upon that preliminary run.

Q What was the orientation of the Camry with respect to the lanes at the time it was hit?

A I don't know anything other than approximately headed southward. That doesn't mean it couldn't have been at some angle. It more than likely would have been

at an angle facing towards the right, and so the left based upon the damage profile; but that damage profile could have been produced also by sitting straight in the lane and the Jeep coming around and hitting it with its left side before the Jeep had rotated clockwise 90 degrees.

Q What was the speed of the Camry before this impact?

A I think it was stationary at impact.

Q So it was not moving?

A Correct.

Q And what was the delta V of the Camry as a result of the impact with the Jeep?

A Well, the barrier equivalent velocity is approximately 13 miles per hour, which is probably going to be close to its delta V because there is not a lot -- I mean, the weights are close. The crush is close. But probably 10 to 15 miles per hour would certainly do it. I think 10 is a bit too low and 15 is probably a little bit too high.

Q I think I recall two EDCRASH runs with respect to the Camry?

A Yes.

Q I'm going to mark those two as composite Exhibit 29. Was the Camry hit by anything other than

the Jeep?

A Probably by the Ford based upon damage to the left side of the Camry. Probably the Ford contacted it, not substantially because it's just sheet metal damage, but probably there was some contact that certainly occurred during the M-SMAC runs. In my opinion it's nothing substantial. I think it's contact as both vehicles are traveling to their rest positions.

Q We've talked about your preliminary M-SMAC runs. Can you pull those out, and let's go ahead and mark those as composite Exhibit 30.

A Let me say this also: Mr. Brady did these for me, and I told him -- he asked me what were the initial set-up parameters, and I said I want to see whether roughly a 45-mile-per-hour separation speed is consistent with the rest positions. He said how fast should I run them together, and I said I don't really care because you can get that separation speed by any combination, but I said just have the Jeep go in at a fairly slow speed. So he chose 80 miles per hour and 10 miles per hour, which produces about 35-, 36-mile-per-hour delta Vs for both vehicles. There is nothing magic about that. What he was really doing, instead of trying to determine delta V or the impact speed, was trying to determine the approximate separation speeds necessary to

produce the observed spin-outs in order to use this information in conjunction with Exhibit 28, my manual calculations.

Q Have we now marked all of the information that's in your analysis file?

A Except for extra diagrams, yes.

Q Those look to be as though they were simply repeats of things we marked earlier.

A That's correct. And also there is a couple of plastic overlays which I didn't use, but they are overlays of information you already have.

Q So now tell me what your opinion is about how this accident happened.

A All right. I'm going to focus on four vehicles: first of all, the van, and then three primary collision-involved vehicles. I'll mention some others. The van for some reason lost its right front wheel, wheel being defined as tire plus rim, and also there were some braking components that apparently broke off with it. That interrupted the flow of traffic. The vehicles following the van, two or three of them at least, hit portions of the wheel, et cetera, assembly that came off the van. There was a Saturn. There was the Camry. There was one or two other vehicles which are documented by police photographs and by witness

statements and other documents in the police file. But the Camry stopped in the HOV lane.

The Ford T Bird was also in the HOV lane, as was the Jeep Cherokee. The Jeep was ahead of the Ford, obviously. The Jeep slowed in the HOV lane, apparently in response to the Camry being stopped in front of it. And before changing lanes, which I assume was the intent of Mr. Belli, the Jeep was traveling slowly in the HOV lane and was struck from the rear by the Ford after the Ford skidded a distance of approximately I think 67 feet. The front of the Ford contacted the rear of the Jeep with the approximate offset I stated earlier at the speeds we've already discussed.

The Jeep was accelerated forward. It rotated clockwise while continuing to travel southward and probably slightly towards the right or west. Its left side contacted the rear of the Camry which was stationary in the HOV lane. The Camry then traveled southward, rotated counterclockwise, and traveled toward the median shoulder and median barrier. The rotation of the Jeep, that is, the clockwise rotation of the Jeep, was probably reversed so then began rotating counterclockwise traveling toward the south and toward the east, that is, towards Atlanta and towards the right, spinning counterclockwise toward its rest

position. I should say yawing counterclockwise toward its rest position.

The Ford continued traveling toward the south and probably made contact with the left side of the Camry perhaps at two separate locations towards the front and toward the rear of the left side, and the vehicles came to rest as shown in the photographs and by the police measurements and on some of the drawings which I have. And obviously, there was a fire which occurred which will be described by witnesses, and I guess that's Mr. Arndt's area of expertise. But that's basically how this accident happened.

Q Referring back to Exhibit 8, which is the large scale drawing by Mr. Brady, this essentially depicts both the Jeep and the Ford as traveling in the proper direction for the lane of travel. Is that accurate to your belief?

A Yes. The Ford's angle, the Ford is pretty much fixed because of the tire marks. The damage to the front of the Ford and rear of the Jeep helped to establish the Jeep's position, but again, I can't discriminate a heading change of the Jeep of perhaps 5 degrees, maybe even 10 degrees, based upon physical evidence.

Q And then also in Exhibit 8 we have points of

rest depicted for the Ford?

A Yes, ma'am.

Q And then the Camry?

A Yes.

Q Is it depicted as being overturned?

A No.

Q That's just where the wheels were?

A Yes, and that's --

Q -- documented in the police file.

A Yes.

Q And then the Jeep over sort of on the line between lanes two and lanes three as we've marked them on another drawing?

A Yes.

Q Which part of the Jeep hit which part of the Camry?

A Well, probably the first components to engage were the bumpers, front bumper and rear bumper.

Q What damage from the Camry impact did you observe on the Jeep?

A Oh, let me back up a minute. Was your former question involving the Jeep and the Ford?

Q No.

A That wasn't the question. Please ask it again.

Q Just the Jeep and the Camry.

A Jeep and the Camry. Thank you.

The left side of the Jeep.

Q Where on the left side?

A I need a photograph. Certainly the driver's door was involved. I think both the driver's door and the passenger door contacted the bumper of the Jeep. That was what made the first -- let me back up a minute. The driver's door, that is, the left front door and the passenger door, that is, the left rear door of the Jeep, made contact with the rear bumper of the Camry.

Q You pulled out a couple of photographs which you are referencing. Could you tell us the roll and negative number?

A Yes, but there are other photographs which show the same, but I did pull out these two photographs from Exhibit 19, roll D, the first two photographs which are negative numbers zero A and 1A.

Q I'm going to write roll D, zero A and 1A.

Q And have you calculated a delta V or a BEV for the Jeep with respect to the impact that's essentially side impact with the Camry?

A Roughly I think on Exhibit 28 I list a delta V of approximately 12 miles per hour, but that's approximate.

Q And that's for the Jeep?

A Yes. It could be a little less than that because of the weight differential, but that's approximate.

Q And that's the delta V, not the BEV?

A It would be about the same probably, but it's an estimate so it could be the BEV.

Q With regard to the earlier range you gave me as to the delta V of the Jeep, have you also calculated a BEV?

A No, I have not.

Q What about with regard to the range of the delta V for the Ford? Have you calculated a BEV?

A No, I have not.

Q Do you believe or hold the opinion that any component of the fuel system was directly impacted by any part of the Ford?

A I don't know.

Q Or by the ground?

A I haven't addressed that. I don't know.

Q Do you hold any opinion or do you intend to express any opinion about when the fire --

A You know, let me back up just a minute. I'm not going to address that, but based on experience, probably part of the Ford did strike the fuel tank of

the Jeep. But I'm not sure of that and don't plan to testify to that, but just knowing what I do about the underride and the way the accident happened and where the fuel tank was, that's likely. But I think Mr. Arndt would handle that. I'm just telling you what I believe.

Q Did you document that in any measurement or photograph?

A I didn't document it for that purpose specifically, but maybe a photograph I took would document that. I can't point to one and say here is -- as far as I know, I can't point to one and say here is evidence of that. It's something I didn't focus on.

Q Did you make any measurements of the displacement of the rear seat?

A No.

Q Or the displacement of the spare tire?

A No.

Q Or the displacement of the floor of the cargo area?

A I did not.

Q What about with regard to the front seats? Did you document any or measure any displacement of the front seats either longitudinally or laterally?

A I measured nothing. I took photographs which would be some documentation, but I didn't attempt to

quantify it with any sort of measurement device.

Q Did you measure the angle of the seat back of the driver's seat?

A I did not.

Q Did you make any measurement of the displacement of the body structure around the front doors of the vehicle?

A Only if it's reflected on the exhibits which show the crush. I don't think that I did, but just a minute, please.

No, except for that earlier point we talked about.

Q Which is the point on the rocker panel below the A pillar?

A Yes. That would be all I measured.

Q Did you make any measurement of the displacement of the rear axle?

A Well, as I found it, yes. That's documented on Exhibit 22.

Q Okay. Tell me --

A I didn't measure it, but when I found it -- and I understand it was loose, and perhaps it's just been set in that position as this vehicle was set on the steel frame that's carrying it today.

Q Was the center of the rear axle housing, was

that one of your data points?

A No. Just a minute. I see some point here. I don't know what that is. Just a minute. I don't recall that it was, but there is something which may have been measured, if I could have my field notes, please.

I do have a measurement. I'm reading from Exhibit 3 next-to-the-last page: bolt head on lower rear of differential. And then parenthetically I state it has moved forward like the right rear and left rear wheels. That apparently on Exhibit 22 is this very lightly drawn point on the subject vehicle with the circle. On the exemplar vehicle it must be with the square.

Q So that would indicate that on the accident vehicle the center point of the bolt head of the rear axle was moved forward and to the right?

A Yes, that is correct, at least that's how I found it.

Q Okay. After the separation from the Ford, were the Jeep's wheels still turning?

A I don't think its rear wheels were. I think its front wheels could have been turning.

Q Were the rear wheels locked up by the damage?

A I've assumed that they were.

Q When you examined the rear wheels, would they

move? Would they spin?

A Well, the weight was off of them and the axle was loose. No, I couldn't have spun them probably because of the way the vehicle was on the steel fixture which was made to carry the vehicle, but I don't remember that specifically. That might be actually in some photographs. I've got a note, as I typically would make during an examination of a vehicle, that says the left front and right front are free to rotate. That's FTR. And the left rear and right rear are locked by damage, or essentially would have been locked by damage.

Q Okay. What was the distance that the Jeep traveled after impact with the Thunderbird?

A Approximately 100 feet we discussed earlier.

Q It's 102 feet, I think?

A Yes. That's just straight line measurement from CG to CG.

Q And do you have an opinion about when the engine stopped on the Jeep in this accident sequence?

A I wouldn't know that. I don't know that. I wouldn't be surprised if it stopped at impact, but I don't know that.

Q Did the Jeep have any additional contact with any vehicle after it separated from the Camry?

A I don't know that. I don't know, for example,

that the Ford and the Jeep may have still been in some contact when the Jeep contacted the Camry. I just don't know that. I don't think there is any significant contact of the Jeep with any other vehicle after contact with the Camry, nothing that would produce significant damage is what I'm saying.

Q In any of the work that you have done, have you attempted to calculate a pulse?

A No.

Q Either shape or length?

A Have not.

Q Do you have any opinion about whether or not the fuel system of the Thunderbird was compromised in this accident?

A I don't.

Q When I went through your pictures, I noted some of them that I wanted to ask you about, and since these have Bates label numbers on them that everybody has got, if we can use those, it would be helpful.

Let me show you what has been labeled as photograph or Bates number 1456. And is the tape on the floor simply the stationary point you used to do your crush measurements as opposed to representing the --

A Original outline of the vehicle?

Q Yes.

A The tapes are there just to illustrate the measurement box, or they are the measurement box I put around the vehicle. They are placed rather randomly, actually, just so I make a rectangle around the vehicle.

Q And Bates labeled photographs 1517 and 1518 show I believe -- is that underside components?

A That's the rear bumper of the Jeep.

Q And there is tape in place?

A Yes.

Q Is that documentation of your measurements of the crush?

