LIBERTY UTILITIES HEARING EXHIBIT SBUA-04

A.25-06-017

Attachments to Q14

Depositions Provided as Exhibits to Answer to Question 14

Deposition Transcript

Case Number: JCCP No. 5228
Date: February 19, 2024

In the matter of:

MOUNTAIN VIEW FIRE CASES

GARY FOWLER

CERTIFIED COPY

Reported by:
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CSR No. 13709

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SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF LOS ANGELES - SPRING STREET COURTHOUSE

COORDINATION PROCEEDING SPECIAL TITLE (RULE 3.550),	)
MOUNTAIN VIEW CASES	) NO. JCCP NO. 5228

REMOTE VIDEO-RECORDED DEPOSITION OF

GARY FOWLER

FEBRUARY 19, 2024

REPORTED BY: CHERYL S. ORTEGA, CSR NO. 13709
STENO

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF LOS ANGELES - SPRING STREET COURTHOUSE

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REMOTE VIDEO-RECORDED DEPOSITION OF GARY FOWLER, TAKEN BEFORE CHERYL S. ORTEGA, CSR NO. 13709, A CERTIFIED COURT REPORTER FOR THE STATE OF CALIFORNIA, COMMENCING AT 9:25 A.M., MONDAY, FEBRUARY 19, 2024.

STENO

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Greg Buhlert, Videographer
Greg McCullough, assistant, Berger Kahn
Evan Krell, assistant, Berger Kahn

INDEX

EXHIBITS

STENO

MONDAY, FEBRUARY 19, 2024

9:25 A.M.

-OOO-

THE VIDEOGRAPHER: We are on the record. My name is Greg Buhlert. I am a notary public contracted by Steno. I am not financially interested in this action, nor am I a relative or employee of any of the attorneys or any of the parties.

Today is February 19th, 2024. The time is 9:25 a.m. Pacific. This video deposition is taken remotely via Zoom. The name of the case is Mountain View cases, filed in the Superior Court of the State of California for the County of Los Angeles, Case Number JCCP 5228.

This is the video recorded deposition of Gary Fowler, PhD, Volume I. The attorney taking this deposition is David Brisco.

We will now do the attorney role starting with the taking attorney Mr. Brisco.

MR. BRISCO: David Brisco, Cozen O'Connor, for various subrogation plaintiffs.

THE VIDEOGRAPHER: Okay. Our defending attorney today is Mr. Mijanovic.

MR. MIJANOVIC: Krsto Mijanovic on behalf of Liberty and Dr. Fowler.

STENO

09:27 THE VIDEOGRAPHER: Okay. And Mr. Romney. Is Mr. Romney there?

Okay. Ms. Stevens.

MS. STEVENS: Amanda Stevens, Schroeder Loscotoff Stevens, on behalf of various subrogation plaintiffs.

THE VIDEOGRAPHER: Mr. Simon.

MR. SIMON: Craig Simon of Berger Kahn on behalf of plaintiffs. We also have Greg McCullough helping us on IT and Evan Krell.

THE VIDEOGRAPHER: Okay. Ms. Meyers.

MS. MEYERS: Dana Meyers, Cozen O'Connor, for various subrogation plaintiffs.

THE VIDEOGRAPHER: Okay. Mr. Schroeder.

MR. SCHROEDER: Good morning. Eric Schroeder, Schroeder Loscotoff Stevens, on behalf of various subrogating plaintiffs.

THE VIDEOGRAPHER: Okay. Mr. Schmitt.

MR. SCHMITT: Good morning. Eric Schmitt, Denenberg Tuffley, for subrogating plaintiff American Modern Property and Casualty.

THE VIDEOGRAPHER: Mr. Maycon.

MR. MAYCON: Howard Maycon, Cozen O'Connor, for various subrogation plaintiffs.

THE VIDEOGRAPHER: Mr. Julius.

09:28 MR. JULIUS: Jason Julius of Baron & Budd for Public Entity plaintiffs.

09:28 THE VIDEOGRAPHER: Okay. Ms. Kirshner.

09:28 MS. KIRSHNER: Jessica Kirshner for plaintiffs.

09:28 THE VIDEOGRAPHER: Mr. Cadieux.

09:28 MR. CADIEUX: Jon Cadieux, Singleton Schreiber, on behalf of individual plaintiffs.

09:28 THE VIDEOGRAPHER: Ms. Shkolnikov.

09:28 MS. SHKOLNIKOV: Lilla Shkolnikov, Grotefeld Hoffman, on behalf of various subrogation plaintiffs.

09:28 THE VIDEOGRAPHER: Ms. Sell.

09:28 MS. SELL: Margaret Sell, also of Grotefeld Hoffman, on behalf of various subrogating plaintiffs.

09:28 THE VIDEOGRAPHER: Mr. Landis.

09:28 MR. LANDIS: Paul Landis, from Bauman Loewe Witt & Maxwell, on behalf of various subrogating plaintiffs.

09:29 THE VIDEOGRAPHER: Okay. Mr. Gold.

09:29 MR. GOLD: Russ Gold, Fox Law, on behalf of various individual plaintiffs.

09:29 THE VIDEOGRAPHER: Ms. Yee.

09:29 MS. YEE: Stephanie Yee on behalf of various subrogating plaintiffs.

09:29 THE VIDEOGRAPHER: Mr. Robertson.

09:29 MR. ROBERTSON: Good morning, Alex Robertson on STENO

behalf of various individual plaintiffs.

THE VIDEOGRAPHER: Mr. Loscotoff.

MR. LOSCOTOFF: Bill Loscotoff for subrogating plaintiffs.

THE VIDEOGRAPHER: Okay. Have I missed anyone? Very good.

The court reporter today is Cheri Ortega with Steno. Would the reporter please swear in the witness.

GARY FOWLER,

having been first duly sworn, testified as follows:

EXAMINATION

BY MR. BRISCO:

Q. Good morning, Dr. Fowler.

A. Good morning.

Q. You have been deposed a number of times I understand; is that correct?

A. Yes.

Q. Okay. Approximately how many times in your career?

A. I don't have a list but a few hundred.

Q. Okay. I'm going to dispense with the usual admonitions that we give in depositions. Fair?

A. Yes, you don't need to give them.

Q. Okay. Forgive me, I'm playing with a new platform, so there may be delays every now and then as I introduce a new exhibit.

I will introduce the deposition notice as the first exhibit. I believe we're on witness 34, so I'll introduce the exhibit as 034-0001.

Going forward today I'll just refer to exhibits as Exhibit 1, 2, 3, et cetera, and ignore the 34, Witness Number 34 prefix.

(Exhibit 034-0001 marked.)

BY MR. BRISCO:

Q. Okay. All right, sir. I'm presenting to you Exhibit 1, which is the deposition notice in this case.

Now, I can't see your screen so I need you to just let me know if I ever need to zoom in or out of a document that I'm sharing with you. You also should have the option to download a document that I'm showing you.

Can you see Exhibit 1 on your screen?

A. Not yet.

Q. Okay. Well, that's a little concerning because I'm presenting, so I expected that to be an easy yes?

A. Oh, there it is. It just popped up.

Q. Okay. Maybe there was a delay.

So Exhibit 1, I'm going to scroll through it slowly, is your deposition notice. It's an eight-page

document, including requests for production of documents.

Presumably, you've seen your deposition notice before?

A. I've either seen portions of it or it's been discussed with me.

Q. Sure.

How about, let's test our zoom. Can you see the document well or is it better when I zoom in like this?

A. I can see it now, yes.

Q. Okay. And in your deposition notice of Exhibit 1 we asked in Request for Production Number 3 for your entire expert witness file for this case, including all correspondence, notes, memoranda, reports, et cetera.

Do you see that there?

A. Yes.

Q. Okay. Did you produce in this case your entire expert witness file?

A. Yes.

Q. Okay. So everything you relied upon or reviewed that support your opinions has been produced?

A. I'll say mostly, yes. I received Dr. Kumar's deposition, his notes and what I'll call slides. I think I received those after my file was produced, and I don't know if they were included in the production or not.

And then more recently I've received additional photographs and files or depositions. And frankly, I don't know if -- if they were produced as part of my file or not.

Q. Gotcha.

So besides Dr. Kumar's deposition and file materials that you may have received after producing your file and deposition transcripts in this case, anything else that you relied upon in forming your opinions that you believe may not have been produced with your file?

A. The only thing I can think of, and it's not that I relied upon it, it's that it's useful information, are the photographs taken by Jerry Zamiski.

And again, I don't know if they were produced with my file or not.

Q. Who is Jerry Zamiski?

A. He's a metallurgical engineer in the Los Angeles area that had some prior involvement with this case and took photographs, and those photographs were sent to me.

Q. Was he a retained consultant for Defendant Liberty in this case?

A. I believe so. That's my understanding.

Q. Did you ever have a conversation with Mr. Zamiski about this case?

09:34 A. I have not.
09:34 Q. Did you receive anything other than photographs that were taken by Mr. Zamiski?
09:34 A. Let me just check. It's at the other end of the table.
09:35 No, just photographs.
09:35 Q. Sir, when were you retained in this case?
09:35 A. I was initially contacted on July 27th, and then the first work that I actually did was about six weeks later.
09:35 Q. When you say July 27th, is that 2023?
09:35 A. Yes.
09:35 Q. Okay. What were your instructions during that -- with retention?
09:35 A. I was just asked if I was available to consult with the attorneys representing Liberty, and I indicated that I was.
09:36 Q. Okay. Were you advised that you were replacing Jerry Zamiski in this case?
09:36 A. No.
09:36 Q. Jerry Zamiski is a metallurgist in the same general field as you are?
09:36 A. Similar, yes.
09:36 Q. Did you ask why you -- well, strike that.
09:36 Let me first put in another exhibit. This is

marked as Exhibit 2 to your deposition, the defense expert witness designation. I'm going to present it to you now so that you should be able to see it. I'm going to scroll down to Page 6, which has a section regarding your intended testimony.

Have you seen this document before, sir?

A. I believe I have.

(Exhibit 034-0002 marked.)

BY MR. BRISCO:

Q. Okay. All right. Right in the middle of the Page 6 of the PDF but marked as Page 5 on the document of Exhibit 2 it states that, Dr. Fowler is expected to testify regarding general principals of metallurgy, as well as specific testimony related to the subject incident, including the condition of the subject conductors, triplex and other physical evidence collected in causation of those conditions. Dr. Fowler is also expected to testify to the opinions, if any, offered by plaintiffs' designated experts that fall within his area of expertise.

Do you see that, sir?

A. Yes.

Q. Okay. Is that an accurate reflection of the categories of opinions that you intend to offer in this case?

A. Yes.

Q. And do you intend to offer any other opinions not reflected in this Exhibit 2 expert designation?

A. Well, that's pretty brief. I provided this morning a more comprehensive list of opinions, but those cover the general areas.

Q. Okay. Speaking of which, I'm uploading now the document we received, plaintiffs received from Defense Counsel this morning slightly after the 9:00 a.m. start time of your deposition. It is a three-page document that I will mark as Exhibit 3 to your deposition.

Okay. Can you see Exhibit 3, sir?

A. Yes.

(Exhibit 034-0003 marked.)

BY MR. BRISCO:

Q. Okay. Looks like we have nine points of opinions with some of them having multiple bullet points under them.

Sir, when did you make this document?

A. Yesterday.

Q. Okay. When did you provide this document to Counsel or defendant?

A. This morning.

Q. Okay. What time this morning?

A. Just before 9 o'clock, but not by much.

Q. Okay. Did you make any modifications to the document this morning?

A. I corrected some typos.

Q. Let me get one more document into the record before we proceed, sir. Plaintiffs also received this morning a list of prior deposition and trial testimony for you. I'm going to mark that single page document as Exhibit 4.

Do you see this Exhibit 4, sir?

A. Yes.

(Exhibit 034-0004 marked.)

BY MR. BRISCO:

Q. Okay. And this is -- it says on this deposition trial testimony, and it's going back to the start of 2020; is that correct, sir?

A. Yes.

Q. And you said earlier you've testified hundreds of times in deposition, correct?

A. Yeah. I believe I said a few hundred, yes.

Q. And is this -- what is this Exhibit 4 intended to represent, simply the last five years of testimony or --

A. Actually, it's a list I keep that's supposed to go back four years, and this goes back to the beginning of 2020.

09:42 Q. So these are all the cases you've testified on as an expert witness in either deposition or trial in the last four years?

09:42 A. Correct.

09:42 Q. How many of these cases were you testifying on behalf of the defense as opposed to the plaintiffs?

09:42 A. I believe all these are on behalf of a defendant.

09:42 Q. Okay. How about in your career testifying at deposition and trial, what percentage would you say are for the defense as opposed to the plaintiff?

09:43 A. I think in the past, as I recall, it was more two-thirds defendant, one-third plaintiff. And in recent years it's been more heavily weighted towards a defendant.

09:43 Q. Let me ask you about some of these topics for your list of Exhibit 4 depositions over the last four years. Do any of these cases involve failure of an ACSR type conductor causing a wildfire?