A Well, yes. It's documentation of the shape of the bumper at various points measured from the centerline. Also typically what I do is state at what points left and right of the centerline I make my crush measurements in my field notes. So it would serve that purpose also.

Q And I think in looking at the C1 through C6 documentation on one of the exhibits -- is it this one?

A Which vehicle?

Q Jeep.

A Yes, 25B.

Q The maximum crush was how much?

A That's the left end. That's 49.2 inches.

Q And the position to the right, immediate right of that, was how much?

A 42.3 inches. When you say position, you mean the measured position immediately to the right.

Q C2.

A Thank you. Yes, 42.3 inches.

Q Let me show you a photograph which is Bates labeled 1527, and in that photograph there is a hand and a pen. Is that your hand and pen?

A My pen. Probably my hand too.

Q What are you pointing at?

A I think that's the point on the rocker panel near the front, this being on the right side that was measured.

Q And similarly in Exhibit 1528 there is a pen and a hand. What is that pointing at?

A That's the sister point on the left side.

Q And in 1530 there is also a hand and pen, and 1532. Can you tell me what those are?

A I'm sure I must be pointing to points that I measured, but I'd have to look at some other photographs to try to answer that question for you. But they must be points that I measured on one of the vehicles. This looks to be probably the Jeep, and I'm not certain of that.

Q It's in the stack that is all Jeep pictures.

A Let me look in my description in my field notes and that might refresh my memory.

The 1352 is apparently a measurement to my --

Q I'm sorry. Is it 1332?

A It's neither. It's 1532. That shows the location of the reference point at the front of the vehicle at the right that's shown on my crush measurement diagram. 1530 must be the same position as the left.

Q Okay.

A Just a minute, please.

Yes, I don't see anything else it could be.

Q And there is photographs on this page which are Bates labeled 1542 and 43. I just want to make sure which vehicle is that.

A That's the Camry. That was taken showing the position of the Camry before I had it moved for more detailed examination.

Q And there are several components shown in photograph 1546. Which vehicle are those from?

A The Camry. You have the rear vinyl, the rear energy-absorbing material, and the front energy-absorbing material.

Pardon me. I think that vinyl was to the

rear. I don't recall for certain.

Q Let me show you photograph 1589. I believe that's the Camry again?

A Yes.

Q And there is damage done to the right front?

A Yes.

Q Do you have an opinion about what caused that damage?

A I think the upper damage was probably caused by somebody trying to get into the hood. I can't believe it's caused by the accident. The lower damage may have been that damage which was caused by the vehicle striking some component in the roadway. I'm not certain of that, but that may be what caused it.

Q Do you have any indication from either your visit to the scene or the police measurements or documentation of the scene that any of these vehicles contacted the center barrier wall?

A I don't have any evidence that they did. I wouldn't be surprised to learn that, for example, the Ford may have lightly contacted it, but no major contact.

Q Mr. Kirk, how would you compare or correlate, if you can, the forces acting upon the Jeep as a result of this rear-end collision as compared to either a 301

test or an NCAP test?

A I don't know that I could. I haven't attempted to do that. I guess we could look at the force required as displayed by EDCRASH and compare that to some force measured in an NCAP test or 301 test. The damage is certainly more substantial. Let me say this: The damage is also different. If we talk about the crush of the bumper, the bumper level crush is certainly more on the Jeep, rear of the Jeep, than the 301 test would produce, but crush higher up is less; for example, roof crush is almost nonexistent. In a 301 test you're probably going to get roughly equal crush in both areas.

Q Because the barrier extends --

A Involves -- if it doesn't extend all the way to the top, it extends high enough to the top that it pulls more of the upper structure forward or forces more of the upper structure forward.

Q So do you hold an opinion that this accident was less severe than a rear 301 test?

A Well, a 301 test involves a 4,000-pound barrier hitting this vehicle, and you're going to produce a delta V of between 15 and 20 miles per hour; and the delta V here is close to 30 miles per hour, perhaps as high as 35, so the delta V is certainly more substantial in this accident.

Q Do you intend to express any opinion about fault of the various drivers involved or possible violations of law of the various drivers involved?

A I don't.

Q Is there any other opinion that you hold that I haven't asked you about or we haven't discussed?

A Or that's not reflected somewhere in my exhibits that I marked? I can't think of anything else.

Q And we've marked or looked at everything that you have relied on and all the documentation that you or the people that work for you have created; correct?

A Yes.

MS. OWENS: I don't think I have any more questions.

MS. BRACCO: I just have a few questions.

EXAMINATION

BY MS. BRACCO:

Q I'm Ann Bracco here for the driver of the van, Joe Brennan. I think it was your testimony today that you have not interviewed Joseph Brennan. Is that correct?

A Correct.

Q Have you ever inspected the van after this incident?

A I have not.

Q Have you ever had an opportunity to inspect the wheel component or components that had come off the van after the accident?

A I don't know I've had the opportunity. I haven't asked to do that. Whether they even exist I don't know. But no, I've not taken the opportunity nor asked for the opportunity to examine those components.

Q Would it be fair to say that you haven't inspected any component or any part of the van which wheel came off in this accident?

A Correct.

Q Do you have an opinion as to why the wheel may have come off the van?

A No.

Q Have you incorporated any information you have about the van and the wheel coming off into an opinion as to how the accident occurred?

A Only to the extent I stated earlier, that apparently the wheel coming off the van was the first event in this chain of events that led to the catastrophe, the serious accident.

Q And have you been asked to give any sort of opinion or your analysis to a computer animation specialist in this case that would involve anything to

do with the van?

A No.

Q Do you know the name of the wrecker service that the van was taken to?

A No.

Q I guess it would be fair to say that you haven't spoken with anyone at the wrecker service where the van was taken to after the accident?

A No. My only knowledge of that would be perhaps something in the police documents, but I have not spoken to anybody there.

Q Do you know right now where the remnants of that wheel assembly or tire is?

A I have no idea.

Q And I just want to ask you real briefly about the damage to the Camry as a result or as you think may be a result of it possibly hitting the wheel assembly. Do you have any knowledge as to whether or not the vehicle, the Camry, once it possibly hit the wheel assembly, was operational or not?

A I don't know. No, I couldn't tell you scientifically. I don't know why it wouldn't be operational. I know somebody stated the air bag deployed, which is a little surprising. I say surprising based upon I wouldn't expect the impact with

the wheel to exert enough force to cause that to happen. It may be the wheel hit right on the sensor. But I don't know why it wouldn't -- why it couldn't be operated. I just don't know.

Q So you wouldn't say that the Camry could not have been removed from the HOV lane as a result of it hitting the wheel assembly?

A I don't have any knowledge and would not state that one way or the other. I don't know.

MS. BRACCO: That's all I have.

MS. OWENS: I have two more.

FURTHER EXAMINATION

BY MS. OWENS:

Q In your examination of the Jeep, did you make note of any indication of what the seat belt positions were for the driver's seat, the left rear seat behind the passenger, or the center rear seat?

A No.

Q Did you note any evidence of a child seat in the interior of the vehicle in the debris?

A I don't recall that I did, but I wasn't looking for it. Of course, it burned up anyway, so I don't know if I could have seen anything if I had been looking for it.

MS. OWENS: That's it. That

was my two.

MR. FRYHOFER: I don't have any questions.

(Deposition concluded 3:15 p.m.)

E R R A T A S H E E T

Pursuant to Rule 30(7)(e) of the Federal Rules of Civil Procedure and/or Georgia Code Annotated 81A-130(B)(6)(e), any changes in form or substance which you desire to make to your deposition testimony shall be entered upon the deposition with a statement of the reasons given for making them.

To assist you in making any such corrections, please use the form below. If supplemental or additional pages are necessary, please furnish same and attach them to this errata sheet.

- - -

I, the undersigned, RONALD E. KIRK, do hereby certify that I have read the foregoing deposition and that to the best of my knowledge said deposition is true and accurate (with the exception of the following corrections listed below).

Page_____ Line_____should read:_____

Reason for change:_____

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Signature

Sworn to and Subscribed before me
_____, Notary Public.
This_____day of _____, 2002.

My commission expires:

BH

C E R T I F I C A T E

G E O R G I A:

FULTON COUNTY:

I hereby certify that the foregoing deposition was reported, as stated in the caption, and the questions and the answers thereto were reduced to the written page under my direction; that the foregoing pages 1 through 130 represent a true and correct transcript of the evidence given upon said hearing. And I further certify that I am not of kin or counsel to the parties in the case; am not in the regular employ of counsel for any of said parties; nor am I in any way financially interested in the result of said case.

This the 9th day of October, 2002.

_____

BARBARA HILGER, RPR
Certified Court Reporter #A-295

DISCLOSURE

STATE OF GEORGIA:

COUNTY OF FULTON:

Deposition of RONALD E. KIRK

Pursuant to Article 8.B. of the Rules and Regulations of the Board of Court Reporting of the Judicial Council of Georgia, I make the following disclosure:

I am a Georgia Certified Court Reporter acting as an agent of Regency Reporting, Inc., who was contacted by the offices of M. DIANE OWENS to provide court reporting services for this deposition. I will not be taking this deposition under any contract that is prohibited by O.C.G.A. 15-14-37 (a) and (b).

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BARBARA HILGER
Certified Court Reporter
#A-295

DATE: SEPTEMBER 27, 2002

IN THE STATE COURT OF FULTON COUNTY

STATE OF GEORGIA

ROY LOUIS BELLI, et al.,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	Civil Action
	)	File No. 01VS018431G
DAIMLERCHRYSLER CORPORATION, et al.,	)	
	)	
	)	
Defendants.	)	
	)	

DEPOSITION OF DON C. STEVENS

Phoenix, Arizona
October 29, 2002
10:00 a.m.

Reported by:
AMY MERRIFIELD, RPR
AZ CCR #50097
IL CSR #84-4027

I N D E X

E X H I B I T S

E X H I B I T S

THE DEPOSITION OF DON C. STEVENS,

taken at 10:00 a.m. on October 29, 2002, at the Arizona Biltmore Resort, 2400 East Missouri, Kingman Conference Room, Phoenix, Arizona, before Amy Merrifield, a Notary Public and Certified Court Reporter #50097 in the State of Arizona, pursuant to the Rules of Civil Procedure.

The plaintiffs were represented by their attorneys, Butler, Wooten, Fryhofer, Daughtery & Sullivan, L.L.P., by George W. Fryhofer, III, Esq., and Gregory R. Feagle, Esq.

Defendant DaimlerChrysler Corporation was represented by its attorneys, Swift, Currie, McGhee & Hiers, by M. Diane Owens, Esq.

Defendant Muleta was represented by his attorneys, Savell & Williams, L.L.P., by L. Sandy Fine, Esq.

Also present was Sharmi Lawrence.

Phoenix, Arizona
October 29, 2002
10:00 a.m.

(Exhibits Nos. 1 through 20 were marked for purposes of identification.)

DON C. STEVENS,

called as a witness herein, having been first duly sworn to speak the truth and nothing but the truth, was examined and testified as follows:

EXAMINATION

BY MS. OWENS:

Q. Good morning, Mr. Stevens. We were introduced a moment ago. My name is Diane Owens, and I represent DaimlerChrysler Corporation in the lawsuit that has been filed by Mr. and Mrs. -- or, I'm sorry, it's -- yeah, it is Mr. and Mrs. Belli and Mr. Urquhart.

And I understand that you have been retained to perform services for the plaintiffs in this matter?

A. That's correct.

Q. What services have you been retained to perform?

A. I'm serving as the coordinator for the computer animation of the collision.

Q. Okay. Did you actually do the computer animation that, apparently, is on one of the discs that we've marked as an exhibit to your deposition?

A. The actual animation is created by Jay Saul.

Q. Okay.

A. S-a-u-l.

Q. And so what does a coordinator do then?

A. I'm acting as the central -- the focal point between the experts whose information is necessary to compile the animation.

Q. Okay. Did you actually generate any work product with regard to this file?

A. I did generate some elements of the vertical motion of the vehicles following impact.

Q. Okay. Anything else that you've actually generated?

A. I did not generate the aerial photographs in our case file, but I did research and purchase them.

Q. Anything else that you have generated in terms of work product that is a part of the animation

or any other digitization that's been done by other experts?

A. It would also be appropriate to mention that I correlated the aerial photograph with the scene diagram so that it acts as a background to the measured data.

Q. Okay. Anything else that you, yourself, have generated?

A. No, I believe that covers it.

Q. All right. We've marked as Exhibit 1 to your deposition a copy of your curriculum vitae; is that correct?

A. Yes, ma'am.

Q. And it tells me that you have both a bachelor's of science in mechanical engineering and a master of science in mechanical engineering from the two different Oklahoma schools?

A. That's right.

Q. And you went to work for Safety Engineering & Forensic Analysis in January of 1998?

A. Yes.

Q. And before that, you worked for Arndt & Associates, correct?

A. Yes, ma'am.

Q. As I understand it, Safety Engineering &

Forensic Analysis is owned by Stephen Arndt --

A. That's right.

Q. -- son of Frederick Arndt, for whom you worked at Arndt & Associates?

A. Yes, that's all correct.

Q. And before that, you worked at a company call Simula, S-i-m-u-l-a, in Phoenix, and what did that company do?

A. They manufacture and develop safety technologies for automotive and aircraft applications.

Q. Did any of the work of that company deal with fuel system design or performance?

A. A portion of their work was the protection of fuel systems from impact in aircraft design, developing energy-absorbing flooring and fuel tanks which could survive impact.

Q. What about for vehicles?

A. Near the last 18 months of my employment there, we undertook a project which involved the analysis of fuel tanks on light trucks and their crashworthiness.

Q. Did you do work on that personally?

A. Yes, ma'am.

Q. And did light trucks include a sport utility vehicle such as the Jeep Cherokee that's at

issue in this case?

A. No.

Q. For whom was that analysis of light trucks undertaken?

A. It was a joint effort between our company and Arndt & Associates, who I later went to work for.

Q. Okay. And do you know who funded that program?

A. Our company was compensated by -- for my time by Arndt & Associates, but I'm not certain as to where their funding was provided.

Q. Have you learned since you went to work for either Frederick Arndt or Stephen Arndt where the money came from to pay for your time on that project?

A. No, ma'am.

Q. So tell me what that project entailed in terms of what you did.

A. I was responsible for analyzing and reconstructing a large set of automotive crashes, each of which involved a GM light pickup with the side saddle fuel tank system.

Q. The CK pickup truck?

A. Yes, ma'am.

Q. Did you ever prepare any written report of your findings?

A. Yes, I did.
Q. And what title did that report have?
A. I believe it will be the third item down to publications on the second sheet --
Q. Okay.
A. -- of my CV.
Q. The principal authors are listed as yourself, Mr. Hurley -- who is Mr. Hurley?
A. His name is Todd Hurley.
Q. Who is he?
A. He was another engineer at Simula with me at the time.
Q. What about C. VanIngen-Dunn?
A. Caroline VanIngen-Dunn.
Q. Who does she work for?
A. At the time, she was employed by Simula, as well as she was the supervisor on the project.
Q. Was this paper published in any peer-reviewed journal?
A. Not to my knowledge.
Q. Who was the paper presented to, if anyone, or any group?
A. The paper was prepared for Mark Arndt.
Q. Do you know whether he presented it anywhere?

A. I do not know what happened after the presentation to him.

Q. Did that analysis deal with the comparison of the GM CK pickup truck to other pickup trucks? Was there any -- in other words, was there any data in there about Fords or Dodges or GMCs to compare the CK to other vehicles?

A. No, it didn't compare other vehicles.

Q. Mr. Stevens, how old are you?

A. I will be 35 on Halloween.

Q. Okay. So that means you were born in, what, '67?

A. Yes, ma'am.

Q. Happy birthday.

A. Thank you.

Q. Have you ever worked for an automotive company or a company that made components for mass-produced automobiles, trucks, or other vehicles?

A. That is a portion of Simula's business.

Q. Who did they work for?

A. I'm aware of parts manufactured for BMW, and I can't specifically say that I'm sure of other manufacturers in their line.

Q. It indicates here on Exhibit 1 that you also performed accident reconstruction on more than 20

vehicle crashes while you were at Simula; is that correct?

A. Yes, ma'am.

Q. Did any of those involve a Jeep Cherokee?

A. I can't say if the Jeep Cherokee might have been a striking vehicle at any of the collisions, only that each of them involved a CK truck.

Q. Okay. Did you ever testify in any of those situations where you had done the reconstruction?

A. I did not testify in any of the cases involved with the study performed at Simula.

Q. Okay. While we are talking about testimony, I've marked as Exhibit 2 a list of deposition trial testimony that you've provided to us this morning; is that correct?

A. Yes, ma'am.

Q. Are these -- appears to be four indications of where you've given testimony?

A. That's correct.

Q. For how long a period?

A. I'm sorry, could you clarify the question?

Q. Sure.

The earliest date on this is 9/8/99.

A. Yes, ma'am.

Q. Is that your first deposition, or is there

testimony before that date that are -- simply aren't on the list?

A. No, that is the first time which I was called for deposition.

Q. And in the Locken versus Christensen case in Maricopa County, what was your testimony about?

A. That case involved a vehicular collision in which it was indeterminate who of the drivers was at fault.

Q. So it was a road wreck case?

A. That's correct.

Q. Were there any product liability implications?

A. No, there were no product liability implications.

Q. Okay. The next one listed is a deposition in Carver versus Uniroyal. Also indicates you testified at trial in that matter?

A. That's correct.

Q. That was in San Diego?

A. Yes, ma'am.

Q. Tell me what that was about.

A. That was a light pickup that lost control and rolled on the highway in San Diego. The loss of control involved a tire tread separation, and I was

performing the accident reconstruction for that case.

Q. On whose behalf, the plaintiff or one of the defendants?

A. On behalf of the plaintiff.

Q. And who was the plaintiff's attorney in that case?

A. Michael Goldstein.

Q. Is he from San Diego?

A. Yes, I believe it's Cardiff by the Sea is the actual city their office is located in.

Q. Okay. Who were the defendants in the case, Uniroyal, and were there any others?

A. I'm sorry, I don't recall if there was a secondary defendant.

Q. Do you remember the law firm that represented Uniroyal?

A. No, I don't.

Q. And your testimony in that case was limited to accident reconstruction?

A. Yes, ma'am.

Q. Okay. The last one listed as Boswell versus City of Detroit, which was in Wayne County, Michigan, indicates you gave a deposition in that case.

Tell me what that case was about, please.

A. That was a vehicular collision. And I was

asked to determine fault and reconstruct a collision for purposes of the suit which is listed there.

Q. Were there any product liability allegations in that case?

A. No, there were not.

Q. You left Simula and went to work for Arndt & Associates and stayed there for about two years until, I think, Mr. Arndt closed the business; is that right?

A. Yes, ma'am.

Q. What did you do when you were working for Arndt & Associates?

A. I have been employed to reconstruct collisions and support the owners of the company in product liability cases and other matters that we are retained on.

Q. Would it be fair to say that you worked assisting either Fred Arndt or Mark Arndt in their expert undertakings?

A. Yes. And Steve Arndt, as well.

Q. Okay. Did you ever -- were you ever named as an expert yourself during the time you worked for Arndt & Associates?

A. Yes, I believe the Locken versus Christensen occurred during that time.

Q. Okay. Was all of the work that you did at Arndt & Associates related to litigation or possible litigation?

A. In addition to litigation-based work, we also perform testing and research for publication, and so I did work toward those goals.

Q. And was the research funded by any particular entity, company or group?

A. There were a number of different research projects undertaken, but the one which is cited on my CV is the second item, which deals with the post-crash fire environment. And to my knowledge, that was entirely funded internally by our organization for research.

Q. And that was presented at the SAE conference in 1999?

A. Yes, ma'am.

Q. Did you present it or did Mr. Stephen Arndt or Mr. Mark Arndt?

A. I believe Steve presented that paper.

Q. Do you know if it was published in the annals?

A. It would be in the proceedings of the conference.

Q. There is a difference between the

proceedings and the annals, correct?

A. I don't know.

Q. Okay. And when Mr. Frederick Arndt closed automotive -- I'm sorry, Arndt & Associates, you went to work for Safety Engineering & Forensic Analysis, which is abbreviated, usually. Is it SEFA?

A. Yes, ma'am. That's correct, as well.

Q. And it indicates that you have done reconstruction collision dynamics and vehicle handling simulations of vehicle collisions using computer modelling, investigations and testing?

A. Yes, that's all correct.

Q. Okay. Have you ever done any testing on a Jeep Cherokee or Grand Cherokee vehicle?

A. I don't recall that vehicle platform in any of our tests.

Q. Have you done testing of fuel system performance?

A. Yes, I have.

Q. What vehicles did you test with regard to fuel system performance?

A. I can recall testing on a Ford Mustang, testing on a Honda motorcycle, and then testing of fuel system components such as filler necks or caps for a Dodge Power Wagon truck, and I'm sure there are several

other vehicles that I can't recall off the top of my head.

Q. Have you been named as an expert in any other cases at the current time besides this one?

A. Yes, ma'am.

Q. What kind of cases have you been named an expert in?

A. The other cases on which I'm retained as an expert and anticipate I will testify are principally rollover reconstruction, and I have one motorcycle vehicular collision case that I'm working on.

Q. Do any of them involve post-collision fires?

A. There was fire in the motorcycle collision, and there have been fires in at least one of the rollover collisions that I can recall at this time.

Q. What vehicle was involved in that rollover collision with fire?

A. A Ford Explorer.

Q. Have you prepared any written reports in any of the other cases that have been provided to the defendants in those cases?

A. Yes, I have.

Q. Did you prepare a written report in the Ford Explorer case yet?

A. I should clarify. I'm working on a number of cases involving a Ford Explorer.

Q. With fire?

A. The one with the fire I have not written a report for.

Q. What about the motorcycle fire?

A. I have not prepared a report for that yet.

Q. Now, as I understand your work in this case, you do not intend to offer any opinions about reconstruction; is that correct?

A. I will be offering my analysis of the kinematics of the vehicle vertically and how it responded to the impact.

Q. "The vehicle" means the Jeep vehicle?

A. Yes, ma'am.

Q. Any other opinion that you expect -- expert opinion that you expect to express at this trial?

A. Only that the aerial photographs which I've obtained accurately reflect the accident scene.

Q. Okay. Have you inspected any of the subject vehicles?

A. I have seen each of the subject vehicles.

Q. Did you accompany Mr. Arndt on his inspections?

A. I was with him on one of the times that he was at the vehicles.

Q. Okay. Did you make any notes of your inspections of any of the vehicles?

A. No. I believe my documentation was photographic only.

Q. And do you have those photographs with you today?

A. I don't have the photographs in my possession, because Mr. Arndt is preparing for his deposition tomorrow and relying on the photographs. So I can turn those over to you tomorrow, if you wish.

Q. Will they be part of Mr. Arndt's file?

A. All of them will.

Q. So let me make sure I'm clear on this. On one occasion you were with Mr. Arndt when you looked at one of the accident-involved vehicles, correct?

A. Yes, ma'am.

Q. Which vehicle did you and he look at together?

A. Mr. Arndt and I went to view each of the three accident vehicles on a single trip together.

Q. Okay. So you were with him on each of the occasions you looked at the subject vehicles, or did you come back a second time by yourself?

A. I made only one trip, and on that trip I saw all three vehicles.

Q. And was Mr. Arndt with you to look at all three vehicles, as well?

A. Yes, ma'am.

Q. Okay. Was anybody else with you and with Mr. Arndt from your offices?

A. No, ma'am.

Q. Were any other experts there?

A. No.

Q. And to make sure I'm clear, you have no independent notes of your inspection findings, correct?

A. That's correct.

Q. Do you have photographs which Mr. Arndt has?

A. That's right.

Q. Did you take the photographs for him, or did you both take photographs?

A. We both took photographs.

Q. Do you remember when the inspection was?

A. Close to May 1, 2002.

On the back of the photographs is a sticker which will indicate the precise date.