09:43 A. The James versus PacifiCorp, that was a trial in Portland that involved, as I recall, five different fire origins. And also, as I recall, they were all ACSR and there were various claims relating to each fire origin.

09:44 Q. Okay. And did you come up with an opinion in

the James case as to the cause of the fire or fires relating to the ACSR conductor?

A. Well, we can call it the James case, but there were really five different fires, and for each fire I examined the evidence and made metallurgical observations as to the condition of the ACSR.

Q. Okay. In any of those five cases did you render an opinion that the ACSR conductor failed from fatigue fracture?

A. I did not. There's no evidence of a fatigue fracture in the ACSR on any of those five fires.

Q. Okay. Did you render an opinion in any of those five fires relating to the James case that the ACSR conductor came down due to line slap?

A. I know that was a consideration in one of them, but the arcing on one conductor was oxidized and did not match what was present or the lack of arcing on the mating conductor or the nearest conductor.

Q. Uh-huh.

A. So I know I offered testimony that there was not an indication of line slap, nor was there an allegation in one of the fires. I know another fire a tree fell on it and broke the ACSR. And I believe there were two others where trees were involved.

Q. Gotcha.

STENO

Now, you anticipated my next question. I appreciate it. I was going to ask you to give me a brief synopsis of just what your opinions of what brought the lines down in those five cases.

You said one involved tree fall and two others that involved trees; is that correct?

A. You know, it's been long enough that I may not remember the precise number, but my recollection is there were three of them that involved trees, either -- I know one of them with certainty broke the ACSR and it fell to the ground. Two of them a tree was involved, but I think one of them the conductors had been replaced, so not all the evidence was available. One of them there was an allegation of a branch spanning two conductors and creating arcing.

So, you know, there were a variety of conditions relating to those five fires.

Q. Uh-huh. Besides the James case on our Exhibit 4 list of testimony, any other cases that involved an ACSR conductor?

A. No. The others are aviation, except for the Gonzalez case.

Q. So all the others were aviation, except for the Gonzalez case.

When you say aviation, what does that mean,

like what brought a plane or a helicopter down?

A. Correct, or what created the damage that was at issue.

Q. All right. We've been talking about prior deposition and trial testimony. I want to ask you more broadly in terms of just retention as an expert. How many times have you been retained by -- to work on a wildfire case?

A. I don't have a list.

Q. Best estimate.

A. Dozens of times.

Q. Okay. Of those times you've been retained to work on a wildfire case, what percentage of the time have you been retained to work for a defending utility as opposed to the plaintiff's side?

A. Well, I remember a plaintiff case from a fire that started in the Sacramento area where I was retained by the plaintiff. Just recently I was retained by a communication company in a wildfire in Colorado, and there may be an odd one here or there, but the rest of them have been retained by the utility.

Q. Okay. And so when you say "by the utility" that includes Southern California Edison is one of those utilities?

A. Yes.

09:49 Q. How many times have you been retained to defend
09:50 Southern California Edison in a case?
09:50 A. Well, I'm not paid or retained to defend. I'm
09:50 retained to examine the evidence as a metallurgical and
09:50 materials engineer. But they have asked me to look at
09:50 evidence dozens of times. I don't keep a list so I don't
09:50 have a specific number.
09:50 Q. What other utilities besides Southern
09:50 California Edison have you been retained by regarding a
09:50 wildfire case?
09:50 A. PacifiCorp, they had a series of fires several
09:50 years ago, and I looked at more than five, but probably
09:50 as many as eight, possibly ten fires for them. And I
09:50 looked at one for Nevada Energy. And I looked -- I
09:51 worked for a utility down in Texas whose name I don't
09:51 recall.
09:51 Q. So other than the one recent plaintiff case you
09:51 referenced and the communications company in Colorado,
09:51 have all your retentions in wildfire cases been for the
09:51 utility?
09:51 A. As best I can recall, yes.
09:51 Q. Sir, I presented again Exhibit 3 to your
09:52 deposition, which is your list of testified -- your list
09:52 of opinions in this case. I'm going to start working
09:52 through some of these and have you help me understand

your opinion and the basis for it.

I'm going to read the first one. I just got this this morning after the depo start, so I'm going to read the first one into the record and then ask you some questions, sir.

Opinion 1 in Exhibit 3 says: The evidence indicates that the center and north ACSR conductor is between Poles 226731 west pole and 34334 east pole, experienced contact during windy conditions on November 17, 2020.

I'm going to read the full bullet points here, sir, make sure I've properly encapsulated your opinions.

The north conductor separation was approximately 135 feet eight inches from the west pole, 17 feet from the lab reference cut. Separation on the north conductor was caused by damage created during arcing between the north and center conductors. The north phase exhibit had multiple areas of arcing on both sides of the separated ends. The center conductor exhibited multiple areas of arcing. The most severe arcing matches the location of the north conductor separation. Conductor clashing typically occurs within the center third of the span. The span was 304 feet. The separation strands estimated to be about 50 by Dr. Kumar on the north and center conductors were all

caused by arcing during conductor clashing. Recloser data analyzed by Don Russell indicates phase to phase fault at approximately 11:55 a.m., followed by three phase to ground faults prior to lockout.

Sir, did I accurately read your first opinion into the record?

A. Yes.

Q. Let's take this in chunks. So -- and I'm not sure, I have your file in front of me so if we need to pull up a certain photo that you can reference we'll do that. But can you walk me through the basis for your Opinion Number 1?

A. My basis is examination of the evidence that show arcing on the north conductor and the center conductor.

Q. When --

A. The windy descriptions -- the windy conditions, rather, and the day were provided as I recall in the Cal-Fire report. And plus in witness depositions.

Were you asking about the first sentence or the first bullet point?

Q. Yeah. Let's talk about -- let's take it sentence by sentence here. So I was asking more generally about the basis for the opinion and I appreciate your response. Let me take it bullet point by

bullet point.

The first part that, the center and north ACSR conductors experienced contact during windy conditions on November 17th, 2020, what is your basis for that opinion, that the two conductors contacted on the day of the fire?

A. You see what I would refer to as fresh melting on both conductors in the same location. And if you go down to the last bullet point in discussions with Dr. Russell, he indicated that there was a phase to phase fault at approximately 11:55 a.m., and that is consistent with the physical evidence that shows arcing between the north conductor and the center conductor.

Q. Are you of the opinion that the contact between the two conductors caused the phase to phase fault?

A. I'm telling you it's consistent with it and the timing matches.

Q. When --

A. I think I would defer to Dr. Russell, because he's really the specialist in looking at recloser data, but I found the information that he provided to me was consistent with the north conductor causing or contacting the center conductor.

Q. And when you say the physical evidence you observed that supports this, you talked about fresh melting?

09:58 A. Correct.
09:58 Q. Okay.
09:58 A. I talked about arcing damage that is, what I referred to, as fresh.
09:58 Q. And what does that mean when an arc damage is fresh?
09:58 A. Well, in looking at conductors often time the evidence, if there's arc damage, the evidence is taken into custody and put in storage, and it retains the non-oxidized appearance where I've seen multiple conductors that have had some evidence of arcing, but the arc area has been oxidized, and therefore, would not be contemporaneous with the fire origin that occurred on the day where there was evidence of conductor contact.
09:59 Q. Uh-huh. So you'll forgive me, as you've experienced numerous times in your depositions that sometimes you're dealing with lay attorneys and we're going to have to simplify things sometimes.
09:59 So when you say -- is it fair then to say more oxidation for you is -- indicates an older arc mark, as opposed to less or no oxidation, which means fresh, as you put it?
09:59 A. In simple terms, yes. It's a little more complicated than that. But as an example, aluminum after the passage of a rather substantial amount of time will

oxidize and turn a dull gray appearance. Copper, after the passage of time, will turn a green appearance. And when the coloration of the arc damage matches the coloration of the adjacent conductor, I typically refer to that as old arc damage. Whereas new or fresh arc damage has a shinier appearance; however, it, too, can have some oxide when viewed in the electron microscope or it has some discoloration when exposed to a ground fire.

So there are different conditions that can change the appearance of the arcing.

Q. We've been using terms like fresh, new, old. Can you date the arc marks in this case?

A. Well, unfortunately, you can't come up with a precise dating, because there's too many variables that control the oxidation. And in California which has a more arid environment, it takes longer for the arc damage to become oxidized, but it eventually will.

But fresh is usually referred to with the characteristics that I just gave you.

And old is usually characterized by the characteristics I just provided.

Q. Uh-huh. Just to clarify, if you can't date it specifically are you able to give a date range? So, you know, this -- this arc mark is new and is, you know, three to six months old, and this arc mark is old, it's

over two years old?

A. Not precisely, but usually when it's two years old you can tell that it's a former arc area. There's been enough oxidation in my experience.

Q. Are you aware of any articles or studies that support your opinions as to whether an arc mark is older or newer or fresh?

A. You know, I -- in my work I haven't seen an article that would address that. I think mostly I've seen metallurgists, including myself and even Dr. Kumar, that address some whether it's new or old. Again, depending on the oxide layer that is formed since the formation of the arc damage.

Q. Sticking with your -- the first sentence of Opinion 1 -- I won't present it the whole time unless you need it up, and if you need it up, sir, let me know.

A. I have -- I have a hard copy here so...

Q. Okay. Then I won't need to put it up for your benefit.

The contact between the center and north conductors on the day of the fire and the corresponding arc mark that you identified, would that have created sparks that would have been a competent ignition source for a fire?

A. Well, when arcing occurs you expel molten

10:03 1 metal. There's a certain pressure associated with the
10:04 2 arcing event. Whether that's a competent ignition source
10:04 3 or not, I haven't addressed that.
10:04 4 Q. Sure.
10:04 5 And what would you need to know to address
10:04 6 whether the arcing between the center and north
10:04 7 conductors in this case was a competent ignition source?
10:04 8 A. Well, I typically wouldn't address that.
10:04 9 There's a professor at Berkeley that's probably the best
10:04 10 in the world at establishing that.
10:04 11 Q. Who is that?
10:04 12 A. Carlos Pao.
10:04 13 Q. Do you believe that if there was a fuel source
10:04 14 underneath the center and north phase conductors when
10:04 15 they emitted that arc spark that the fuel source could be
10:04 16 ignited?
10:04 17 A. I don't have any opinion. I think that that
10:05 18 would generally be beyond what I addressed in this case.
10:05 19 Q. Okay. And I guess -- I'm not asking you -- I
10:05 20 appreciate you weren't asked to determine whether an arc
10:05 21 spark caused the fire. I guess I'm more asking whether
10:05 22 something is a possible competent ignition source, right.
10:05 23 So not whether you did the analysis in this case, but
10:05 24 just as a general matter of commonsense and your
10:05 25 experience as a metallurgist, can an arc from a line slap

event ignite a fire? Is that possible?

A. I know there have been some cases where I believe people have offered that opinion.

Q. Sure. And I was just -- want to know, do you have that understanding, that an arc from a line slap event can cause a fire?

A. Well, I certainly haven't studied it in this case and there's enough variables that I wouldn't be able to offer an opinion.

Q. Sure. Again, not talking about whether it was the cause of the fire in this case. Talking generally about an arc from a line slap event from two lines, such as the center and north phase conductor. Do you know -- do you know what the temperature is of an arc from -- from two conductors, such as the center and north phase?

A. Well, there's two temperatures you ought to consider. The arc temperature, which is usually, at least in the literature, thought to be about 5,000 Farenheit or above. And then there's the metal temperature. And if the molten metal stays on the conductor that would typically suggest a metal temperature closer to the melting temperature of that metal.

Q. Gotcha.

And in this case the -- we're dealing with

aluminum with a steel core, so what are the melting temperatures of the aluminum and steel?

A. Aluminum -- pure aluminum is 1,220 Farenheit. The ACSR conductor actually melts over a temperature range of 1195 to 1215 --

Q. Okay.

A. -- Farenheit. And steel would be the order of 26, 2700 Farenheit, depending on the carbon content.

Q. So are any of the temperatures we just discussed, the ACSR on the lower range at 1195 Farenheit, up to the arc temperature of 5,000 Farenheit, are any of those temperatures high enough to ignite combustible grasses?

A. Well, it's not what they are at the arc side, it's what they are when they hit the ground.

Q. Do you have an understanding as to what temperature they are when they hit the ground?

A. No. That's a detailed analysis that is beyond my expertise.

Q. Okay. Now, we've been talking about a line slap event in the air and whether that arcing event can ignite combustible grasses or vegetation down below. How about once the line comes down if the line is energized, and now you have these arc temperatures in direct contact with the ground. Do you believe that an energized

conductor, such as the north phase conductor we have in this case, is a competent ignition source if it's energized when it contacts the ground?

A. I've seen that in other cases. For this case, I do not know.

Q. You don't know if the energized conductor in this case caused the fire?

A. Correct.

Q. Would you agree that the energized conductor in this case could cause a fire, it's a competent ignition source?

A. Frankly, I don't know. There's enough variables and there's enough people that are capable of answering that question that I typically don't.

Q. No. I appreciate you typically don't. I just want to know if you're even aware that an energized conductor, such as the north phase conductor contacting the ground, could cause a fire?