Q. Had Mr. Arndt been to see the vehicles on an earlier occasion without you present?

A. I believe he had seen one or more of them earlier, yes.

Q. What was the purpose of going back in May of 2002 to look at them again?

A. That would probably be best asked of Mr. Arndt, but I know that during our inspection it was a detailed investigation we made. We spent a good amount of time with each vehicle.

Q. Doing what?

A. Photographing and documenting the collision, generally inspecting the vehicles.

Q. Was the fuel tank in or out of the Cherokee when you were there on May the 1st, 2002?

A. It was still mounted in the vehicle.

Q. Were you there when it was dismounted?

A. I was not.

Q. Did you take photographs on that occasion that have been digitized and used in your animation or simulation?

A. The photographs I took in that occasion were digital photographs, so they are in digital format.

Q. Have you used them in your computer animation?

A. They may have been relied upon in some

manner by Mr. Saul when he created the environment for the animation, but I did not personally use them since I had no part in actually animating the collision.

Q. You just provided the data to Mr. Saul?

A. That's correct.

Q. Have you been to the scene?

A. I have not.

Q. So other than expressing opinions regarding the vertical motion of the vehicles during the collision sequence and your opinions regarding the accuracy of the scene diagram superimposed on an aerial photograph, do you intend to offer any other opinions?

A. No, I don't.

Q. Have you been asked to offer any other opinions?

A. I have not.

Q. Okay. Tell me how you became interested in computer simulations, computer modelling.

A. Using the computer, you can perform far greater number of calculations than you can by hand. And I appreciate the ability of the computer to potentially increase the accuracy of reconstruction of collisions over more old-fashioned hand calculations.

Q. Did you take courses in CAD or computer modelling while you were still in school, either

bachelor's or your master's program?

A. I did study AutoCAD as a student at the university. And computer modelling is something that you tend to study in more private, post-education courses.

Q. Since you received your master's degree, have you attended any courses dealing with computer modelling or simulation, accident simulations?

A. Yes, ma'am.

Q. Which one of these -- would that be under your continuing education section of your CV?

A. The second bullet, which says McHenry Accident Reconstruction Seminar, November 2000.

Q. And where --

A. It was directed with that topic.

Q. Where is that held?

A. I believe in Los Angeles.

Q. Who is the sponsor?

A. Ryan McHenry. He is the owner of McHenry Engineering.

Q. How long a course was it?

A. Two days, I believe.

Q. Did they present any written materials?

A. Yes, I'm sure there are course notes and course summary provided to me, I believe at my office.

Q. Are you an owner of SEFA?
A. No, ma'am.
Q. An employee only?
A. I like to call myself a partner, but employee is probably more appropriate.
Q. Do you hold a title such as, you know, secretary or treasurer or vice president?
A. No. Engineer.
Q. And are fees charged for your services?
A. Yes, ma'am.
Q. How much is your fee?
A. I believe it's $155 per hour.
Q. And do you know how much of your time has been billed to this Belli case so far?
A. No, I don't know the amount of that time, but I have provided the correspondence files with the bills in it.
Q. Right. Could you pull that back out?
A. It's right there.
Q. Thank you. You may as well get all of the rest of them out. We're getting to that now.
A. All right.
Q. All right. You've handed me a Manila folder that is labeled 01114 Fryhofer?
A. Yes, ma'am.

Q. And that is your correspondence file?
A. That's correct.
Q. Is this your file or SEFA's file?
A. SEFA's file.
Q. Okay. And is all of the correspondence, as far as you know, that SEFA has either received or sent involving this file?
A. It is.
Q. And it also includes bills?
A. It does. The right side would be outgoing, and the left side incoming.
MS. OWENS: Okay. Well, I didn't mark this before, because I wanted to hear just that before I did it. So let me do that now.
We'll mark the file as Exhibit 21.
(Exhibit No. 21 was marked for purposes of identification.)
Q. BY MS. OWENS: Mr. Stevens, was anything removed from your file before you came here today other than your pictures, which I understand are with Mr. Arndt and will be given to us tomorrow?
A. Our company's entire file on this case is more than just the photos, which we've mentioned, and there are a number of materials which are listed on the case index which is in my file today which are with

Mr. Arndt in order for his preparations at this time and will be turned over to you tomorrow.

MS. OWENS: Okay. Can I have the case index?

Q. BY MS. OWENS: We have previously marked a folder containing the case index as Exhibit 3 to your deposition?

A. Yes, ma'am.

Q. Have you reviewed all this material in connection with your work?

A. I have not.

Q. Can you tell me which of that material you have reviewed?

A. I brought the materials which I have reviewed with me, and we could go over them one at a time, or we could go over the list.

Q. Okay. That's fine. Let me go back to my initial question.

Have you removed anything from the file before your deposition today?

A. I have not.

Q. And so far as you know, has anyone else removed anything from the file before your deposition today?

A. No, ma'am.

Q. In Exhibit 21, I note that a letter was sent on October 17 from you to Gary McDowell asking for an additional inspection of the Cherokee to complete the digitization process?

A. Yes, ma'am.

Q. Has that been done, to your knowledge?

A. Yes, it has.

Q. And do you have the results of that yet?

A. They are contained both in printed format and electronic format in my exhibits here today.

Q. Have you done all of the work that you think you need to do in order to express final opinions today?

A. I would like to reserve the right to do more, should more information become available, but at this moment don't intend to do anything further.

I will, of course, continue to manage the animation, should that become necessary.

Q. Am I understanding correctly that your initial involvement in this case was to assist Mr. Arndt, or were you retained separately to do this computer modelling or assisting of the computer modelling?

A. My involvement included both those topics, essentially, from the beginning.

Q. And what were you asked to do in terms of work on a model or an animation, something of that sort?

A. I was asked to coordinate the different disciplines necessary to provide all the animation -- excuse me, all the information to complete the computer animation of the collision.

Q. Who does Mr. Saul work for?

A. He's a sole proprietor.

Q. And you've worked also with Gary McDowell?

A. Yes, I have.

Q. And what is his role in this case, as you understand it?

A. Gary is responsible for creating three-dimensional models of the accident and exemplar vehicles for use in our engineering analysis and in the animation.

Q. And when you say "models," is that physical models or are those CAD?

A. Yes, it's an ambiguous term. It means scaled computer replicas of the vehicles.

Q. So you gathered the information from the various disciplines, correct?

A. Yes, ma'am.

Q. Mr. McDowell creates the three-dimensional

models, correct?

A. Yes, ma'am. He represents one of the disciplines.

Q. And Mr. Saul put it all together --

A. That's correct.

Q. -- to make the animation which you have given us in hard form and on CD?

A. Yes. I don't have the animation in a hard form. It's strictly a computer file.

Q. All right. So in your work, you've described it as coordinating with the various disciplines?

A. That's correct.

Q. Have you met with any of the other experts in this case other than, obviously, Mr. Arndt?

A. I have.

Q. Who have you met with?

A. I met with Ron Kirk.

Q. And when was that?

A. At the time of the vehicle inspections, May 1, 2002.

Q. And where was that meeting?

A. At the offices of my client.

Q. And that would be Mr. Fryhofer?

A. That's correct.

Q. So the offices in Atlanta, versus Columbus?

A. Atlanta.

Q. And who else was present at that meeting besides yourself, Mr. Kirk, and, presumably, Mr. Fryhofer?

A. Mr. Arndt and other members of Mr. Fryhofer's firm.

Q. What was discussed at that meeting?

A. It was mostly a social meeting. I don't recall the content of the discussion. It occurred because we were in town, I believe.

Q. Did you take any notes of the meeting?

A. I did not.

Q. Did you have substantive discussion with Mr. Kirk regarding his accident reconstruction?

A. I did not personally have a discussion such as that. He may have discussed it in general terms with the other persons at the table.

Q. Have you met with Mr. Kirk any other time besides the meeting in Atlanta at Mr. Fryhofer's office?

A. Not pertaining to this case.

Q. Have you spoken to Mr. Kirk on the telephone about this case?

A. I have not spoken to Mr. Kirk, but I have been in contact with his associate, Ken Brady.

Q. And I take it that was a telephone contact?

A. Multiple contacts, correct.

Q. Was it also e-mail?

A. In the sense that Mr. Brady and I transfer electronic files using an FTP server, yes, contact of that sort has been established.

Q. So the only time that you've spoken to Ron Kirk, either in person or by telephone, about this case was at that meeting at Mr. Fryhofer's office in Atlanta in May of 2002?

A. Yes.

Q. Have you met or spoken with Dr. Burton?

A. I have met him, but not in regards to this case.

Q. Have you met or spoken with Mr. Gilberg?

A. I have not.

Q. Have you spoken to any other of the experts who may have been named by plaintiffs in this matter about this case other than Mr. Arndt, Mr. McDowell, and Mr. Kirk at that meeting in May of 2002?

A. No.

Q. Okay. Now, you mentioned that you've dealt with Mr. Brady, who works for Mr. Kirk?

A. Yes, ma'am.

Q. Tell me about what you have requested of Mr. Brady and what he has sent to you.

A. Mr. Brady delivered to me a computer file in Microsoft Excel format, which is a spreadsheet, representing the kinematics of all three of the vehicles involved in the collision sequence in this case.

Q. And do you have that with you today?

A. Yes, I have printed format and electronic.

Q. Can you find the printed forms? May be in this file?

A. Yes, that's it. Thank you.

Q. Okay. And I've gone through and sort of marked some of those things.

A. All right.

Q. Okay. Thank you.

This is a multi-page document that's been marked as Exhibit 11 to your deposition?

A. Yes, ma'am.

Q. And tell me what this is.

A. May I hold it a moment longer?

Q. Sure.

A. This is a columnar printout of a file titled 11010_0CT21.xls. This file represents the X and Y coordinates of each of the three vehicles and their angle of rotation every 33 milliseconds throughout the animation. That is, there are three lines per second.

Q. And when was this transmitted to you?

A. Would have been within the last two weeks, but I don't know the date of the transmission.

Q. And is it your understanding that that information is based upon Mr. Arndt's measurements of the vehicles?

MR. FRYHOFER: You said Arndt.

MS. OWENS: I'm sorry. I'll try again.

Q. BY MS. OWENS: Is it your understanding that that information is based upon Mr. Kirk's measurements of the vehicles?

A. I'm not able to state what the basis for the file that he's provided me is. It is a response to my request for a time history of the kinematics of the vehicles.

May I correct myself? My prior statement that there are three lines per second, it's actually 30 lines per second. There's three lines every tenth of a second.

Q. All right. So we've got an X and Y

column?

A. Yes, ma'am.

Q. For each of the vehicles?

A. Yes, ma'am.

Q. Can you tell from this which vehicle is which, or is it on a separate page?

A. I believe they're sequenced with a 1, 2 and 3; is that correct? I'm sorry. Forgive me. At this distance, I can't see very well.

Q. Yes. 1, 3, 2.

A. Okay.

Q. Then there's an M and a psi?

A. Yes.

Q. Okay.

A. So the first one, X-ray, Papa, Charlie, 1 is the X position of one of the vehicles.

Q. Do you know which one?

A. I believe that was the Thunderbird. I can't say, specifically. The next column, Yankee, Charlie, Papa is the Y position of that vehicle.

The next one is Papa, Sierra, India, 1, which is the location of the angle of that vehicle in the X/Y plane. And the sequence repeats for the next three sets -- the next two sets of three columns each for the other two vehicles in the collision.

Q. There is a vehicle that I think 3 actually comes after 1?

A. Yes. It goes 1, 3, 2. If you'd like me to take a few moments, I can figure out based on the data which one represents which vehicle, but I can't say out of memory.

MS. OWENS: Okay.

MR. FRYHOFER: You want to take about a five-minute break?

MS. OWENS: Absolutely.

(A recess was taken from 11:01 a.m. to 11:07 a.m.)

Q. BY MS. OWENS: Okay. Mr. Stevens, have you had a chance to look over that data --

A. I have.

Q. -- and which vehicle is which?

You've labeled them for us so that vehicle number 1 is the Thunderbird, vehicle number 3 is the Camry, and vehicle number 2 is the Cherokee?

A. Yes, ma'am.

Q. Now, you got this from Mr. Brady. Did you receive anything else from Mr. Kirk's office or from Mr. Brady that you've used in doing your work in this case?

A. No, ma'am. That file accurately

represents the positions of the vehicles, and I can transfer that to Mr. Saul --

Q. Okay.

A. -- in order so that he could provide the artistic view of that.

Q. All right. Now, I noticed included in the file materials you have with you today is a rough draft of Mr. Kirk's deposition, some of the exhibits --

A. I believe that's correct.

Q. -- which I do not believe I've marked, because everybody's already got that. But I would like to pull it out for a second.

Okay. In looking at this rough copy of Mr. Arndt's deposition, you also have selected exhibits from -- I'm sorry, Mr. Kirk's deposition?

A. That's right.

Q. You have Exhibit 15, Exhibit 16, Exhibit 26H, Exhibit 5.

Want to verify?

A. Yes, ma'am. Yes.

Q. Did you utilize those for any of your work?

A. I did use some of the information in the exhibits from that deposition for my work.

Q. Do you recall what you needed or what you

used?

A. I do.

Q. What did you use?

A. I relied upon Mr. Kirk's work-up of the vehicles in order to determine their dimensions and mass properties.

Q. Of the exemplar vehicles, or of the accident vehicles, or both?

A. Principally, of the exemplar vehicles.

Q. Now, in addition to those marked exhibits, there are also in the file which is labeled number 32 that is Mr. Kirk's deposition, three unmarked groups of paper, which, I presume, deal with the Cherokee, the Toyota, and the Thunderbird?

A. That's right.

Q. I believe I saw those also contained elsewhere within your file, or something very similar to them in your -- I believe you called it your working file?

A. Yeah. We tend to call it the investigative file.

Q. Okay.

A. But the pieces which have been pulled out are the summary sheets on the top of each of the exhibits up in your hand, which indicated the

dimensions and mass properties of each of the three vehicles.

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

MS. OWENS: All right. I'm going to mark these as composite Exhibit 22. It's three pages, which are the cover sheets to the material from Mr. Arndt's office.

Q. BY MS. OWENS: This material is from Mr. Arndt, is it not?

A. Yeah, it's from the file kept by SEFA.

Q. I'm sorry. I keep saying that.

A. That is from Mr. Kirk's deposition in this matter.

Q. And you've pulled off the three summary sheets which we've marked as Exhibit 22?

A. That's right.

Q. Okay. Now, is this for the exemplar vehicles or the accident vehicles that we've marked as Exhibit 22?

A. Those are for exemplar vehicles configured --

(There was a short interruption.)

Q. BY MS. OWENS: All right. Now, what did you use -- you told me you used this to get mass

properties?

A. Yes, ma'am.

I'm sorry, at the interruption I was indicating that those represent the exemplar vehicles loaded as they were at the time of the accident.

Q. Okay. So who did you give this to, or did you use it yourself?

A. I used this information myself.

Q. To do what?

A. In order to calculate the kinematic movement of the vehicles as a result of collision.

Q. Vertically?

A. Vertically.

Q. Okay.

A. Because the information represented in the Excel file, which we previously discussed, gives the X and Y positions and the plane of the road.

Q. And not the Z?

A. But not the Z.

Q. And --

A. And I may have neglected to represent an opinion that I was asked to offer, because it wasn't as -- not quite as concrete as the vertical motions, that it's my opinion that this animation does accurately and technically represent the motion of the

vehicles, and it's my opinion that it is representative of Mr. Kirk's opinion and Mr. Arndt's opinion, as well.

Q. We'll come back to that.

You also have Roll A and Roll B of Mr. Kirk's photographs?

A. Yes, ma'am.

Q. Are these exemplar or accident -- actually, they're scene -- one of them's the scene. Are both of them the scene?

A. I think they're both scene photographs.

Q. Have you utilized those in any way?

A. I did use these photographs. I used those photographs to understand the characteristics of the damage to the roadway caused by the impact of the vehicles and the fire to compare that damage to the damage which I could see in the aerial photographs to verify that the photographs accurately reflect the accident scene. And I provided this information to Mr. Saul in order that he could artistically represent the accident scene more closely.

Q. Did you give the data that we have marked as Exhibit 22 to anyone, either Mr. McDowell or Mr. Saul?

A. I did not.

Q. Okay. You also have police -- a set of

the police photographs of the scene, which we've marked for reference as Exhibit 5?

A. Yes, ma'am.

Q. And how did you utilize these photographs?

A. I used those photographs to determine the characteristics of the skid marks at the scene, the relative positions of the burn patterns and skid marks to the lane striping, and also for validation of the aerial photographs' authenticity and applicability.

Q. Okay. You can put that out of the way.

And then there's a file there that contains a police report, as well, I believe, which I have -- we've marked as exhibit what?

A. 4.

Q. And what does that file contain?

A. This file contains the Atlanta police accident report, and a larger file which is entitled City of Atlanta, Atlanta Police Department complaint number 010260134.

Q. And have you used any of the information in that file?

A. There is a cursory scene diagram in the file which I initially relied upon, but subsequently there was an accident scene survey produced which allowed me to refine the dimensions of the accident

scene based upon that information.

Q. Have you a copy of that accident investigation team survey?

A. I do. The file which I received is stored on the compact disc, which I have provided, and the elements of it underlie the exhibits that I have here, which are combined with the aerial photographs. But I don't believe I have a straight printout of that accident diagram from the police with me today.

Q. Do you have it on your CD?

A. Yes.

Q. That, I think, you have loaded in your computer?

A. Yes, ma'am.

Q. Can you show me that?

MR. FRYHOFER: What are we looking at now, Diane?

MS. OWENS: He's going to pull up the accident scene diagram --

MR. FRYHOFER: Okay.

MS. OWENS: -- that he pulled out of --

MR. FRYHOFER: -- which is on the CD that she has; is that correct?

MS. OWENS: Yeah, that we marked as Exhibit 20.

MR. FRYHOFER: Okay.

MS. OWENS: Instead of pulling my computer out, I'm going to let him look at his, just because it will be faster, we hope.

THE WITNESS: The information we have here is contained in the file on the CD that says -- is entitled Accident Scene Drawing With Aerial Photos.DWG, indicating it's an AutoCAD file. This is the drawing which I received, which I understand to be created by the police at the time of their road closure and investigation.

Q. BY MS. OWENS: And the little lines with the illegible box out to the side, does that contain data? When you enlarge it, in fact, you can see the data with, I presume, survey points?

A. I believe that's correct.

Q. Okay. Now, can you show me the point of rest of the vehicles?

A. Yes, ma'am. I should indicate that the drawing here, I have performed one modification to, because I believe that the drawing received from the police had the orientation of the Jeep Cherokee approximately 90 degrees off from its actual rest position, based upon the police photographs. I believe that the positions of the wheels which were measured

were correct, but I adjusted the object which represents the Jeep Cherokee to orient it in the way that I believe it actually came to rest.

Q. Is that consistent with Mr. Kirk's opinion?

A. Yes, it is.

Q. Did you read Mr. Kirk's deposition?

A. I skimmed it.

MS. OWENS: We don't need those anymore. We don't need the accident scene or police reports anymore.

THE WITNESS: How about the --

MS. OWENS: Photos? No.

THE WITNESS: -- police photographs?

MS. OWENS: No.

That's your index. We're done with that. So I think we're down to your working -- your investigative file, I'm sorry.

THE WITNESS: This is my resume.

MS. OWENS: Okay. We've done that.

All right. Did you pull the aerial photographs out of this file?

THE WITNESS: Yes.

MS. OWENS: They were on top, and they're not there anymore. You have, I think, three aerial

photographs.

THE WITNESS: These are all elements of that file.

MS. OWENS: Okay. Which I've marked as 6A, B and C.

THE WITNESS: Yes, ma'am.

Q. BY MS. OWENS: All right. Now, you told me earlier that one of the things you did in this file was obtain aerial photographs, and I noticed in your correspondence file that there were a couple of letters from you to people saying: We are looking for these aerial photographs?

A. That's correct.

Q. Where did you get the aerial photographs that you used?

A. Contained on the compact disc are three different photos. There are two obtained from one source and another obtained from the United States Geological Survey, USGS, which is simply a satellite photo that I used for identifying the location of the accident scene when searching for it from professional photographers.

Q. Which one is the USGS?

A. None of the printed copies represent the satellite photos, because I didn't rely on it, but I

did include it for completeness.

Q. So one of the things on the CD which is marked as Exhibit 20 is a satellite photograph?

A. That's correct. And it's marked USGS in the title.

Q. And you used that to know what coordinates to give people when you were saying you needed aerial photographs from them?

A. That's correct.

Q. Okay. What company did you eventually get the photographs from?

A. It was necessary to contact several companies in order to try and find photographs at the proper altitude of the specific location of the scene. I received a compact disc from the company who provided these aerials to me with their logos and company information on it, and I copied those files onto the CD that you have today. The CD from that company is in the balance of our file, which is in Mr. Arndt's possession today.

I believe the company is called Georgia Aerial Surveys, but it would be good for us to confirm that from the logo on the CD, for the record, eventually.

Q. Which Mr. Arndt, presumably, will bring

with him tomorrow?

A. He will bring with him tomorrow.

Q. Okay. And do you know when the aerial photographs that you eventually used were obtained?

A. I do.

I'm sorry, do you mean the date of their photography or the date on which I received them?

Q. Both.

A. One of the photographs was taken on December 7, 1999, and one of the photographs was taken on April 19, 2001.

Q. Do you know if there had been any changes to the roadway between those two dates?

A. There were no substantial changes evidenced in the photographs.

Q. Now, let me turn to Exhibits 6A, 6B, and 6C, and just go through them.

Tell me what 6A is and --

A. 6A is entitled: Aerial Photo of Accident Scene (2001). So this is a section of the aerial photograph which I obtained which includes the accident scene for this case, and there is a red box drawn around the general area of the accident scene.

Q. By the way, the CD that you received from, you think, Georgia Aerial Surveys, can that be

reproduced by you so I can get a copy of that?

A. I could reproduce the specific CD, but the identical files are contained on the -- in the photos subdirectory.

Q. Okay. How many aerial photos are in that subdirectory?

A. Two. That is precisely -- excuse me, my correction.

There are three photos in that subdirectory, because the information received from Georgia was supplemented with the USGS satellite photo, which I had received earlier. So on your CD are three. On the original CD, there are only two.

Q. Tell me what 6B is, please.

A. Exhibit 6B is entitled: Accident Scene Drawing With Aerial Photo. It's scaled 1 inch equals 30 feet on this diagram, and this is elements of the scene survey produced by the police correlated to the aerial photograph which was taken in 1999. So the backdrop to this photograph is earlier than the photograph which we discussed a moment ago.

Q. All right. And why did you decide to use this 1999 aerial photograph?

A. When researching the photographs, I found that there were two different dates on which this

company had photographed the accident site. On one date, they had taken the photographs at a relatively low altitude, and on another date at a higher altitude. The lower altitude, which was taken in 1999, provides more detail of the roadway, and that's why it's used in these exhibits here. However, the later photograph produced in 2001 includes on the road what I believe to be the burn pattern generated by the accident vehicles, and that's the reason which I procured it, as well.

Q. And then there's 6C, and tell me what that is, please.

A. 6C is similar to the prior exhibit -- was it 6B?

Q. Yes, sir.

A. This is the same drawing, but with the backdrop from the later photograph taken in 2001. So 6B and 6C are the same survey elements produced on the two different photographs.