A. As I've said, I've seen it before.

Q. You've seen it actually ignite the ground before?

A. No. I've seen where there's been evidence of arcing on the ground and people have identified that as the initiation site.

Q. Okay. So you have seen cases where an

energized conductor has contacted the ground and there's evidence supporting the conductor causing the fire?

A. I have other cases where people have concluded that.

Q. Okay. You just didn't do that analysis personally in this case, correct?

A. Well, I did the metallurgical examination, and I realize there's some photographs where the captions indicate arcing on the ground. By the time I went out to the scene that evidence was no longer available, and the conductor when I examined it had one little arc tick that was away from the area of separation. And I don't know if that would have been sufficient to ignite the vegetation or not.

Q. Let me get some terminology right so we'll be on the same page. I've seen from your file you are familiar with the terms pole one and pole two in this case?

A. Yes.

Q. Okay. And so pole one being the easternmost pole closest to the Mountain View Barbecue?

A. Correct.

Q. And pole two being the westernmost pole in which the north and center phases are connecting poles one and pole two. Sound good?

STENO

A. Okay. Yes.

Q. Shorthand, I like to refer to them as pole one and pole two, and throughout your deposition I may use the term Item 1 or Item 2. And I suspect you're familiar with those terms in this case as well but let me clarify.

Both Item 1 and Item 2 are referring to the north field phase conductor in this case. Sound good?

A. Yes.

Q. Okay. And when I say -- sorry, go ahead.

A. The only problem with using pole one and pole two is I don't know if people will confuse that with Item 1 and Item 2, and they are not the same. And that's --

Q. I -- sorry. Go ahead.

A. That's why I tried to stay with the east and west pole.

Q. Okay. Item 1 is connected to, after the north phase field side conductor failed and came down to the ground, Item 1 was connected to the east pole, correct?

A. Yes.

Q. Okay. And Item 2 was the portion of the north field conductor that was connected to the west pole, correct?

A. Correct.

Q. Okay. And so when you talk about seeing arcing

on the subject conductor, you're talking about Item Number 2?

A. There was arcing on Item 1 and Item 2.

Q. No. I appreciate that. I think -- right now we were talking about the evidence of, you said there was one area of arcing on the subject conductor, and I think you were talking about from contact with the ground, but that's where I was trying to zero in on on what you were referring to?

A. As I said, there's a small arc mark, and I think I referred to it as an arc tick, which is -- can be used to identify a small arc area that potentially could have been from ground contact.

Q. Uh-huh. And you observed this arc tick personally yourself or through the photographs?

A. No. I observed it during the lab examination.

Q. Okay. And how far from the failure point on Item 2 was this arc tick located?

A. It shows up on the second page of my notes from December 7th and it's identified as V., which stands for very small arc mark, in about the middle between the reference cut at zero and the cut at 15 feet.

And, you know, I should say that during the June 2023 lab examination there was -- the conductor was cut. And for the purposes of the location of subsequent

photographs, it all relates back to a reference cut that is at zero. Unfortunately, it doesn't correspond to the reference through the conductor between the poles.

So just to help you out for a minute, there's an additional page where I've put the dimensions, and that identifies the lab cut at 118 feet eight inches. And then I put Ref.0. That's reference zero for the lab dimensions.

Q. Were you present for the June 2023 lab exam?

A. No, I wasn't.

Q. Do you know if Mr. Zamiski was present?

A. It's my understanding that he was.

Q. Okay.

A. But I haven't confirmed that because I haven't spoken to him.

Q. Did you attempt to call Mr. Zamiski regarding his work in this case?

A. I attempted on December 7th, 2023, when we were aligning the various parts that had been -- parts of the conductors that had been cut during the prior exam. And I called him to get his input, but I didn't reach him at that time.

Q. Okay. You never received a call back?

A. I think I did, but it went to voicemail, and then the issue had been resolved by then.

10:17 Q. So coming back to the arc tick, if I followed you were telling me it's -- I was trying to understand its location for you in reference to the failure area. Are you able to tell me how -- what the distance is of the arc tick from the failure area of Item Number 2?

10:18 A. My notes indicate that it was about in the middle of the piece of conductor between the reference cut at zero and the cut made at 15 feet.

10:18 Q. Okay. So right in the middle there, somewhere around seven to eight feet?

10:18 A. Yes. It will probably show up in the photographs where there's a tape measure next to it.

10:18 Q. Okay. And the arc tick you referred to, you said it's potentially from the energized line contacting the ground; is that correct?

10:18 A. Yes.

10:18 Q. Okay. And do you believe that the north field conductor was energized, Item Number 2 was energized when it contacted the ground?

10:19 A. Yes.

10:19 Q. Okay. And is the Item Number 2 capable of igniting a fire on contact with the ground?

10:19 A. I think you've asked me that and I've seen where people have opined that fallen conductors can ignite a ground fire.

STENO

Q. I did. I apologize.

Did you see any other evidence of arcing on the Item Number 2 consistent with contact with the ground?

A. Nothing that I could confirm. I attributed the balance of the arcing to conductor clash between the north conductor and the center conductor.

Q. And as you said before, whether the conductor clash while it's in the air is capable of igniting a fire is outside of your area of expertise?

A. Yes.

Q. Okay.

A. At least for this case because I haven't studied it.

Q. I'm going to introduce the other document produced to us with your opinions this morning entitled, "Span Dimensions." We'll mark this as Exhibit 5 to your deposition, sir.

(Exhibit 034-0005 marked.)

BY MR. BRISCO:

Q. Do you have a copy in front of you?

A. Yes.

Q. Okay. I'm going to present it so everybody can see it, but it's placed vertically -- since you have a copy in front of you I won't worry about getting it placed appropriately unless we need to mark on it.

What is this document, Exhibit 5, that's entitled "Span Dimensions"?

A. Well, it shows the east pole and the west pole, and then the north conductor and the center conductor and the various locations where it was cut or where the north conductor separated. And also, there are splices identified on this document.

Q. I'm going to share my screen while we talk about this Exhibit 5, because I can't orient the uploaded exhibit properly.

Sir, can you see the screen with the Exhibit 5 on it?

A. Yes.

Q. Okay. So it looks like the -- this -- between the west pole on the left side and the east pole on the right we have this top line of dashes going over the top. Is that the center phase?

A. The uppermost one is, yes.

Q. Right. Okay. Center phase has been referred to in the evidence inspections as Item Number 3?

A. Correct.

Q. Or at least a portion of the center phase?

A. Yes, that's correct.

Q. We've been -- we see here, I see Item Number 2, which we've been talking about earlier is the portion of

10:24 the north field side conductor that was attached to the west pole?

A. Yes.

Q. Okay. These are your notes, sir?

A. Yes. I put this together.

Q. Okay. And it says here in the middle -- well, let me first say, Item 1 here we see is marked showing the line connecting, the north field line connecting to the east pole?

A. Yes.

Q. Okay. The separation is marked 135 feet eight inches?

A. Correct.

Q. Is that the distance from the west pole?

A. Yes.

Q. All right. And right here you note next to the separation of Item 1 and 2 you say lab cut at 118 feet eight inches, reference point zero?

A. Yeah. Reference is abbreviated so the period goes with R-e-f, and zero is just where the dimensions start for the numbers that are on the lab samples.

Q. And when we talked about the arc tick that was potentially from the conductor contacting the ground, that was located in the area between this lab cut and the separation here in Exhibit 5?

A. Yes. More specifically, my notes show it's between reference zero and then the cut at 15 feet, which is before the separation.

Q. Gotcha.

Let me just finish -- we'll take a break in a few minutes, sir. I just want to finish asking questions about this document.

Here, just to the left of the lab cut on the Item Number 2, it says old splice 109 feet.

Do you see that, sir?

A. Yes.

Q. Okay. And what's the purpose of that notation?

A. There was a former splice -- by former I mean predated the fire -- and that little squiggle in front is approximately 109 feet from the west pole. And then on the other side of the separation is another old splice, meaning it was oxidized at about 175 feet, six inches from the west pole.

Q. Do you have any idea of when those splices were installed?

A. I don't have the specific date, other than they were oxidized, and that's why I referred to them as an old splice, as distinguished from the new splices on the center phase, which I believe the testimony is that was cut down after the fire.

Q. Right. Okay. Sticking with the north field conductor and these old splices marked in your notes on Exhibit 5. Do you know how old the north phase conductor was at the time of the fire?

A. I don't know the specific number of years, but the presence of two splices in the mid span region would suggest that that was newer than the ends.

Q. Do you know when the splices that you have marked old splice were installed?

A. No.

Q. Okay. Could it have been more than five years before the fire?

A. You know, I don't know. All I can tell you is that it was oxidized to the point that would suggest that it predated or would indicate that it predated the fire.

Q. Same with the center phase, do you know how old the center phase conductor was?

A. I don't know, other than that section that says new conductor between two splices, that was replaced after the fire.

Q. Okay. But how about the Item Number 3 that you examined, do you know how old Item Number 3 was?

A. I do not.

Q. Okay. How about the roadside conductor, do you know how old the roadside conductor was?

10:29 A. Well, I'll tell you what I know is the roadside conductor, my notes reflect on the last page, was oxidized and it had a splice at the east end.

10:30 Q. Uh-huh. Okay. And what is the significance of that?

10:30 A. It had been out there a while, enough to oxidize, and I just noted the presence of a splice.

10:30 Q. Okay. Now, are you able to give me any more specificity other than it had been out there awhile?

10:30 A. No. You can't date these because aluminum is fairly reactive, in the sense that it oxidizes in a relatively short period of time, and the oxide remains stable and it doesn't change much.

10:30 Q. We have been going for a little more than an hour, sir. Why don't we take a ten-minute break and keep going.

10:30 A. Okay.

10:31 Q. Thank you.

10:31 THE VIDEOGRAPHER: The time is 10:30 a.m. We are off the record.

10:44 (A recess was taken.)

10:44 THE VIDEOGRAPHER: The time is 10:43 a.m. We are back on the record.

10:44 BY MR. BRISCO:

10:44 Q. Dr. Fowler, earlier when we were talking about

10:44 the arc tick that was potentially from the conductor
10:44 contact -- Item Number 2 contacting the ground, do you
10:44 have a photograph in your file that you can refer me to
10:45 regarding that arc tick?
10:45 A. Yes. If you look around Photograph 1052.
10:45 Q. This would be in the folder marked from your
10:45 December 7th inspection?
10:45 A. Yes.
10:45 Q. Okay. There's two of those folders, one of
10:45 them is with an SM on it.
10:45 A. Correct. I had a technician there that also
10:45 took photographs.
10:45 Q. Okay.
10:45 A. But this would be the one that is not marked
10:45 with SM, and my photographs start out with DSCN.
10:46 Q. So it would be DSCN 1052?
10:46 A. Correct. And it may include a few photographs
10:46 before and a few photographs after.
10:46 Q. Okay. Thank you.
10:46 Sorry, I'm in the wrong folder.
10:47 Okay. I'm going to mark as Exhibit 6 the photo
10:47 DSN 1052 (sic) from your file from a folder marked the
10:47 inspection photos December 7, 2023, EAG.
10:48 Is this the photo of the arc tick that you're
10:48 referring to?

STENO

10:48 A. That's an overall view. I would suggest going to the next photo.

(Exhibit 034-0006 marked.)

BY MR. BRISCO:

Q. Okay. Next photo in order would be DSN 1053. The shared screen version, it's easier to get on the same page. All right, sir, I'm showing you the next photo in line DSCN 1053. Is this the same line but zoomed in?

A. Yes.

Q. Okay. Does this show the arc tick you're referring to?

A. It -- it does, but it also shows the mechanical damage. As I recall --

Q. (Unintelligible) --

A. -- if you go to the next photograph, it may be --

Q. DSCN 1054, sir, on the screen?

A. Yes. You see those little areas of molten metal?

Q. I'm going to have you mark them for me here after I add this as an exhibit, but tell me what's relevant to the area of the molten metal on this photo DSCN 1054 from Item Number 2?

A. Well, right in the middle you see a small arc tick, arc mark.

STENO

Q. Uh-huh. I'm going to introduce this same photo as Exhibit 7. Okay. Now, you should be able to see it, sir, and we are going to do some marking today on exhibits. So I wanted to give you the ability to annotate and I'm --

(Exhibit 034-0007 marked.)

MR. MCCULLOUGH: Mr. Brisco, this is Greg McCullough. If you would like the witness to annotate you need to have him present --

MR. BRISCO: Oh, I see.

MR. MCCULLOUGH: -- and then he's able to annotate.

MR. BRISCO: So I'll shop share on my end. Thank you for that tip.

BY MR. BRISCO:

Q. Sir, are you able to see on your screen on the right side a list of the marked exhibits in this case?

A. Yes.

Q. Okay. The top one I believe should be the Exhibit 7 that we were just referencing, Photo DSCN 1054.

Do you see that?

A. Yes. Well, I see the Exhibit 7.

Q. Okay. And, Greg, feel free to interrupt me if you can give better direction to him, but if you click on the --

10:51 MR. MCCULLOUGH: I can do that.

Sir, if you click on the word present to the right of the seven, that should share the exhibit from your screen.

THE WITNESS: I did that and something is popping up, yes.

MR. MCCULLOUGH: Yes. And now, if you click on the pencil that's on the toolbar three quarters of the way on the right --

THE WITNESS: Yeah.

MR. MCCULLOUGH: -- click on that. You will have the ability to -- you should have the ability to draw now.

BY MR. BRISCO:

Q. It looks like there's a paint brush there.

You're quicker than I am, sir. So you just made a circle of what, sir?

A. That looks like an arc tick.

Q. Okay. So on Exhibit 7 you've circled what looks like the arc tick that we've been discussing so far in this case on Item Number 2?

A. Yes.

MR. SIMON: This is Craig.

Are there other arc ticks that he can circle.

THE WITNESS: You know, there may be, Craig.

Maybe go to the next photo.

BY MR. BRISCO:

Q. Okay. I think this means you've got to now stop presenting on your side.

MR. MCCULLOUGH: Before you do, could you please click save annotated exhibit in the top right-hand corner.

THE WITNESS: Done.

MR. MCCULLOUGH: And then type in 034-007 --

THE WITNESS: And save again?

MR. MCCULLOUGH: No, if you can -- yeah, we'll correct it later then. Thank you. What is currently 034 will be marked as 034-0007-A.

MR. BRISCO: Perfect. Thank you, Mr. McCullough.

(Exhibit 034-0007-A marked.)

BY MR. BRISCO:

Q. And now, if you can hit stop presenting on your screen, Dr. Fowler.

All right. I appreciate you working with us on the technology here. I'm going to share my screen again, which is that same Exhibit 7 photograph, and I'll go to the next in order. And it looks like from there we --

A. We moved on to something else. So if you back up, it looks like there's some other very small arc

ticks. On the right side of that photo, yes.

BY MR. BRISCO:

Q. Okay?

A. Where your cursor is.

Q. Yep, this area?

A. Yeah. And maybe even to the right a little bit more.

Q. Okay. Then let's go through our exercise again, because I want to be able to document with you the areas you see the arc tick on this particular location. So I do need you to click on the Exhibit 7 again and draw for us again the other areas you see the arc ticks.

A. You know, I just have to tell you, the image when you bring up Exhibit 7 isn't quite as clear as the original photographs, but that looks like the area we were looking at, the other photographs.

And I should also point out, you see the, sort of the shiny areas on tops of the strands?

Q. Yes, sir.

A. My notes also reflect mechanical damage in that area.

Q. And do you have an opinion as to what would have caused that mechanical damage?

A. Well, it was most likely handling after the fire, maybe during a recovery of the conductor.

Q. Okay. Let me make sure I properly documented this exhibit. This is still Exhibit 7-A, but now with a new oval shaped mark on the right side that you did for us, marking the location of additional arc ticks on this Exhibit 7-A; is that correct, sir?

A. Yes.

Q. Okay. And you can go ahead and hit save annotated.

A. Done.

Q. Yeah.

MR. SIMON: Put in the full exhibit number if you can all the way to the digit.

BY MR. BRISCO:

Q. So if you type in 034, sir, that's your witness number, and then after typing in 034 -- you have to back up.

A. Wait a minute.

Q. Now you type in a dash, 0007, and then an A. Perfect. Now hit save. Perfect. And you can stop presenting.

And just to clarify, so the arc ticks that you circled for us on Exhibit 7-A, those are the arc ticks we discussed earlier when we talked about this energized Item Number 2 contacting the ground. And that's an arc tick that potentially could have been caused by contact

with the ground, correct?

A. Potentially, yes.

Q. Okay. I'm going to share my screen and show you -- you had a chance to review the PowerPoint that was part of Dr. Kumar's deposition?

A. Okay.

Q. Right, you reviewed the PowerPoint, correct?

A. Yes.

Q. Okay. Actually, I don't remember what the PowerPoint was marked on Dr. Kumar's deposition. We'll attach it later to yours, but I'll mark it as Exhibit 8 to your deposition, and I'll just refer to the slide numbers.

Do you recognize this area depicted on Slide 159 of Dr. Kumar's PowerPoint, Exhibit 8 to your deposition?

A. Yes.

(Exhibit 034-0008 marked.)

BY MR. BRISCO:

Q. Okay. And I can't see the way it looks on your screen, so if you need me to zoom in let me know.

But what area are we looking at here?

A. You're looking at Item 2 that is 15 feet ten inches to 16 feet four inches from the reference cut.

Q. Okay. How far is this from the failure

location on Item 2?

A. Well, it's at the location of separation, and what you have to realize is that in one location there were three strands that separated, and in another location there were four strands. So I believe the 16.4 is the three-strand location, and I can probably -- there's another slide where he shows an overall view of where this was taken.

Q. Gotcha. I follow you.

If you want to find that slide, that's fine, for -- I'm not trying to cut you off, but I follow where you're at.

A. Well, there's 200 slides. If you want to take the time I will, but if that answer suffices. You see the caption, side-view of three failed aluminum strands and arcing?

Q. Yes.

A. Yeah. So this is -- this is Item 2 on the three-strand area of separation.

Q. Right.

A. And all I'm saying, for those that want an overall view, I believe there's a slide that shows that.

Q. If you know that slide number handy, that's fine. I'd be happy to hear it. Otherwise, I won't take your time to have you search for it.

A. Well, I'll tell you what I know better is -- are the -- I made some enlargements that were scanned and produced as part of my file. And one of the enlargements shows both ends together, but as long as you know what we're looking at, I'm fine.

Q. No, that's fine. What I'm trying to get is where this location is in relation to the arc ticks you circled for us in Exhibit 7-A, and I believe -- and so can you give me a distance from the arc ticks approximately that this Slide 159 image is located at?

A. You'd have to add a foot -- and actually, one foot, four inches --

Q. Uh-huh.

A. -- to the note I referred to previously. It shows the arc tick about in the middle between zero and 15 feet.

Q. Right.

A. So if you take that to be seven and a half and this a foot and a half, it would be about nine feet away.

Q. Gotcha.

And it being nine feet away is -- this location is nine feet away from the arc tick location but closer to the failure point; is that correct?

A. I'm not certain I know what you're asking with that request.

STENO

Q. Sure.

So your --

A. You asked the distance between the arc tick and what we're looking at, at least because we're looking over a range here --

Q. Right.

A. -- at 16.4 and that's about nine feet away.

Q. Right. The arc tick is about nine feet away from this location, correct?

A. Approximately.

Q. Okay. And this area that we're looking at in Slide 159 is closer to the failure location; is that correct?

A. Well, this -- this is the failure location, but let me tell you what -- what's been done and -- for ease of discussion I believe both Dr. Kumar and I have -- if we're using a single dimension, it's referring to the four aluminum strands in the core strand that's separated, and that's at 17 feet.

Q. Gotcha.

A. And this is eight inches away from that.

Q. Gotcha.

A. So again, for brevity, we've just referred to a single location at 17 feet, and there's an overall view that shows the relationship between Item 1 and Item 2 and

where this is located in relation to 17 feet.

Q. Okay. You agree that both the area of the arc tick that you identified in Exhibit 7-A and this area we're seeing on Photo 159, both areas of the conductor were in contact with the ground after separation, correct?

A. Item 2 is in contact with the ground and Item 1 was in contact with the parking lot, which you could also call the ground.

Q. Right, a softball question, but both the area we're looking at on 159 and the Exhibit 7-A area you showed us, both of those are laying on the ground about nine feet apart from each other, correct?

A. Wait. When you say both of them you mean the arc tick and the severed end, the separated end?

Q. Correct, yes, exactly. Both the -- both photographs we're looking at are two areas of the conductor, Item 2, that are just lying on the ground after separation.

A. Yeah, that's correct. But don't forget that there's damage that is eight inches away from this area and that's the reference area, 17 feet. And all that is laying on the ground afterwards.

Q. Sure. There's other areas laying on the ground afterwards, correct?

STENO

A. Well, you can -- you can tell the portion of the conductor based on the discoloration that was clearly on the ground.

Q. Right. So I didn't mean to spend so long on just identifying where this is located, but I just wanted to simply confirm we're on the same page, that this is another area that's lying on the ground. But let me move on to my question, is, what is it that you believe caused -- well, strike that.

What would you describe this blob of material here we see in Slide 159?

A. It's molten aluminum.

Q. So what do you believe caused that molten aluminum?

A. Conductor clashing.

Q. Why do you believe that's caused by conductor clashing?

A. Well, you have to start with the north phase conductor coming down, and what caused it to come down was extensive melting associated with the conductor clashing. And then when you look at the mating north conductor, you see in this area is the most significant damage on the north conductor -- sorry, on the center conductor.

And then you add that with the phase to phase

fault that was part of the recloser data, then they all tie together very nicely.

Q. Let's -- yeah. I want to ask you a couple questions about why you think that is conductor clashing in that photo. But before -- before we do that, let's take a step back then and have you explain to me the sequence of events that occurred in this case with the north phase conductor coming down?

A. Okay. The north and center phase experienced conductor clash or clashing that were rather significant arcs that melted multiple areas on both conductors. The core strand at location 17 feet melted through or it mostly melted through. And the core strand is what really provides the strength for the ACSR conductor, and when that melted then the one portion that's labeled Item 1 fell to the parking lot, where it appears to have experienced some mechanical damage.

And Item 2 that was attached to the west pole fell to the ground. And then in addition to that, the portion of Item 2 -- or maybe -- maybe I ought to -- we need to include an Item 2 from the point of separation to the west pole.

So the portion of Item 2 that was closer to the west pole contacted the triplex and created arc damage, and there was more arc damage on the north phase closer

to the west pole than what was observed on the triplex. So I believe it's likely that it came in contact with another grounded object, such as the guy wires, because it was still above the ground. It wouldn't have contacted the ground.

Q. I'm -- so if I follow the -- on its way down, the Item Number 2, north phase conductor, hits the service drop, making the mark we see on the service drop about eight feet from pole two, and then as it continues to fall also hits the guy wire making the additional marks we see on Item Number 2?

A. Yeah. I think that's likely, but, you know, I don't know if at that point a portion of the conductor is already on the ground, but it would appear to be moving and contacting the grounded conductor or guy wire or another ground object. I mean, I -- I can't tell you precisely. All I know is the guy wire is in the area where there was other arcing --

Q. Okay.

A. -- on the north phase.

Q. I follow you.

Sir, did you read the deposition of Victoria Victor?

A. Yes.

Q. Okay. And do you believe that the north phase

Item Number 2 portion that came down, when it hits the service drop, would that make sparks that are consistent with what Victoria Victor observed as testified in her deposition?

A. Well, my recollection is that she didn't see any conductors down when she was describing what she saw.

Q. What I'm asking you is would that make -- that contact from the north phase number two contacting the service drop, would that contact emit sparks?

A. Yes.

Q. Okay. And would those sparks be located in a similar area where Victoria Victor testified she observed sparks on the day of the fire?

A. Well, I don't think I'm in a position to analyze her testimony and respond to that question.

Q. Do you recall Victoria testifying that she saw sparks at the top of the pole but couldn't tell if it was the wire or the transformer?

A. I recall her talking about the transformer, but I also recall her talking about the conductors being in the air. And I also recall her talking about the timing, which doesn't match with the, at least the recloser data, where there was a recorded phase to phase, and I believe three phase to ground recordings.

Q. Are you going to be providing any opinions

regarding the start time of the fire in this case?

A. No.

Q. Okay. Are you relying on the time of Victoria Victor's observations for your opinion in this case?

A. The answer is no, I haven't analyzed her testimony. You asked me about her, so I pointed out the inconsistencies between her testimony and at least the recloser data. In other words, she saw the arcing and presumably the fire before the recloser data indicates there was arcing or phase to phase fault or phase to ground fault.

Q. And what makes you believe she saw the arcing before there was a phase to phase or phase to ground fault?

A. Well, we know the timing of the phase to phase and phase to ground faults, and I believe she provided a time that preceded that.

Q. And do you have any information as to what Victoria Victor based her time of her observations on?

A. Whatever she said in her testimony.

Q. You don't recall as you sit here today, fair?

A. There was something about a Ring video, but it's been awhile since I reviewed her testimony.

Q. Sure. Do you recall Victoria Victor testifying that she had no concept of time?

STENO

A. Not specifically.

Q. What was the time that you said the phase to phase fault and phase to ground fault occurred?

A. I'd have to go back and look at her testimony. All I remember is that it was before the recloser.

Q. I apologize, yeah. I was asking -- you referenced the recloser data and the time of the phase to phase and phase to ground fault.

Do you know that time?

A. Oh, I'm sorry, is that what you asked?

Q. Yeah, sorry. That's what I intended to ask, but I don't know if I did a good job of it or not.

A. My apologies. 11:55 a.m., approximately, when there was a phase to phase fault. But I need to tell you Don Russell would have the exact time.

Q. Sure. But the approximate time of the phase to phase fault was 11:55 a.m.?

A. That's my understanding based on a discussion with Don Russell.

Q. Okay. How about the phase to ground fault?

A. That followed it but shortly after.

Q. Okay. If Victoria Victor's observations were at 11:55 a.m., her observations being sparks towards the top of pole two, would those observations be consistent with a phase to service drop contact as you discussed

earlier?