Q. Okay. And using 6B, because it's a little clearer, to me, at least, we have a green vehicle --

A. Yes, ma'am.

Q. -- superimposed on the aerial photograph. Which vehicle is that?

A. That's a drawing of the exemplar Cherokee -- undamaged Cherokee, I should say.

Q. And is it intended to depict the Cherokee going down the road before the accident?

A. I would say it does that, yes.

Q. And then immediately in front of that we have two parallel lines, which I presume are intended to reflect the skid marks from the Thunderbird --

A. That's correct.

Q. -- from the braking marks from the Thunderbird?

A. Yes.

Q. And then there's a depiction of the impact between the Thunderbird and the Cherokee?

A. Yes.

Q. Coming forward, there is an -- in the same lane, that looks to be a red line in the road?

A. Yes.

Q. What's that intended to depict?

A. That is an element from the police scene survey which doesn't include any labels associated with it, so I can't say for certain what it was intended to depict at the time of the investigation.

Q. And then coming forward, we have two vehicles at rest, a Thunderbird up against the median wall, correct?

A. Yes.

Q. And the Jeep in the second lane of travel from the median wall pointed to what would be, I think, the northwest -- or northeast? At any rate, eliminate the directions.

A. Yes.

Q. Okay. No Toyota shown on any of this?

A. That's right.

Q. No van shown on these photographs. Is it in the animation?

A. The van is not in the animation.

Q. And why not?

A. Because the animation is intended to depict an engineering reconstruction, and I don't have sufficient information about the van's motion to include it with confidence.

Q. Okay. Now, returning to the opinions that you intend to express in this matter, you told me that one of the opinions is that the aerial photograph accurately depicts the scene?

A. Correct.

Q. And what is the basis for that opinion?

A. Beginning with the photograph taken in 2001, that opinion is based upon the presence of elements in the photograph which are correlatable to measurements taken in the scene survey diagram, which

we've previously discussed. Specifically, lane stripe beginning and end points, positions of the HOV lane diamonds, and the burn patterns in the approximate positions of the vehicles' rest positions.

Q. And that's the sum and substance of that opinion is that the aerial photograph accurately depicts the scene?

A. Yes.

Q. Okay. You then indicated to me that one of the things you had done in this case is you have reconstructed, so to speak, the vertical motion of the vehicles at and after the time of impact, correct?

A. Yes.

Q. Okay. Presumably, that work is included in this material, and I'm pulling out a file that I have labeled Exhibit 14.

Is that your work with regard to the vertical motion?

A. There are two documents in my file which represent this portion of my work. One is a printout of a sheet generated by a program, MathCAD, in which the formulas used for a portion of reconstruction are presented.

And the item which you referred to just now is a printout of an Excel spreadsheet, which I used

to communicate the reconstruction history to Mr. Saul so that he could place the vehicles in the proper orientations in the animation. So the Excel sheet is a result of the MathCAD sheet.

Q. And that's marked as Exhibit 13?

A. Yes, ma'am.

Q. So Exhibits 13 and 14 represent the work you have done on the vertical pitch resulting from the principal collision?

A. That's correct.

Q. And is there any other written material relating to your work in that regard?

A. I do have other printed materials which pertain to this portion of my opinions. And those would be diagrams in which I've placed the digitized computer models of the vehicles in relation to one another in a manner in which I believe represents their collision engagement.

Q. Can you pull those out for me?

A. Yes.

Q. Oh, thank you.

A. Yes, ma'am.

Q. And these diagrams are marked as Exhibits 15, 16, 17, 18, and 19, correct?

A. Correct.

Q. Okay. Now, have you only calculated the pitch angle -- or the vehicle pitch, excuse me, from the collision for the Jeep?

A. There was also a resulting pitch downward of the Thunderbird striking the ground, but the calculations for the Thunderbird were comparatively simple because it strikes the ground and its motion is limited, whereas the Jeep's motion is more complex.

Q. Do any of these materials in Exhibits 13, 14, or 15 through 19 reflect the work you did with regard to the Thunderbird?

A. The values for the rotational velocity of the Thunderbird are similar to those for the Jeep, just to the opposite direction. And so the information is represented in those calculations, but perhaps not as clearly described as elements for the Thunderbird as they are for the Jeep.

Q. Why did you -- well, let me strike that and ask it this way.

Did you believe it was necessary to do the vehicle pitch work that you've done, or were you asked to do that by someone else?

A. I believed it was necessary, and it was agreed that it would improve the fidelity of the animation.

Q. Now, the indication on these two exhibits, 13 and 14, is that what you were attempting to do was ascertain vehicle pitch resulting from the collision, correct?

A. Yes, that's correct.

Q. Did you do any work to try to determine what the vehicle pitch of the Thunderbird was before the collision?

A. I did note in the vehicle's specifications what the spring rates for the Thunderbird's front end were in order to account for brake dive with the wheels of the Thunderbird creating the tire marks seen prior to impact.

Q. And what conclusion did you arrive at in terms of the difference in pitch and effect of the Thunderbird because of brake dive?

A. I worked with Mr. Arndt on that topic, and he indicated to me that the down pitch of the Thunderbird is approximately 1 inch of the front, while its rear end rises approximately 1 inch.

Q. And so you used that figure or just accepted that figure?

A. That's correct.

Q. Do you know what his source for that opinion was?

A. I don't. That condition is represented in the diagram before you.

Q. Marked 15?

A. Yes, ma'am.

Q. And do you have any opinion about whether or not the Jeep -- the rear end of the Jeep vehicle was pitched up or down as a result of factors related to what was going on in the road, what it was doing dynamically at the moments just before the collision occurred?

A. Based on the information provided to me by Mr. Kirk, I don't believe there was a substantial pitch in the Jeep at the point of impact.

Q. Do you know what the relative bumper heights were of the Thunderbird front bumper and the Cherokee rear bumper?

A. I have that information available to me, and I can determine it if you like.

Q. Please.

A. I will be taking this information from the three-dimensional models, and they are of considerable size, so please bear with me while they load on my computer.

(A discussion was had off the record.)

THE WITNESS: So the height of the bumper

is not clearly specified unless we determine to what point we're going to measure.

Can you tell me what point on the bumper you would like me to indicate its height? Because the bumper has a lower structure and upper structure.

Q. BY MS. OWENS: The Cherokee or the Thunderbird, or both?

A. Right now I have the Thunderbird on screen.

Q. I'd like the uppermost point of the bumper on the Thunderbird.

A. I've just measured from the ground level to the approximate top of the bumper on the Thunderbird, and I find it to be about 23 inches.

Q. Now I would like to know the bottom-most point of the rear bumper of the Cherokee.

A. Will there be any more questions regarding the Thunderbird's dimensions? Because if I close it, the Cherokee will be more readily accessible.

Q. I hope not. Close it up.

Can you talk and do that at the same time, or not?

A. Yes, ma'am, I can. Yes, I can.

Q. Has Mr. Kirk seen any of your work?

That's okay.

A. I can't talk as well as I thought I could.
Q. We won't do two things at once. I'll come back to that.
A. Mr. Kirk has seen the animation.
Q. When?
A. I'm not certain of the date on which he has looked at it, but I spoke with Ken Brady today and confirmed that Mr. Kirk agreed that the animation represented his reconstruction accurately.
Q. Okay. Back to your Cherokee --
MR. FRYHOFER: That's the red Cherokee.
THE WITNESS: I've got the red Cherokee.
MR. FRYHOFER: Off the record.
(A discussion was had off the record.)
THE WITNESS: I have, unfortunately, just realized that what I thought was the exemplar Cherokee model is the accident Cherokee model. So you have two copies of the accident Cherokee.
Q. And none of the exemplar?
A. And none of the exemplar. But I can have that couriered over before Mr. Arndt finishes tomorrow.
Q. That would be great.
A. All right.
MR. FRYHOFER: Can you make a note of that?

THE WITNESS: Yes.

I apologize for that.

Q. BY MS. OWENS: That's all right.

Tell me your opinion about what the pitch of the Cherokee was after the principal collision.

A. All right. Thank you. On the second page, I have theta sub P, which is listed as the peak pitch angle after collision of 8.2 degrees. And I believe that is the pitch angle which the Cherokee attained prior to beginning its decent back toward the ground.

Q. Is that pitch measured at the back of the vehicle or nose of the vehicle or measured at the CG?

A. It would be the angle between the -- measured at the front of the vehicle.

Q. So that would be downward pitch at the front?

A. Pitch forward, yes.

Q. In other words, as shown on Exhibit 16, when the Thunderbird comes in, it underrides the Cherokee to a certain extent?

A. Yes, that's correct.

Q. The front of the vehicle, the Cherokee, would go down?

A. More importantly, the rear of the vehicle

would be lifted by the impact from the Thunderbird.

Q. Okay. And the 8.2 degrees is measured from the initial bumper relation to the ground?

A. If you took the line connecting the contact patch for the front and rear tires before impact, and the line connecting those points at the peak pitch, that would form an 8.2-degree angle, with the understanding that this is just a reference point for this calculation, that that is reasonable to use.

Q. Okay. And then looking at Exhibit 16, again, now, so I understand exactly how this works, Mr. McDowell would have done the CAD three-dimensional modelling of the vehicles?

A. That's correct.

Q. And you then took that and had them interact in this way to show us what -- or illustrate, presumably, Mr. Kirk and/or Mr. Arndt's opinions about what the interaction of the vehicles was at the point of full engagement?

A. Mr. McDowell provided me six separate files, each containing one vehicle. And I combined those files into separate files which represented the interaction of the vehicles at the point of contact.

Q. And what does Mr. Saul do then?

A. Mr. Saul is skilled at running the

software which generates the animation. He has no engineering contribution to the product, but he has excellent artistic skills.

Q. And in order to create the animation, you have to generate a drawing representing each slide or cell for the animation; is that correct?

A. To some extent, but the representation of those cells is done through the transfer of the X, Y, Z, and rotation data via the Excel spreadsheets. And when those data are applied to the crushed and uncrushed models, which we've also provided him, the relative position of the vehicles is accurately represented and matches the drawings that I've given you today.

Q. Okay. In looking at Exhibit 16, there's purple. What is that? Is that the back seat?

A. No, ma'am. I think that the purple in this case is the back bumper of the Cherokee.

Q. Okay.

A. And I believe that comes through blue when you look at the computer files on the CD.

Q. All right. It is purple in the picture, isn't it?

A. Yes. It's an artifact of the printer.

Q. And looking at Exhibit 17, there are four

pictures or depictions on this, and the lower right-hand corner there is a view from the driver's side of the Jeep and Thunderbird vehicles, correct?

A. Yes.

Q. And it shows the point of penetration of the front of the Thunderbird to be in front of what would be the location where the rear door would meet the body panel?

A. Yes. In this diagram, the front of the Thunderbird has passed the position of the center line of the rear wheel, so I believe what you said is fundamentally correct.

Q. And is there a reason why the top's not on the Cherokee in these drawings?

A. When Mr. McDowell digitized the vehicles, the top had been removed for extrication of the occupants, and he digitized them as two separate entities. And because the top's position on the vehicle is not exactly discernible at the time of impact due to the damage the top has undergone, I left it off for the photographs so we could understand the relative positions of the internal components of the Cherokee.

Q. All right. Is any portion of the fuel system depicted on any of the diagrams that are marked

as 15, 16, 17, 18 and 19, of the Cherokee, that is?

A. In diagram 15, the fuel tank is represented as a red digitized model of the tank and can be seen at the back of the vehicle.

Q. Okay. Are we seeing it on 16?

A. It's difficult to determine whether or not I can actually see elements of it, because the digitization of different parts is similar in the fact that they're all made out of quadrilaterals. But in the models on the CD, you can see the digitization of the fuel tank and its representation there.

Q. Okay. When you spoke to Mr. Brady, was it this morning?

A. I spoke to him, yes, this morning.

Q. Okay. Did you ask him about specifically the pitch component of the data that you had input into the computer animation of this accident?

A. The only thing I asked of Mr. Brady in Ron Kirk's office is that they confirm that the kinematics of the vehicle and the animation are consistent and accurately represented the reconstructive opinions which they're going to offer.

Q. And he said that they did?

A. They represent his reconstruction. I did not ask him to perform any analysis or opinions about

the pitch angles which I have personally generated.

Q. Has Mr. Arndt reviewed your computer-generated data?

A. He has.

Q. And has he expressed to you any opinion about whether or not it accurately reflects his opinions?

A. I believe he feels that it does accurately reflect his opinions.

Q. Did Mr. Arndt work with you at all in the preparation of these computer-generated materials?

A. Yes. Mostly in directing me as to which exhibits would be necessary for his deposition, and I created materials for my own.

Q. Is there any working file containing earlier versions of drawings?

A. Because these vehicles, as we've seen, represent about 30 megabytes each, it's not possible to retain every version along the way. In fact, it's really the evolution of one file. So the file that you see there is the file that has come from ground zero up to final version.

Q. But it does not contain all of the evolutionary steps?

A. There is no point at which the

evolutionary steps are saved to a separate file, because when the models given to me by Mr. McDowell are brought into a separate file, as I mentioned, for manipulation, each time you move the wreck to adjust their orientation with respect to one another, there is no history of where it has been in my analysis. So --

Q. All right. So I just want to make sure I understand that what's on the CD that you have given me marked as Exhibit 20, with the addition of the exemplar Cherokee data that you are going to furnish tomorrow, I have everything that you have on a computer about this case?

A. That's correct.

Q. So you --

A. Maybe -- I want to clarify that.

There are probably a couple of printed exhibits here, which -- yeah, they would be contained in those files.

So, yes, it's still true. But I have some printed exhibits here that are different views of the files I have provided to you that you could also obtain if you manipulate the files.

Q. Okay. You told me that you believe that the peak pitch was 8.2 degrees --

A. Yes, ma'am.

Q. -- and that calculations will tell us when that occurred and so forth.

Did you -- you also indicated that your opinion would include not just the vertical kinematics, but how the Jeep Cherokee responded -- is what I wrote down?

A. The response is given in the form of the kinematics.

Q. Okay. Is there any other bases for your opinions regarding vertical motion of the Cherokee following the collision that we haven't talked about?

A. I did make it clear that positioning of the digitized models together provided the basis for the amount in which the vehicles moved relative to one another, correct? That would be the -- in addition to the Newtonian kinematics that is used to calculate this motion, the digitized models are the bases for the degree to which each vehicle moves during the interaction.

Q. I'm not sure I understand that. Let me tell you why.

I've always understood that computer-generated modelling is a result of input; the output is a result of the input. Are you telling me that in this case, the output gave you data that you

used to formulate your opinion; the output of which we are discussing now, the results when you use a program and you put the vehicles into motion and you generate things like that?

It's sort of what came first, the chicken or the egg question, I think.

MR. FRYHOFER: Objection; compound.

MS. OWENS: Okay. Let me start over again.

THE WITNESS: I think that would be good.

Q. BY MS. OWENS: Okay. I don't understand when you said that the computer modelling formed a basis for your opinions regarding vertical acceleration.

A. Okay.

Q. Can you explain that to me?

A. I can. We should be clear about the term "model," because, once again, it's very ambiguously used in the industry. I'm not talking about a mathematical model, but physical model.

And so in the calculations that I have here, there is a point in time and a pitch angle for the Cherokee at which the vehicles are no longer in contact with one another, and that angle was determined from the computer models --

Q. So --
A. -- as physical evidence.
Q. So you used the data and calculations in 13 and 14 as input, and that created the angles of the vehicle -- movements of the vehicles at separation?
A. No, I'm afraid I'm not being very clear.
Q. I'm hopelessly confused then.
A. The computer models that Mr. McDowell generated are a digital representation of the physical evidence of the vehicles.
Q. Right.
A. And they allowed me to place the vehicles into contact with one another in a way that would not be possible using the actual accident vehicles.
Q. As depicted in --
MR. FRYHOFER: Those aren't the crash vehicles.
MS. OWENS: Those aren't the crash vehicles?
THE WITNESS: Turn two pages.
MR. FRYHOFER: This is off the record.
(A discussion was had off the record.)
Q. BY MS. OWENS: Okay. You have measurements of the vehicles, correct?
A. That's correct.

Q. And those measurements of the damaged vehicles allows you to put them together in a way that you believe depicts how the accident occurred between the Thunderbird and the Cherokee?

A. I'm able to place them together at the point of maximum engagement, deepest crush.

Q. And then using that data, you're able to calculate the pitch angle of the Cherokee following the principal collision?

A. The orientation of the two vehicles at their deepest crush told me the altitude of the vehicles at the point that they stopped applying forces to one another. And the remainder of the calculations were the response of the vehicles to the forces which they applied to each other during the crash.

Q. Is there any other basis that supports -- or you believe supports your opinions regarding the vertical movement and orientations of the vehicle following the accident?

A. I think everything I've relied on is contained in the exhibits that we've discussed so far.

Q. Okay. And then the last area you told me you were going to talk about is that your opinion is the animation accurately reflects the motions of the vehicles during this and after this collision sequence?

A. Yes, ma'am.

MS. OWENS: Okay. I think it's time to look at your animation.

(The animation was viewed on Mr. Stevens' computer.)

THE WITNESS: Okay. So this is the animation which is on the CD, and the file is 01114 Animation with Camera 1 in parentheses. And the extension on this file is M2, the numeral 2, V, like Victor. And this file plays in Windows Media Player or any software that plays DVD files.

Q. BY MS. OWENS: So it's a DVD?

A. The M2V indicates that this is the video portion of a DVD file because it has no sound.

Q. Okay.

A. So camera 1 is a representation of the vehicle kinematics from a mostly overhead view. There is no fire in this view, because it is intended to illustrate the kinematics of the vehicle. Camera 2 will include the fire propagation.

Q. Okay. All right. Let's move to view 2, please.

A. Okay. So this view will be the same kinematics, the same models, and the same exact motion as seen in view 1, but the camera is located lower on

the plane of the roadway, and the propagation of the post-crash fire is included in this view.

MR. FRYHOFER: What's going on now?

MR. FINE: Off the record.

(A discussion was had off the record.)

Q. BY MS. OWENS: Mr. Stevens, there is a running time clock on the lower left-hand corner of that. Is that an indication of the length of time it took from the point of impact throughout the collision sequence?

A. Yes. The clock in the bottom left corner begins at the initial impact between the Thunderbird and the Cherokee and continues to the end of the animation. There is an alphanumeric indicating -- that is seconds of elapsed real time in the corner.

Q. Looked like 4.36 seconds or so when the animation ended?

A. I'll have to find out in one moment. But this animation which you are viewing is played at one-third real time, so three seconds of real time elapses in the time it takes one second of the animation's vehicle motion.

Q. So in other words, if it's 4 -- let's just say it's 4.3 seconds in the clock on the left-hand corner. That would be 12.9 seconds of real time?

A. No, I'm afraid it's the other way around. In order for 4 seconds of the clock to elapse, it takes 12 real seconds of watching the video. So if you were in the vehicles at the time of the collision, the clock would indicate the actual time that had elapsed since the collision occurred.

Q. So that's 4.3 seconds?

A. That means that when this simulation stops, from impact 4.3 seconds, four-and-one-third seconds of vehicle kinematics has been simulated.

Q. And is that translatable to the actual time that the vehicles were in movement?

A. Yes. When I will generate a realtime version of this using identically the same elements but played at full speed, and then the same clock in the corner, but it will take only four seconds from the time you push play for the animation to complete itself --

Q. Okay.

A. -- from the time the vehicles strike --

Q. Okay.

A. -- for it to complete itself.

Q. Okay. Is that the only two versions of the animation on the disc?

A. Those are the only two animations on the

disc and the only two camera views which have been created.

Q. Okay.

A. It's possible that there would be another camera view which would further illustrate the motion of the vehicles, but it hasn't been generated at this time.

Q. Okay. Where did the information regarding the flame pattern come from?

A. That was provided to me by Mr. Arndt and given to Mr. Saul to render.

Q. Okay.

A. That was provided to him in the form of one of the documents in my file.

Q. Can I see the remainder of that investigative file, please.

A. Yes.

MS. OWENS: Thank you. All right.

We have depictions of -- looks like four depictions of the Thunderbird exemplar and accident vehicles --

THE WITNESS: That's right.

MS. OWENS: -- I will mark as -- we'll call it 23.

(Exhibit No. 23 was marked for purposes of identification.)

Q. BY MS. OWENS: And this -- one of the pages of Exhibit 23 includes underbody views?

A. Yes.

Q. Were those utilized in any of the animations that you did -- or that were done?

A. The files on the CD represent all of the animations which have been created for this case and the only two camera views yet produced.

Q. Okay. Then we've got four pages dealing with the exemplar and accident 1991 Jeep Cherokees?

A. Yes, that's correct.

(Exhibit No. 24 was marked for purposes of identification.)

Q. BY MS. OWENS: And four pages which we'll mark as Exhibit 25 that deal with the Camry?

A. Yes.

Q. Exemplar and accident?

A. That's right.

(Exhibit No. 25 was marked for purposes of identification.)

Q. BY MS. OWENS: Let me show you what's been marked as Exhibit 12 and ask you to tell me whose notes those are?

A. Those are notes in my handwriting.
Q. And it indicates that the flame erupted after 100 milliseconds of contact?
A. That's correct.
Q. And what is the basis for that statement?
A. The sheet of notes that you have in your hand is my notes regarding the description of the fire propagation provided to me by Mr. Arndt.
Q. Okay. Develop ball over 500 milliseconds to full size, 60 to 80 feet in height?
A. Yes, ma'am.
Q. Again, that all comes from Mr. Arndt?
A. Yes, it does.
Q. You don't have any separate opinions about that?
A. I do not.
Q. All right. I'm going to have to have an interpretation here.
A. I'll be glad to.
Q. Can you just go ahead, for the record, and read it all in?
A. Yes, I will.
This document is stamped with my case number and time number in the corner. There's a phone number at the top, which is the fax number of Mr. Saul.

And the document reads, "Ball of flames on impact. Eruption after 100 milliseconds of contact. Develop ball over 500 milliseconds to full size, 60 to 80 feet height. Enveloping full rear halt at vehicle torroidal column of roiling viciously oily black smoke."

Q. That from Mr. Arndt, as well?

A. That's correct. I wrote it down verbatim.

Intensity decreasing after 100 milliseconds. Taper to 20 feet height after one second.

I then have a simple hand-drawn graph of the volume of fire, based upon the notes which have been previously read.

Beneath that it says: Large fire left behind. Vehicle emerges with 20-foot fireball. Inside fire licking all the way to front windscreen.

That's the end of the document.

Q. Did you receive any information other than from Mr. Arndt and Mr. Kirk that were used in -- or their offices that were used in your animations?

A. Mr. Arndt, Mr. Kirk, and Mr. McDowell.

Q. Okay. Just for the record, can you tell me what the pages marked there, four pages marked as composite Exhibit 7 represent?

A. These are printouts from a program -- computer program which is called VIN Decoder. And they are the breakdown of the VIN numbers from the accident vehicle for the Toyota Camry, the Jeep Cherokee, and the Ford Thunderbird.

Q. And similarly, there are some papers which are unmarked from Expert Auto Stats. Is that -- and then there's 1988 Manufacturer's Motor Vehicle Specifications. Is that simply obtaining weights and wheel bases and track widths and that sort of thing for the vehicle?

A. Yes. Those were vehicle specifications I obtained to verify the ones which I was relying on from Mr. Kirk's deposition.

Q. Okay. Are there any other areas that you expect to give testimony about at a trial in this matter?

A. I think we've covered everything.

Q. Is there an index of what is on the CD that's marked as Exhibit 20, which you furnished to me?

A. The items on the CD are sorted into appropriately titled subdirectories, but there is no printed index. Although since I'm providing you an additional file for that, if you would like me to generate such an index, I could.