A. I don't know. That's beyond the scope of anything I evaluated.

Q. Do you know what else in the area of pole two could have caused the sparks she saw at the top of pole two?

A. The answer is no but I don't believe it was the transformer.

Q. Okay. You inspected the transformer in this case?

A. Yes, but it had been repaired by the time, or at least serviced by the time I saw it.

Q. You saw the transformer during your December 5th and 6th site inspection, 2023?

A. It was on December 6th.

Q. Okay. Where was the transformer located during your December 6th, 2023, inspection?

A. At the Liberty facility in South Lake Tahoe.

Q. It had already been removed and placed into evidence there?

A. Correct.

Q. Okay. Who was present for this inspection?

A. Russell, Krsto, Steven and Tom Fee.

Q. Okay.

A. And I was informed that the transformer from

the west pole had been refurbished in May of 2022, and that a car hit the pole and they removed the transformer.

Q. So you were advised that a car hit pole two in the May of 2022 and the transformer was replaced?

A. I don't have the date of the car impact. I just was informed that it was refurbished in May of 2022.

Q. Can you -- I believe you testified you saw no evidence on the transformer that the transformer was involved in any way with sparking or arcing or significant events on the day of the Mountain View fire?

A. Well, certainly there was none when I observed it, and I'm not aware of any damage to the transformer.

Q. So if there's no damage to the transformer from your observations and there is damage from the service -- the north phase conductor contacting the service drop, which would have created sparks, is there anything else that could have created sparks that Victoria Victor would have seen up high at the top of pole two on the day of the fire?

A. I don't know.

Q. Uh-huh.

A. I did not evaluate what she observed. I just noticed that it was from a timing viewpoint her best estimate of the time was inconsistent with the recloser data.

STENO

Q. And so the only reason you believe her observations are inconsistent with the recloser data, and her observations being the north feed conductor contacting the service drop, is simply you believe her observations occurred before the phase to phase fault and phase two service drop contact?

A. I believe she provided that testimony.

Q. Right. Did you understand her testimony is all based upon her reference to her Ring camera video?

A. She mentioned that but I would have to go back and review her testimony again. I don't recall, other than generally where she was, generally her observations, and generally the time that she gave.

Q. Okay. Thank you, sir.

I want to go back to asking you about this area in Slide 159 on Dr. Kumar's PowerPoint, we'll mark it as Exhibit 8 to your deposition. I believe you said that the molten material and Slide 159 you said is caused by phase to phase contact?

A. Yes.

Q. Okay. How do you know that it's caused by phase to phase contact as opposed to the conductor contacting the ground?

A. In my experience, because when you get ground contact because the ground is a relatively poor conductor

and the photographs that I saw that were identified as arc marks on the ground were on rocks, and also just my experience of seeing conductor energized as fallen to the ground, the arc marks are relatively small. The melting you're seeing there is relatively large. I mean, it's -- it's much greater than I would assume --

Q. Okay. So the size of the molten blob here is what tells you --

THE REPORTER: He's frozen, I believe.

(Discussion off the record.)

MR. BRISCO: You're on mute, Dr. Fowler. I can't hear you now.

THE WITNESS: Sorry. How much did you not get?

MR. BRISCO: That's a good question. I don't know. I'll tell you what I did get and we'll start over again. Okay.

THE REPORTER: If you want me to read it, I can.

MR. BRISCO: Please, Cheri, can you read back the portion we got.

(The record was read as follows:

A I mean, it's -- it's much greater than I would assume --)

THE REPORTER: But I don't think you were done with that sentence, sir. Did that help at all?

THE WITNESS: Well, somewhat.

I mean, this is much greater than I would expect with ground contact on the what looked like volcanic rock that was on the ground.

BY MR. BRISCO:

Q. What do you mean by volcanic rock on the ground?

A. Well, when I went out there it just looked like there was gravel that was porous, and so I assumed it was crushed up volcanic rock that had been deposited in the field in that area.

Q. Oh, I see. I see. So -- so this conductor had -- this section of the conductor we see in Slide 159 would have fallen into the field, but you believe there would be pieces of gravel in the field. Is that what you're saying?

A. Correct. And there are photographs taken afterwards that show exactly where it landed.

Q. Right.

A. And where it landed is not where Cal-Fire identified arc damage on the ground.

Q. Sure. No. I don't want to detour you too much. I want to just understand why you believe this particular blob in 159 is from contact with another phase, as opposed to contact with the ground as it's

energized. And you talked a moment ago about the size of this blob being much bigger than you would expect with contact with the ground.

Any other reason you think this is not from contact with the ground?

A. Well, I just identified -- I'm looking at photographs now that show the end of the conductor, and those are not the areas where the report identifies arc burn on rock. So there was nothing from the field investigation by Cal-Fire that put arcing, ground arcing at this location.

And then the other reasons I've given to you.

Q. Sure. Can you get ground arcing by contacting just the dirt, the ground, as opposed to those rocks?

A. Potentially, but in my experience live conductors that have gone to the ground have relatively low level arcing, more like what I identified in that prior exhibit of that I said small ticks.

Q. Let me scroll down to another area not too far away. I'm at Slide 165, on Dr. Kumar's Exhibit 8 PowerPoint, and I'll show 156 as well to you.

Can you still see my screen, sir?

A. Yes.

Q. Okay. And then 156 is more zoomed in on the same photo of 165, but I'll go back to 165 for a little

better --

A. You're saying 165?

Q. Correct, sir.

A. Okay.

Q. Now, this is a different area than we were looking at in Slide 159, correct?

A. Yes.

Q. Okay. And we see some more blobs here in Slide 165, correct?

A. Yes.

Q. Okay. Also, another area of Item Number 2 that would have been lying in the field after failure, correct?

A. Correct.

Q. Okay. And same question as before. Do you have an opinion as to what caused the blobs we see here in Slide 165?

A. Conductor clash.

Q. Would this have been conductor clash on the day of the fire?

A. That's the only time I'm aware of any conductor clashing, but clearly it occurred on that day and brought the north phase conductor down.

Q. Do you know how far the area depicted in Slide 165 is from again the failure area on Item 2?

A. Yeah. Remember, we talked about the failure area is actually in two locations.

Q. Yep.

A. But for a single reference we've been using 17 feet, where four aluminum and the core strands separated, and it's really the core strand that has to go to bring this down. So that's at 17 feet. So this would be a foot and a half to two feet away.

Q. Okay. How is it that the line slap events -- well, strike that.

Did you also observe evidence of line slap located at the exact point of failure?

A. Yes.

Q. Okay. How is it that the line slap you're referring to that we see, these molten blobs of material in Slides 165 and 159 that we just looked at, how was it that those areas of line slap are contributing to the line coming down, if at all?

A. Well, it didn't come down in this area.

Q. Right.

A. It just -- you create melting and -- and high temperatures there that cause -- that severed some of the strands.

Q. So the melting and severing of strands at the locations we talked about on Slides 159 and 165, does

that create more weight on the remaining strands that are holding up the conductors?

A. Well, yeah. You can -- probably ought to say tension --

Q. Sure.

A. -- rather than weight.

Q. Sure.

A. It's really the core strand that's supporting everything, and if the aluminum strands go then there's a relatively modest increase in the tension in that area. But, you know, it's -- all this happens very rapidly and the damage is very rapid, but the conductor will likely stay in the area until you melt or reduce the strength of the core strand.

Q. Do you have an opinion as to how many line slap events occurred before the core strand ultimately failed?

A. That's probably a question that maybe Don Russell can answer. I'm -- I'm just aware of one phase to phase contact, but, you know, he knows this recloser data and the whole process very well. And there may be other slaps that were not recorded, and that's a question you have to ask him.

You know, metallurgically you see damage at the same location, it's where you would expect it, meaning in the middle third of the span. But he may be able to give

you a better answer if there could have been other line slaps or not. I just don't know.

Q. Uh-huh. Let me get back to your Opinion 1. I want to see if there's some stuff we haven't talked about yet.

A. You know, you could -- well, we've covered a lot more than just one, if you look at two, three and four we've covered a lot of that.

Q. No. I have sense that we'll zip through some of the others as we get there. I just didn't want to leave one fully if there was more discussion to have. So I wanted to look back at it briefly and give me a moment and see.

Do you have -- is there a particular photo that -- in your file that references the evidence that the actual failure area shows evidence of line slap? We've been talking for awhile about other areas of line slap, Slide 159 and 165, but the specific failure area, is there a photo I can look at that -- or you -- demonstrates the line slap at the failure location?

A. I'm not certain I know what you're asking. Are you talking about a side by side photo that shows both conductors?

Q. Well, not necessarily. So what we saw in slide --

A. You know what, you're breaking up a little.

Q. Thank you for letting me know, and certainly if there's a question that I ask that you don't get --

A. I can't hear you now.

(Discussion off the record.)

THE VIDEOGRAPHER: Counsel, I can hear the taking attorney just fine.

This is the videographer.

THE REPORTER: Yeah, it's Dr. Fowler. He was freezing up. When he said he couldn't hear, he was the one freezing up.

MR. BRISCO: Okay. How is it now, Dr. Fowler, can you hear me okay now?

THE VIDEOGRAPHER: Do you want to go off the record?

THE REPORTER: He's frozen.

MR. BRISCO: Yeah, let's go off the record. We're about due for another short break. So let's take a ten-minute break and then we'll keep going.

THE VIDEOGRAPHER: The time is 11:35 a.m. We are off the record.

(A recess was taken.)

THE VIDEOGRAPHER: The time is 11:50 a.m. We are back on the record.

///

BY MR. BRISCO:

Q. Dr. Fowler, looking at the fourth bullet point on Opinion 1, the Exhibit 3, it says the separated strands, estimated to be about 50 by Dr. Kumar, on the north and center conductors were all caused by arcing during conductor clashing.

Are you of the opinion that all of the separated strands referred to by Dr. Kumar occurred, when you say conductor clashing, meaning on the day of the fire, line slap occurring between the north and center phase?

A. Well, I'll say generally, yes, because I'm not aware of other phase to phase faults at this location. But, you know, Don Russell has evaluated that.

Q. Okay. And so --

A. And may be able to provide a better timing.

Q. Okay. From the metallurgical standpoint do you believe that those estimated 50 separated strands on the north and center phase occurred by line slap on the day of the fire as opposed to some other time?

A. Well, I thought you just asked that. I mean metallurgically it doesn't give you a time stamp, and I'm aware of conductor clashing on the day of the fire, and maybe Dr. Russell can talk about the possibility or the occurrence of conductor clash previously.

STENO

Q. I see. And so it's fair to say the absence of any record or documentation showing line slap before the fire causes you to believe that the 50 or so separated strands where you see line slap, that occurred on the day of the fire, and the -- your observations are consistent with it occurring on the day of the fire?

A. I don't think I've -- can answer you better than I have. I'm not aware of another conductor clash or phase to phase fault. If there was a prior occasion then, you know, that would allow for the possibility of another time.

Q. Sure. Just as far as the information you have, there's no other incident of a line slap besides the day of the fire, that's all?

A. Correct.

Q. And the evidence that you see on the -- of these 50 or so separations is consistent with a line slapping, consistent with it occurring on the day of the fire?

A. Yes. There's nothing metallurgically that would say that it didn't.

Q. Gotcha.

And so when those 50 -- approximately 50 line slap events occurred --

A. Hold on. Hold on.

Q. Please.
A. You're going from 50 wires to 50 line slaps.
Q. Okay. So correct me. Are you saying that with each line slap multiple fractures could occur?
A. Absolutely. And not necessarily fractures. Multiple strands could get severed.
Q. Uh-huh.
A. And it could either be by melting, incipient melting, high temperature fracture.
Now, I'll just emphasize again, Don Russell understands recloser data and he may say, well, you could have had additional contact and it wouldn't register on the recloser. You really have to have his input on that issue.
Q. Okay. I follow.
From a metallurgical standpoint when a line slap event occurs it's going to drop molten globules of metal on to the ground; is that correct?
A. Well, there's that potential for that because you have melting, but I believe they did not find any on the ground. As I recall, they looked and didn't find any.
Q. Is that unusual to not find any?
A. Well, there can be -- there were plenty of occasions where they found particles and we've analyzed

them.

Q. Okay. Is it possible that any of the molten globules vaporized before they hit the ground?

A. Well, some of the aluminum vaporized, but the particles that are ejected should remain as particles.

Q. Okay.

A. In other words, they're at a relatively low temperature and should remain as particles.

Q. Okay. Is aluminum ferrous, such that it would be picked up by a metal detector?

A. No.

Q. So is it fair to say that molten globules could have fallen to the ground and not just been picked up by a metal detector?

A. I don't know. I'm not going to speculate.

Q. It's possible?

A. I don't know.

Q. Sir, do you have an opinion as to how the Mountain View fire started?

A. No.

Q. In your conversations with defendants' other experts, Mr. Russell, Mr. Fee or anyone else, did any other experts share with you an opinion as to how the Mountain View fire started?