MS. OWENS: That would be great. Thank you.

I think that's all the questions I have. Thank you, Mr. Stevens.

MR. FINE: I have a couple of questions

EXAMINATION

BY MR. FINE:

Q. My name is Sandy Fine. I'm representing Mr. Muleta in this case.

I believe very early in your deposition you discussed some sort of generalized testing you had done on vehicles back when we were -- Ms. Owens was reviewing your resume with you, and I think you were just discussing generalized testing that you had done on vehicles.

Do you remember that conversation?

A. Yes, sir.

Q. Have you ever done any generalized testing on Toyota Camrys?

A. No, I don't believe so.

Q. Okay. You said you visited the scene in May 2002 with Mr. Arndt to document the vehicles and take digital photos; is that correct?

A. I didn't actually go to the accident

scene. I simply went to the storage location for the vehicles themselves.

Q. You were there to take photos and document the crush to the vehicles; is that correct?

A. Yes. In general, inspection of the crush, the performance of the various vehicle systems, and just to help out with the volume of work in inspecting three separate accident vehicles.

Q. Did you take any written notes while you were there?

A. I did not.

Q. Did anybody take any written notes while you were there?

A. Mr. Arndt dictated notes, and I believe there is a copy of those in my file.

You didn't see them?

Q. I didn't. But if you can find them, that would be great.

A. It's possible that I included them in the notes from Mr. Arndt for him to review for his deposition.

MR. FRYHOFER: I don't think I saw it in there.

MS. OWENS: I didn't see it, either.

THE WITNESS: I apologize. I must have

left it for Mr. Arndt. But he will bring all of those tomorrow, if that's acceptable.

May I say that I didn't rely on the notes which he took nor the investigation for the work that I have presented today.

Q. BY MR. FINE: But you did not make any notes yourself?

A. No.

Q. So everything you relied on from that information was based on the photographs you took?

A. I did take a number of photographs at that investigation, but I didn't rely on my photographs for the preparation of this animation. I simply took the photographs in order to assist Mr. Arndt with the inspection so that he could rely on those for his opinions.

Q. Mr. Saul, I just want to see if we can clear up a little bit about his -- he's merely artistic, is that what you testified to, in assisting in the presentation of what you just saw on your computer; is that correct?

A. Mr. Saul's role is to create an artistic rendering of the kinematics and opinions of the experts. He applies no engineering to the data that we give to him, and he makes no modifications to it. So

he renders the kinematics which we provide in an artistic format with adding the realism of the scene, texture mapping the surfaces...

Q. So just to make it simple, you tell him two plus two equals four, he puts it in. You don't give him two plus two and he comes up with four?

A. That is a very good summary.

Q. It's very simplistic, but that's correct?

A. That's correct.

Q. I noticed in the two views that we saw on your computer that the Camry is sitting still; is that correct?

A. That's correct.

Q. Do you have any animation of the Camry before the impact between the Thunderbird and the Jeep Cherokee?

A. Because the animation is a representation of the kinematics which Mr. Kirk provided to me and I was given no kinematic information prior to the beginning of the animation we see, no such animations have been generated.

Q. Okay. Have you ever been asked to make any digitization or animations of the Camry before the collision between the Jeep and the Thunderbird?

A. I have not.

Q. Do you have any plans to do so?
A. At this point, I don't have plans to do so. I would be glad to do so if asked, but I don't believe that is in the works.
Q. Your location of the Camry in those two -- I don't know what we are calling them -- the two animations that we saw on your computer, how did you come up with the location of the Camry? What is that based on?
A. That is based upon the X and Y positions and the yaw orientation provided to me in the Excel file by Mr. Kirk's office.
Q. Okay. Have you spoken with any witnesses in this case?
A. I have not.
Q. Okay. Have you reviewed any witness statements in this case?
A. I've seen the statements which I believe are included in the police report. And I recall briefly discussing such statements with Mr. Arndt as he reviewed them for his own work. But I have not read those statements myself, and I did not rely upon them.
Q. Okay. Did you ever have any technical disagreements with Mr. Arndt?
A. No, sir.

Q. So if Mr. Arndt gave you a number, you relied on that number in reaching any conclusions that you may have reached?

A. That's correct.

MR. FINE: I have no further questions.

MR. FRYHOFER: I've got a few follow-up questions.

EXAMINATION

BY MR. FRYHOFER:

Q. Mr. Stevens, were you responsible for supervising and coordinating the preparation of the computer simulation and animation in this case which has been provided to counsel on the CD-ROM that was provided here at the deposition?

A. Could you repeat the first part.

Q. Yes.

Were you responsible for supervising and coordinating the preparation of the computer simulation and animations that have been provided to counsel?

A. Yes, I was.

Q. And is it correct that Mr. Kirk provided information to you, engineering information, on the accident reconstruction in a -- I believe you said a two-dimensional form?

A. That's correct.
Q. And did you and Mr. Arndt do some additional reconstruction work as it related to the vertical movement of the vehicles and the overlap of the vehicles?
A. Yes, that's correct.
Q. Okay. Were the measurements of the accident vehicles and the exemplar vehicles done by Mr. McDowell and then presented to you in a computerized format for your use in the animation?
A. Yes, they were.
Q. Did you then assemble the engineering information relating to the vehicle kinematics and vehicle interaction and then provide that to the animator so the engineering information could be seen by someone on a screen with images of the vehicles moving?
A. The purpose of the animation is to graphically depict the opinions of the experts whose reconstructions I was pulling together.
Q. What did you do to get the engineering information in a position for the animator to do a computer art rendering of the movement of the vehicles?
A. It was necessary to take the information from each of the experts, myself included, and provide

it to Mr. Saul in a format in which information was provided at consistent time steps so that the three different data sets; the two-dimensional reconstruction, the three-dimensional vertical motions; and the propagation of the fire had information provided at equally spaced time steps throughout the sequence.

Q. And then did Mr. Saul take that engineering information and create a visual image that we just saw on the computer here today?

A. Yes, that's right.

Q. Now, does the animator change the reconstruction or add any engineering information in the work that he does?

A. The information that I provide him is sufficient to describe the motion of the vehicles throughout the entire history, and he adds no information to the vehicles' motion or kinematics.

Q. So is the animator basically an artist that simply graphically demonstrates the kinematics of the vehicles that you have provided?

A. I'd say that fairly represents his role.

Q. And, in your opinion, is the animation that's been provided to counsel a true and accurate description of the vehicle kinematics as reflected in

the engineering information that you assembled from the other experts, and some of which you provided yourself?

A. Yes, that is my opinion.

Q. And has Mr. Kirk approved the animation as a true and accurate depiction of the vehicle kinematics in this wreck?

A. Yes, he has.

Q. And has Mr. Arndt approved the animation as a true and accurate depiction of the vehicle kinematics in this wreck?

A. He has approved that and also the fire propagation.

MR. FRYHOFER: No further questions.

REEXAMINATION

BY MS. OWENS:

Q. Mr. Stevens, regarding the work that Mr. Saul did, does he use a specialized program or software?

A. He does.

Q. Do you know what it is?

A. I believe it's LightWave, but...

Q. Is that L-i-g-h-t?

A. I believe so. I can ask him today and fill in the answer to that question when I provide you

the CD, if you wish, because I can't be certain that's correct.

Q. And in connection with your work, you've told me that you used a CAD program?

A. I did.

Q. Can you tell me who is the software maker and the version?

A. Autodesk makes it.

Q. Autodesk?

A. Yes, A-u-t-o-d-e-s-k, one word. The version which I use is 2002. But the filings which I have provided are accessible through versions as early as the 2000 version, I believe.

And then I used another Autodesk product, which is called CAD Overlay, in order to match the aerial photograph to the scene survey.

Q. Which version of the software did you use to do that?

A. That's also 2002. But CAD Overlay is not necessary to view the files, only to manipulate the graphical image under the survey.

Q. Did you, yourself, use any other software programs in your work in this case?

A. Yes, ma'am. I used MathCAD.

Q. Math?

A. M-a-t-h-C-A-D.
Q. What version?
A. Version 2001.
Q. What did you use that for?
A. That is the software which -- into which I put the equations to calculate the response of the Cherokee to the collision. And the printed sheet from that program is provided in my exhibits, and the electronic file is also found on the CD. I used Microsoft Excel.
Q. Which version? Not that it matters.
A. XP.
Q. Okay. Have you had as many problems with your XP as I have with my XP?
A. I love it.
Q. Okay. You're lucky.
Go ahead. Any other software utilized?
A. And then I used a program called Paint Shop Pro to manipulate and view my aerial photographs.
Q. Is that a Microsoft --
A. No. It's made by a company called Jasc, J-a-s-c. But it's not required to view any of the images. They are all viewable by any image that supports jpeg.
Q. Which?

A. 7.0 version.
Q. Any other software that you used in any of your work?
A. No. And all the files on the CD will be viewable by one of the programs which we've mentioned today.
Q. Now, the data that you got from Mr. Brady which we've marked as Exhibit 11, is that included on the CD?
A. It is.
Q. And the data which you generated of the vertical data, is that included on the CD?
A. It is.
Q. Are all of the input files that you utilized included on the CD which we marked as Exhibit 20?
A. Yes, including a digital version of the description of the fire propagation, which I read into the record from Mr. Arndt.
Q. And are all of the output that you have generated included on the CD marked as Exhibit 20?
A. Yes, they are.
Q. Mr. Stevens, did you receive a copy of a subpoena for your deposition today?
A. Yes, I did.

Q. And it included a description of a variation of documents regarding your software and computer work?

A. That's correct.

Q. Have you provided all of this information?

A. I've complied to it to the full extent of the law. I'm not allowed to provide programs as indicated.

For instance, AutoCAD 2002 is not something I can turn over. It's a licensed program. But all of the other items which were asked for which were mine to provide, I have provided.

Q. What about the manuals related to the programs?

A. No, I haven't provided those. Those are also copyrighted materials, which I'm not certain how I should get them to you, if you'd like them.

Q. But you've identified now all the software programs that you used?

A. That's correct.

MS. OWENS: And that is all the questions I have.

Thank you.

MR. FRYHOFER: In terms of the exhibits, can we keep the exhibits overnight, because --

MS. OWENS: Absolutely.

MR. FRYHOFER: -- Mr. Arndt is going to need to look at those before his deposition today.

MS. OWENS: Well, we'll leave the court reporter 1 and 2, the CV and testimony list.

MR. FRYHOFER: Okay.

MS. OWENS: I'm going to keep 20, which is the CD.

MR. FRYHOFER: Fine. I have to provide the exemplar model of the Cherokee which was inadvertently left off the CD to create an additional CD including that model and to provide index of the files which were on the CD in a printed form that can be viewed.

Is that everything that was asked for?

MS. OWENS: Correct. I think that's it.

MR. FRYHOFER: That's fine. And then will the -- how do you want to handle -- will the court reporter just make copies, or what should we do? Do you want us to make copies and send them to you and send the originals back to what --

What do you recommend?

MS. LAWRENCE: That's fine with me.

MR. FRYHOFER: So the court reporter is taking Exhibits 1 and 2 and returning the originals to

Mr. Stevens, and copies go with the transcripts.

MR. FRYHOFER: So let's, I guess, give them to you to take to Fred.

THE WITNESS: Okay. And can I just provide you with replacement CDs?

MS. OWENS: That's fine.

THE WITNESS: I will trade you the CD at the time.

MS. OWENS: Well, I may keep them both, but I'll take the new one and we'll substitute that as Exhibit 20, which is the complete disc rather than --

THE WITNESS: Very good.

MR. FRYHOFER: Okay. He'll read and sign.

MS. OWENS: Okay. We will stipulate he can do so before any Notary Public.

MR. FRYHOFER: That's fine.

Thank you.

(The deposition was concluded at 12:46 p.m.)

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DON C. STEVENS

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