A. Not that I recall.

STENO

Q. Did Dr. Russell share with you any opinions in this case?
A. Yes, about the recloser data.
Q. And what about the recloser data?
A. Well, we've pretty much spoken about it.
Q. About the timing of the faults, the 11:55 a.m. phase to phase fault?
A. Yes. And that's an approximate time. He'll give you the precise time.
Q. No. I want to make sure you were sharing -- we're on the same page as to what information you have on Russell's opinions.
How about Tom Fee, did Tom Fee share any opinions with you?
A. Not that I recall.
Q. So you have no idea what Tom Fee will opine in this case?
A. I do not.
MR. SIMON: David, this is Craig.
Can you ask the same questions about counsel, because you limited your question to experts?
MR. BRISCO: Yeah, that's fair.
BY MR. BRISCO:
Q. Did Counsel for Liberty share with you any of its expert opinions in this case?

A. Not that I recall.

Q. Did Counsel share with you any other opinions in this case instead of what caused the fire?

A. I know there was some discussion because of the roof panel that was found on the other side of the field, and there were some discussions about flying debris. But there were more discussions rather than opinions.

Q. Okay. And what was discussed regarding flying debris?

A. Well, that if it were to contact a conductor it could potentially displace the conductor.

Q. Okay. Are you of the opinion that a flying piece of metal brought down the conductor in this case?

A. No. I examined the roof panel and didn't find evidence on it that I could tie it back to contact with these conductors.

Q. Okay. How about a branch or any other object?

A. You know, I just didn't see evidence to support that.

Q. Okay.

(Discussion off the record.)

MR. SIMON: Are you guys interested in taking a little bit longer and grabbing a bite to eat?

MR. BRISCO: Yeah, you want -- that's fine. Do you want -- I don't know if I caught the court reporter

on that. But I don't know where you're at, what you have, if you have a sandwich nearby, sir?

THE VIDEOGRAPHER: Do you want to go off the record?

MR. BRISCO: Yeah, let's the go off the record. I thought --

THE VIDEOGRAPHER: The time is 11:59 a.m. We are off the record.

(Brief recess.)

THE VIDEOGRAPHER: The time is 12 o'clock p.m. We are back on the record.

BY MR. BRISCO:

Q. Okay. I'm looking at your Exhibit 3 opinions list again. I'm on to Opinion 2. It says the west end of the north conductor fell to the ground and was discolored due to the ground fire. Sir, is that the -- is that a ground fire caused by the -- either the line slap or the conductor to the ground?

A. I don't know. I didn't address fire cause or origin.

Q. Okay. So you're just saying there that the conductor -- north conductor was discolored due to the ground fire, but whether or not it was a ground fire caused by that same conductor, you don't know?

A. Correct.

Q. And it says the north conductor contacted the triplex attached to the west pole and arced with the neutral wire approximately 8 feet from the end of the triplex. There were multiple arc marks on the north conductor between 9.5 to 20.5 feet from the cut end of the west pole, indicating additional contact with a grounded object, such as the guy wire.

I believe we've already talked about the sequence of events earlier, sir. Anything we haven't talked about today regarding the basis for this Opinion 2?

A. Well, we've covered it, if that's what you're asking. But the basis is my examination of the evidence.

Q. Sure. And this two kind of -- there's a couple different things going on with Opinion 2 here. Let me start with that first sentence.

The discoloring due to the ground fire, can you describe for me the discoloring you see on the north conductor?

A. The darkish brown to black discoloration on the conductor.

Q. Is there actual melting of the conductor from being attacked by the fire or just dark brown discoloration?

A. Just discoloration. I didn't observe any

melting associated with the ground fire.

Q. You agree a fire didn't cause this conductor to come down, right, sir?

A. Not that I'm aware of.

Q. What portions of the conductor did you observe having this dark brown discoloration due to the fire?

A. It was from the separated end going back towards the west pole for a distance of about 12 feet from the cut, which was not discolored.

Q. And so from the failed end to 12 feet from the cut is discolored, and then once you hit 12 feet from the cut there's no more discoloration from that 12 foot location to the pole?

A. Well, to the cut end.

Q. And where is the cut end?

A. Well, you know, on the north phase they cut the conductor near the bottom of the west and the east pole. So the cut end would be near the bottom of the west pole, realizing there's a photograph showing from the insulator down along the side of the pole where they cut it, and that was actually restrung with new conductor when they put up the north phase.

Q. Okay. Do you believe there was no fire on the ground by the conductor from the point of 12 feet from the west of pole cut going towards the cut location at

the west pole?

A. Well, I gave you the factual observation on that conductor at that location, but if you look at the pole, you know, there's a clearing around the pole. So given where the cut was, I believe the portion of the north phase that was not discolored, that the clearing didn't combust obviously, and so that end was not exposed to the fire.

Q. Do you know how -- how many feet that clearance is from the pole?

A. I didn't measure it specifically. I don't know the precise measurement. You can see the relative measurement in the photographs.

And actually, my notes say about 12 and a half feet to the cut end. I've been saying 12 feet but...

Q. Best estimate was fine, sir.

A. Yeah. I thought it was but...

Q. Move on to Opinion 3, sir. It says, the east end of the north conductor fell to the ground in a gravel parking area and experienced mechanical damage. Apparently numerous people had driven over the conductor, citing the Pitch-man (phonetic) deposition.

What is the basis of your opinion that the Item 1 -- is that what we're talking about here, sir, Item 1?

A. Yes.

Q. So what's the basis for your opinion that Item 1 experienced mechanical damage?

A. There was a relatively modest kink in the conductor and there were abrasions on the conductor. And there's a nice photograph of that kink, although it may take awhile to find it in Dr. Kumar's slides, and that kink was indicative of mechanical damage.

Q. When you say -- as we're looking for this, when you say mechanical damage what -- describe for me what you mean.

A. Well, a force applied to it where it deformed it or being in a gravel parking lot and apparently being run over, you produce abrasions.

Q. And that Item 1 conductor is not energized when those abrasions occurred?

A. Correct.

Q. Okay. Because it already separated from Item 2?

A. Correct.

Q. Do you recall where that kink location -- I know you -- there's a lot of slides to go through and you were trying to find it. Were you able to find it?

A. Well, I think there's two sets of photographs. There's a -- and I'll find it because I saw it yesterday.

STENO

But there's a Cal-Fire photograph that shows the conductor in the gravel lot, and that's around 178, 179. And if you want me to find it in Dr. Kumar's slides that will just take a minute.

Q. No, that's fine.

A. It's a very clear photograph that shows mechanical damage that was mislabeled in the slide as bird caging. And if I find it I'll bring you back to it.

Q. That sounds like a good plan. Let me share my screen then while we're on Item 1. I'm looking at Slide 14 of Dr. Kumar's PowerPoint Exhibit 8.

A. Yes.

Q. Do you see this here in Slide 14, the separation of the aluminum strand and the black burn mark on the strand just below the separation there?

A. Yes.

Q. Okay. What --

A. Which -- I'm sorry. Which slide?

Q. Slide 14.

You with me?

A. Yes.

Q. Okay. What caused this separation with the black burn mark?

A. Arcing damage. There's melting in that area.

Q. And when we talked earlier about the -- one of

your opinions is that the areas of damage to the north phase conductor strands that Dr. Kumar referenced is from line slap. Do I have that right?

A. Would you repeat it, please.

Q. Sure. I'm just trying to understand if this is one of the areas or an example of one of the areas that you believe failed because of a line slap?

A. Yes.

Q. And you don't believe this was a fatigue failure?

A. Absolutely not.

Q. And is this a parting arc that occurred at this location?

A. No.

Q. Okay.

A. You know, you have a parallel path for electricity through the other strands and you're not going to get a parting arc. Let's say you have two wires like this, any electricity that wants to flow through that area would just do it through the other strands. There is not a voltage differential between the two ends of that wire.

Q. So do you believe the black mark we see here on Slide 14 is caused by an arcing event from contact with the center phase as opposed to a parting arc between the

two broken strands in the picture?

A. Yes.

Q. And what -- why is it from a line slap and not from a parting arc?

A. Well, I just told you. Let's just say you cut a piece of wire and you put it -- run current through it at a certain voltage, the other strands have the ability to carry the current. And the separated ends of an individual strand, or in this case two strands, are in intimate contact on both sides of that separation. So there's an alternative parallel current path and there's no voltage differential.

Q. So if this -- this strand in Slide 14 Exhibit 8 did experience a fatigue failure and accompanying parting arc would you see this same type of black mark or no?

A. Well, the black mark is caused by a relatively low level arcing at that location but, you know, you just have to take your head for a moment out of what you see up close or in the microscope and then back up to consider other things like the strength of the conductor to see if it's even possible to generate a fatigue crack.

If you did generate a fatigue crack where would it likely occur, and you have to consider a parallel path for the current to flow. So without a separation you have five aluminum and one core strand, and it's mostly

12:18 the aluminum that will just pick up the flow on the electricity. And as I said, you don't have a voltage differential between the ends of the wire and you're not going to get a parting arc or separation arc.

Q. You won't get a parting arc or a separation arc when the aluminum strands break, is that what you're saying?

A. Correct, in the context of this area that we're talking about.

Q. Right. Right.

So the only way you can get this black mark then is from the arc from contact with the center phase?

A. Well, it's either contact or very close proximity, and Don Russell can talk to you about that.

Q. Understood. But if the -- if the strand had separated, this aluminum strand we see in Slide 14, you're saying you would not get a parting arc and corresponding black mark there?

A. Correct. You don't have a separation, I've explained at least twice know. You have a parallel current path and you do not have a voltage differential.

Q. Okay. All right. Can you see Slide 15 here, sir?

A. Yes.

Q. What would you describe for me is on the right

side on the tips of the two broken strands of aluminum strands?

A. I'm sorry. Beginning of your question wasn't clear. How did it start?

Q. Sure. Can you describe for me what we see here at the tip of the broken aluminum strand?

A. The ends of the strands are melted due to arcing.

Q. Okay. And is that a parting separation arc or an arc from a line slap event?

A. Line slap.

Q. And how do you know that?

A. Well, for the same reason I just gave you at the prior location.

Q. Which is that when the aluminum strands separate a parting arc or separation arc is not occurring?

A. Well, that, and you had a lot of arcing in that area between the north phase and the center conductor.

Q. Okay. Sir, do you have any evidence of another fire -- or strike that.

Do you have any evidence that the Mountain View fire was caused by anything other than the north phase conductor?

A. You know, I didn't do fire cause and origin, so

12:23 I'm not offering an opinion on what caused the Mountain View fire.

Q. The only potential ignition source that you're aware of in the area of the Mountain View fire origin is the north phase conductor?

A. Well, I've studied the conductors. I didn't determine whether that's an ignition source or not.

Q. Did you identify any other potential ignition sources in the course of your examination in the area of the Mountain View fire origin?

A. I didn't examine anything else other than the roof panel, and I didn't see a connection between that and the damage we're seeing on the conductors.

Q. Do you know what caused the fire that caused the discoloration of the conductor you described in Opinion 2?

A. Isn't that the same question?

Q. I don't know. I'm making sure I'm being thorough here and not missing something, so...

A. Well, I'll give you the same answer.

Q. Which is you don't know what caused the fire?

A. I didn't do fire cause and origin.

Q. You know, why don't we -- I was contemplating starting four, but we're so close to our lunch break, sir, I don't want to just start and stop. So why don't

12:25 we take our lunch break now until 1 o'clock. Does that sound good?

A. That sounds good.

Q. Thanks.

THE REPORTER: We're off the record.

THE VIDEOGRAPHER: The time is 12:24 p.m. We are off the record.

Sorry about that.

13:03 (Lunch recess.)

13:03 THE VIDEOGRAPHER: The time is 1:03 p.m. Pacific. We are back on the record.

BY MR. BRISCO:

Q. Dr. Fowler, just real quick want to fix some terminology I was using for -- so far in the deposition, make sure we're on the same page.

Item 1 and 2 are also referred to as the north phase or north field side phase conductor prior to -- excuse me, let me strike that.

Item 1 and 2 are the separate pieces of the north phase or also referred to as the north field side phase conductor outside of the Mountain View Barbecue in this case, correct?

A. Yes.

Q. And we sometimes use the term triplex or service drop when talking about the service drop

connected to pole two that Item 2 had contacted on the way down, and I just wanted to confirm with you, when you say triplex you mean service drop or triplex is the same line?

A. Correct.

Q. Just to clean up the record. Thanks, sir.

Let me move on to Opinion 4 on your list here on Exhibit 3. It says multiple wires were melted and fractured due to the heat generated during arcing when the conductors clashed in the mid span area. Every separated strand exhibits melting. The core stand at the point of separation was melted. Multiple aluminum strands exhibited melting, incipient melting and high temperature fracture. The elevated temperature created during arcing also causes oxidation on the fractured surfaces.

Sir, what does the melting -- describe for me how the melting is related to your opinion that the lines slapped together at these locations?

A. Well, I thought I covered that but maybe you're asking something different. I -- the purpose for saying every separated strand exhibits melting, aside from being factually true it also indicates elevated temperature at that area that caused either gross melting, incipient melting or some of it looks like high temperature

fracture.

And you have to also look at it in the context of the opinion that all these wires separated due to fatigue. And, you know, it's a little odd to think that the only wires to exhibit or allegedly exhibit fatigue also exhibited melting. I mean, if -- if fatigue was an actual mechanism it wouldn't occur in mid span. It would be out near the poles where the stresses are higher, and you would probably have some wear associated with the conductor before a strand became weakened enough to actually fracture.

So I'm trying to tell you what did happen and why it doesn't make -- this is just more information to convey to you that it doesn't make any sense that you would only have fatigue in the mid span, that every fatigue fracture would exhibit melting. And then there's more as you'll see in Opinion 5.

Q. Okay.

A. Correction, Opinion 6.

Q. So but on Opinion 4 that first bullet point says every separated strand exhibits melting. Do you mean every separated strand on both the north phase conductor and the center phase conductor has melting?

A. Correct.

Q. And so that would include, at the failure

location, that would include the seven aluminum strands on Item 1 on the east side pole?

A. Yes.

Q. Okay. And then as well as the steel core?

A. Correct. I have a special note there on the steel core, because the metallography shows melting on both ends.

Q. Okay. Let me -- let me ask you this way then. I just want to get on the same page with you as to the every strand shows melting part.

Let's see. Can you see the Slide 99 here?

A. Yes.

Q. Okay. This is --

A. What's the number? I can't see that detail.

Q. Oh, sure. It's Slide 99 of Kumar's PowerPoint Exhibit 8.

This is the -- one of the strands of fractured aluminum at the failure point but on the Item 1 side, correct?

A. Correct.

Q. Okay. And is this an example that's kind of bubbling of the fracture surface of this aluminum strand, is that an example of the melting?

A. It is, but bubbles is not a term that I think is the most accurate.

Q. Forgive me for the layperson term. What would you call it?

A. Well, no, it's on the slide, but air bubbles isn't the most technically appropriate term. But they're -- they're really voids that formed during the melting process and then this wire broke and the break is through those voids.

Q. Okay. So I'll use your term, I want to be correct with you. Void is the term I'll use.

Let me show you the other -- let me ask you about the other strands from this same failure area. Here is one of the -- this is Slide 97. Similar fracture area but one of the neighboring strands in Item 1 at the failure location?

A. Right.

Q. Okay. Agree we don't see the same bubbling or to use your term void?

A. Right.

Q. Okay. So there is no melting at this location?

A. No. I believe this is an example of high temperature fracture.

Q. But with no melting?

A. Well, you had a melting in that area that created high temperatures, and this strand broke during that process.

Q. Okay. And is there anything about the characteristics of this image in Slide 97 that indicates to you this was a line slap failure event?

A. Well, this is a too magnified view to really conclude line slapping just from a view that's taken at this magnification. I mean, that analysis comes from looking at the span and then going down to microscopic views.

But let me tell you what is not there, is fatigue striations.

Q. And what does fatigue striations look like?

A. We should probably go to Opinion 6 and the article that I included in my binder from the metals handbook that is titled -- it's a section titled, "Fatigue Fracture Appearance." And striations or beach marks are the feature that is created during fatigue crack growth. And there is not one separated end that exhibits fatigue striations or beach marks. There's not one mention of that anywhere in Dr. Kumar's lab notes or his testimony.

Q. In your experience does arcing wipe away any evidence of fatigue striations?

A. Did you say arcing?

Q. Yeah.

A. Well, it melts the metal, and so you've

destroyed that portion of the surface.

Q. Right. So if there were fatigue striations taking place at an area where there was an arcing event the arcing would wipe away the actual evidence of fatigue striations?

A. Well, the arcing wipes away the evidence of anything on the fracture surface.

Q. Right.

A. But then you go to the strength of the conductor and ask yourself the question, how realistic is it that you would have any fatigue in an aluminum strand. And that's the section that is covered in seven. And then where would you expect any damage to occur if it did occur. And that's at the poles where the conductor goes over the insulator.

And then you have to also integrate into your thinking, gee, there's splices on both sides of the separated area, which at least infers that a segment of the conductor has been replaced, and therefore, is newer than the conductors outside the splice. Then it would show as any evidence of fatigue.

I mean, you -- I believe I understand what happened here. And you see where the term flat fracture is used?

Q. Yeah. Would you agree that is a flat fracture?

A. Yes. And all that means is, it does not show distortion related with the fracture, but there are multiple causes for flat fracture. If it's caused by fatigue then you have to show that there is cycling stresses that can be generated to create the fatigue at this location and the fatigue would show up as a striated appearance on the fracture surface.

There's no striations here. There's no beach marks.

Q. But --

(Speaking simultaneously.)

THE WITNESS: -- as your temperature approaches the melting temperature, then your ductility declines rapidly and you get a flat fracture. And that's what you have here.

BY MR. BRISCO:

Q. Okay. I appreciate that, sir. So a lot to unpack. I appreciate there's a -- you're considering a lot of things. So thank you for that. Let me unpack some of this.

So you said this is, what we're looking at in 97, Slide 97 a flat fracture, correct?

A. You can call it a flat fracture. I certainly understand the use of that word. It's not a term that I would have selected for that appearance, but I understand

how the word is being used.

Q. Okay. And you don't see evidence of any fatigue striations or beach marks on this flat fracture surface, correct?

A. Correct. There were none present. There were none identified.

Q. Now, if I --

(Speaking simultaneously.)

BY MR. BRISCO:

Q. -- but I think we agreed earlier, arcing would wipe away any evidence of fatigue striation, correct?

A. Yeah, but look at what you're saying. You're saying, oh, the fatigue striations used to be there, but now the end is melted and it's gone away.

Q. I'm just taking it one step at a time.

A. Then what you're looking at is a melted end.

Q. Sir, the question was simply, does arcing wipe away evidence of fatigue striations. That's it.

A. I've answered that.

Q. Yes, you did.

Let me show you -- let me show you another photo then. We're still on the same location, another aluminum strand end from the same failure location on Item Number 1. Is this another flat fracture, sir?

A. Yes. You can call is a flat fracture. In

13:19 reality what it is, is a high temperature fracture where
13:19 the temperature is near the melting point of the
13:19 aluminum.
13:19 Q. But again, no -- no evidence of the void, the
13:19 bubbling, or as you termed it void in this Slide 110,
13:19 correct?
13:19 A. I don't see any in that photograph.
13:19 Q. Okay. How about Slide 113, yet another failed
13:19 aluminum strand in the failure area. No bubbling or
13:19 material void in that area?
13:19 A. I don't see any in that photograph, but that's
13:19 a high temperature fracture.
13:19 Q. Here's another one, 119, a different failed
13:19 aluminum strand in our same failure area from Item 1,
13:20 same question --
13:20 A. (Unintelligible) a high temperature fracture, I
13:20 just don't see voids there.
13:20 Q. Okay.
13:20 A. In fact, the photographs you're showing me
13:20 don't show microscopic detail, but that first photograph
13:20 showed very large voids that were obvious at this
13:20 magnification.
13:20 Q. Sure. So fair to say, other than one of the
13:20 aluminum strands in the failure area of the fractured
13:20 surfaces don't exhibit material void melting; is that

correct?

A. Wait a minute. You're -- voids is just another artifact from a melting process. Adjacent to these wires is plenty of evidence of melting, and that creates a high temperature that led to the high temperature fractures you've been showing me.

Q. Okay. I follow.

So you're saying adjacent to the strands there's evidence of melting, but on the actual fracture surface of the strands themselves, six out of the seven aluminum strands don't show any material void melting, correct?

A. Well, I'd have to go through all of them, but some -- well, there's extensive melting in that area from the arcing, but that melting had -- that heat has allowed the aluminum strands to fracture.

Q. No. I understand that. I'm just -- I went through each of them. That's why I was trying to show you each aluminum strand in that area and there was only one --

A. Back up one.

Q. Sure. Right here?

A. No. The one you zipped by, because that shows more obvious melting.

Q. This -- where is that at?

13:21 A. Well, you see that rounded nodule on top? Yeah. That's part of what's melted.

13:22 Q. Okay. So you're seeing material voids here like we did with the prior bubbling slide?

13:22 A. Not at that location, no.

13:22 Q. Okay.

13:22 A. There were multiple aluminum strands that showed the voids.

13:22 Q. Uh-huh.

13:22 A. And you have to go to other locations to identify it, but the one you showed me had a lot of voids.

13:22 Q. Yes. One of the -- I was showing you the seven aluminum strands at the failure area on Item 1, and so one of those seven aluminum strands had that bubbling material void?

13:22 A. A lot of it, yes.

13:22 Q. The other ones I didn't see any. And I thought I went one by one with you.

13:22 Did you see any on the other ones?

13:22 A. Not at those magnifications.

13:23 How about the core strand?

13:23 Q. Hold on, I'll get there. One thing at a time.

13:23 A. Okay.

13:23 Q. So I'm still on Opinion 4. I'm looking at the

last bullet point, the elevated temperature created during arcing also caused oxidation on the fractured surfaces.

A. Yes.

Q. So again, I think we're on the same page, but we actually haven't talked about oxidation much today. So can you describe for me oxidation and how it relates to the arcing event you described?

A. Well, the arcing elevates the temperature of the aluminum, and then when it fractures at high temperature that hot metal will react with the oxygen in the environment, and because it's at elevated temperature it will oxidize rapidly.

Q. Do you look at the oxidation to -- the amount much oxidation to tell you how old an arcing event was?

A. Well, we had that discussion earlier in the deposition, and so in that context, yes, but that's usually the outside of the arc area. This is directed more towards the fracture surface, where there was mention of oxidation on the fracture surface.

Q. Okay. Right. And did you see oxidation on the fractured surface of the failed aluminum ends at the failure area?

A. They are all going to be oxidized to a certain extent.

13:25 Q. Right. But the fracture surface is going to show more oxidation than the general surface area of the aluminum strand, correct?

13:25 A. Well, the fracture surface represents relatively fresh metal, and when it's hot it will oxidize, whereas the side in a non-arced area will show oxide that is formed over perhaps years. And that's just -- it's a different oxide level and a different appearance that provides some additional protection, even at elevated temperatures. Less likely to change than fresh metal is at elevated temperature.

13:26 Q. So forgive me, I got lost in your answer and that's probably me.

So do you expect to see more or less oxidation on the fracture surface of the failure area?

13:26 A. Just depends on how long that area remained hot.

Q. Okay.

13:26 A. On the fresh metal you would expect to see some level of oxidation, and on the piece that fell to the ground that obviously saw fire or burning vegetation, which really discolors that area.

13:27 Q. So, yeah, let's stay on Item 1 then, so we're not in the field, we're in the gravel parking lot area, fair?

STENO

A. Yes.

Q. So if you had an oxidation on -- well, strike that.

If you had an arcing event that occurred a year before the fire, would -- would you expect to see more oxidation at that arc location than you would at an area where that had an arcing event on the day of the fire?

A. Generally, yes. It's a matter of degree that depends on the environment.

Q. Okay. How about an aluminum fracture that's exposed to the atmosphere for a long period of time, is that going to cause surface oxidation?

A. It can. The fracture itself doesn't cause the oxidation. The fracture exposes metal that then is exposed to the atmosphere.

Q. But does the fracture then have more oxidation than the general surface of the remaining strand that's always been exposed to the atmosphere?

A. Probably not as much, generally.

Q. Right. And why is that?

A. Because the exterior surface has had longer exposure to the atmosphere.

Q. Is it also because the fracture surface experienced an arcing event?

A. Wait, say that again?

Q. Sure. Is it also because the fracture surface experienced an arcing event?

A. I'm not certain I understand. Are you talking about the parting arc --

Q. Yeah.

A. -- what theory again?

Q. Well, any arc theory, right. So whether it's a parting arc or a line slap arc, is that arc area going to be -- experience more oxidation than other areas that have no arcing evidence?

A. Well, I guess you have to identify different appearances. What you see visually is usually a dull gray appearance on the exterior of the strand, and then in the area of arcing it actually seems a little bit shinier or is a little bit shinier. When you look at this in the electron microscope, you can see evidence of oxidation on the high temperature fractures.

Now, is that as severe as the oxidation that's on the exterior of the strand? Probably not because the exterior of the strand has been exposed to longer periods, but the fracture surface is exposed to elevated temperatures, which accelerates the oxidation process.

Q. Let me go to Opinion 5 please there. It says, Exhibit 3, the microstructure of the steel core at the point of separation indicates local melting due to

arcing. The microstructure does not exhibit annealing or recrystallization due to resistance heating. The change in diameter at the point of separation is due to melting, not tensile necking. A steel core at Item 1, 23 feet to 23 feet four inches was melted on one side, and brittle cracks went through the melted and resolidified area. The thumbnail appearance created by the brittle crack was not characteristic of fatigue crack rows. No striations or beach marks were present in the thumbnail region.

I asked you about the fatigue striations and beach marks with regard to aluminum. Is it the same with steel, where an arc would erase the evidence of striations or beach marks?

A. When you melt a piece of metal, whatever was there previously is altered.

Q. Uh-huh. The -- let me show you Slide 122 from Dr. Kumar's PowerPoint. This is the steel core from north phase Item 1 failed end.

A. Yes, I recognize it.

Q. Okay. Can you tell me, this is not -- well, first, let's make sure we're on the same page in our terminology.

What does necking or pencil necking (sic) mean?

A. What do you see pencil necking?

Q. Tensile necking. Sorry.

STENO

13:34 A. Oh, tensile.

It's -- when I take a ductile piece of metal and pull it at room temperature and I pull it with a very substantial load, the diameter begins to get smaller, especially in a local area. And that lateral contraction of the diameter is what's referred to as necking.

And so for an overload fracture in steel or aluminum at room temperature the metal would pull itself, stretch out, maybe analogous to a piece of taffy, and then finally separate. And adjacent to the area of separation you would see a reduced diameter leading up to the fracture.

Q. Okay. That's in a necking situation, in tensile necking. Is -- is -- if you had a fatigue failure of the steel core conductor would you see tensile necking?

A. No. They -- they're different fracture mechanisms that exhibit different features when they occur.

Q. Sure. And so do you believe that a steel core under fatigue failure and -- well, let me step back. You don't believe the steel core failed from a fatigue failure, correct?

A. Yeah, that's -- the description in -- for this slide is the opposite of a fatigue failure.

Q. Okay. And if a -- if a fatigue fracture occurred with the steel core what would you expect to see?

A. If you look at that article that I provided on page 1 of -- or the first page I should say of the article, "Fatigue Fracture Appearances" --

Q. Uh-huh.

A. -- in Figure 1 they have a cylindrical object. You would see the progressive advancement of the crack as it grew through the metal, and it would leave behind striations and beach marks.

Q. Okay. Now, that -- let me see. Let me attach this article so we're on the same page. That's in your file on -- I got it here. It's under literature, I believe.

Here we go. All right. Since we're talking about this I'll drop it in the document -- or in the exhibit. I think we're at Exhibit 9. Okay. All right.

I will mark as Exhibit 9 the document in your file under literature titled, "Fatigue Fracture Appearances." It is a 15-page article out of the ASM Handbook.

Is this the article here, sir, you're referencing?

A. Yes.

(Exhibit 034-0009 marked.)

BY MR. BRISCO:

Q. Okay. And -- okay. So tell me again, why did you include that article in your file materials?

A. Well, because it describes what a fatigue fracture would look like.

Q. Okay. In the article does it describe what a fatigue fracture would look like of aluminum strands of an ACSR conductor?

A. Well, it -- it's unlikely it would be aluminum strands of an ACSR conductor, because the stressors are so low in the aluminum, you wouldn't get fatigue unless you were at an insulator where you developed some damage due to wear.

Q. Yeah.

A. And reduce the section of the conductor and then possibly or theoretically get fatigue if there's enough wear damage. As a practical matter, the only time I've seen fatigue in conductors is copper conductors at -- that have been damaged at insulators.

Q. How about a steel core conductor, does the article discuss the fatigue fracture with regard to a steel core conductor?

A. Yeah. This article describes --

Q. Sorry to interrupt you, I just want to make

sure we're on the same page. I appreciate you wanting to explain the article in full, but I just want to know kind of, you know, so I don't have to go through the whole thing, does it have -- is it a yes or no, does it actually deal with a steel core conductor fatigue fracture?

A. It deals with steel and what a fatigue fracture looks like in steel and other metals.

Q. Is the steel heated up in this article like a steel core conductor?

A. What are you talking about?

Q. So my question is --

A. When does the steel core get heated?

Q. Well, let me ask you this. When a steel core is in the air is it energized?

A. Yes.

Q. Okay. And so --

A. Well, if you have current going through it.

Q. Right. Okay. So does the article discuss a failure of steel when it's energized? It's a yes or no --

A. I doubt it does specifically but it shows you what a fatigue fracture would look like in steel and other metals.

Q. Okay. I'm just -- I don't want to take

everybody's time and read the whole article. I'm just trying to understand what's in or out of the article.

So does the article in Exhibit 9 from your file, does it discuss fatigue fractures of steel that's undergoing resistive heating?

A. Not that I'm aware of, nor would you expect resistance heating in the steel core. And if it did occur then you would -- to any significant degree, you would see an alteration in the microstructure.

Q. Let me ask you, if a steel core underwent resistive heating before failure, did the steel core exhibit tensile necking before failure?

A. You broke up just a little there at the end.

Q. Sure.

If the steel core exhibited resistive heating before failure, could the steel core exhibit tensile necking?

A. Well, it depends on the temperature. If it's relatively low temperature, like below 600 Farenheit, it probably would. But as you approach higher temperatures then the ductility of the steel diminishes, and you don't get the necking. But you have to look at how realistic your hypothetical is, number one.

Number two, if you get high level resistance heating through a steel core, that heat alters the

microstructure. It either anneals it or recrystallizes it, something that didn't happen here.

Q. Sure. Yeah. I was -- I was simply focused on the necking part and if resistive heating can heat a steel core to the point that it will exhibit necking?

A. Well, the steel core will exhibit necking at room temperature. So you don't need any heating to get necking. And you referred me to a slide, I believe, 122.

Q. Yep.

A. This slide, this is where we started, talks about necking. Let me tell you how wrong that is. The end of that wire has obviously been melted --

Q. Sir, sir, I appreciate it. Let's just -- I don't want to be here all day with you, so it's my pay period on this one. So let me just go through the questions that I have so that we can get done in time. I appreciate it.

So can a steel core exhibit necking under normal temperatures?

A. Normal being like room temperature?

Q. Yes.

A. The answer is, yes, if it's exposed to tensile forces that will exceed the ultimate breaking strength of the core. In other words, necking is a feature that develops when you have an overload fracture, where the

applied forces exceed the strength of the metal that we're talking about, in this case the steel core.

Q. How about when -- if there's resistive heating, can a steel core exhibit necking when there's resistive heating?

A. A little bit of resistance heating. I mean --

Q. Let me --

A. -- I've given you that answer before but --

Q. Let me ask you this.

A. I know you -- I know you don't want to give me narratives but I can go through this quickly.

Q. No. I want to go through it quickly, that's why I want -- some of these things I just want to know a quick answer to. So just focus on the question and go from there.

A. You know, I'm trying to, but I'm trying to give you a complete answer.

Q. I appreciate it.

A. That seems to be where you're cutting me off.

Q. Yeah. Well, okay. Let's talk about alloying a bit. Can you describe for me what the basic term alloying is?

A. When you have mutual melting you can have elements from the one of the strands comingle with elements of the other strand.

13:45 Q. And did the separation in --
13:45 A. There's -- there's another use of the term, but I don't believe it's being used here.
13:46 Q. Did the separation ends of the steel core on both -- both sides of the north conductor in the main failure area, did those separation ends alloy with aluminum?
13:46 A. I would have to look at the element traces. Let me just see if I can -- if you go to Slide 186.
13:46 Q. Uh-huh. I'm there.
13:46 A. Okay. That shows both ends of the steel core, and you see the melted structure at the ends?
13:46 Q. Yes.
13:46 A. You have to look at the element traces taken in that melted area to see if you find any evidence of aluminum or even Zinc, but you have to be a little careful because you have to know what polishing compound they use to prepare these samples.
13:47 Q. Sure. And so my question for you is, does the separated end of a steel core, in fact, show evidence of alloying with aluminum?
13:47 A. All I can say is in Slides 181 to 184 it shows a small aluminum peak in the area that's obviously melted at the end of the steel core.
13:47 Q. Uh-huh. And that would indicate some level of

alloying between the steel core and the aluminum, correct?

A. My only cautionary note is, there's also another area that doesn't show it, and you need to look at the polishing compound that was used.

Q. But was that a yes or a no, that it did alloy with the aluminum?

A. You just need more information.

Q. Okay. So are you unable to tell me if alloying took place?

A. I'm unable to confirm it without knowing the polishing compound that was used.

Q. Okay. But do the test results show evidence of aluminum on the -- alloying with the steel?

A. It shows on the polished surface a small aluminum peak.

Q. Okay. How about going the other way, the surface of the adjacent failed aluminum strands, do they show any evidence of alloying with the steel?

A. Do you have certain slides in mind?

Q. Let me see. I'm trying to pull up the EDS. Here we go. 112.

A. That doesn't help.

Q. 112 is the fracture surface of one of the aluminum strands, correct?

A. Yes.
Q. Okay. And it shows zinc vapor deposits, correct?
A. It shows zinc present, yes.
Q. Okay. And the steel core is coated with zinc, correct?
A. Yes.
Q. Okay. And so if -- during the failure event was there a transfer of zinc vapor deposits from the steel core on to the aluminum fracture surface?
A. Well, there was a transfer of zinc on to the aluminum fracture surface. It doesn't really tell you if it's particles or vapor. But we know there's mutual arcing, or there's arcing in the area that included melting of both the aluminum and the steel core.
Q. And do you believe that's why the transfer of metals occurred?
A. Yes.
Q. Is there a parting arc that occurred between the two failed ends of the steel core?
A. No.
Q. If a parting arc had occurred between the two failed ends of the steel core would you get this, a transfer of metals or vapor deposits as we saw in the EDS slides?

A. I think it's unlikely because they're separating from each other, under that theoretical hypothetical.

Q. In your sequence of events was the steel core the last strand to fail at the -- at the failure area?

A. Well, I can't say exactly, but what I can say is there was enough arc damage that it also included melting of the steel core. So a portion of the aluminum strands were melted. A portion -- or the steel core exhibits melting. And then the others could just fracture because they're very hot. But at that point the aluminum would have very little strength, and the steel core strength would be reduced to zero or near zero because of the extent of melting.

Q. Let me show you Slide 126 on Dr. Kumar's PowerPoint.

So there was an area six feet to the east of the failure location where there was multiple aluminum strands broken, as well as the steel core broken in this area, and the conductor was only being held by three aluminum strands.

Do you recall that, sir?

A. I'm looking at the photograph and I can see three aluminum strands still intact, and I can see the arc damage to the other aluminum strands. And I know if

you continue on there's arc damage to the steel core as well.

Q. Okay. Do you know why the steel core failed at this location before the remaining exterior aluminum strands failed?

A. Well, there wasn't a separation at this point. And the steel core, if you go to Slide 189 --

Q. Uh-huh. Yep.

A. Yeah. You see where the side of the steel core is melted?

Q. Yep.

A. That's the light area and then there's brittle cracks that go through the resolidified metal.

Q. Uh-huh.

A. The core breaks because it's all melting associated with arcing, and that arcing has to come in from the side that melted the aluminum strands. And then the surviving strands are likely on the opposite side of the melting damage that you see on the steel core.

Q. Okay. When you say there's arcing on the side of the steel core here, do I have that right?

A. Yes.

Q. Can that arcing be from a parting arc from an adjacent failed aluminum strand?

A. No.

Q. Why not?

A. Well, you still have a conductive path through this area, and so there's no different -- there's no voltage differential across these wires. That's what I was talking about earlier.

Q. I guess maybe I --

A. Plus --

Q. -- could heat from a parting arc cause this same type of damage that we see in Slide 189?

A. No.

Q. It would look differently if it was heat from a parting arc?

A. Well, you wouldn't get a parting arc because it didn't separate, this area didn't separate.

Q. No. No. That's -- what I'm asking you is, what type of damage a parting arc could cause, right. I understand you don't believe a parting arc occurred here. I get that. What I'm --

A. Well --

Q. What I'm trying to understand is, could the heat from a parting arc cause damage that looks similar to what we see in Slide 189?

A. No.

Q. Why not?

A. Well --

STENO

Q. Is it not hot enough? Is it -- why wouldn't it do that?

A. The times where I've seen conductors separate, I mean, ACSR conductors separate, there's been no evidence metallurgically of heat associated with a parting arc.

Q. So you don't believe there's heat associated with a parting arc?

A. I just tell you, I don't believe there will be a parting arc. I mean, it's -- it's possible that you may get a little tick, a spark, but it wouldn't be the kind of arcing that you get when you have conductors come in contact with each other and melt away the side of the conductor.

Q. Okay.

A. Why would the parting arc be on the side of the core?

Q. So here's what I want to ask you is -- so we started out talking about the steel core being broken in this area six feet away from our failure area, and the lines are only being held up by three aluminum strands at this location, correct?

A. Well, you need to be careful --

Q. Make sure we're on the same page, though, that that's --

A. Yeah, just hold on a minute. You see the deformation in 127 on the three surviving aluminum strands?

Q. Yes. Wait.

A. You see the deformation on the right there? Yeah. This area has been deformed after it came down.

Q. Okay.

A. Okay. So I don't know how soon after, maybe it's consistent with the damage in the parking lot that was described. Maybe it's consistent with coiling or handling. But you have to keep in mind that this area is different than the way it looked as soon as it came down, except for the melting. The melting obviously had to occur when it was in the air. But I'm just saying there's evidence of mechanical damage deformation after this conductor came down.

Q. Okay. You -- the image on the left here on Slide 126, would you consider that bird caging?

A. No, I would not.

Q. What do you understand bird caging to be?

A. If you look at Opinion 9, bird caging is a term used when the outer strands are displaced outward from the inner strands by a relatively uniform amount. For ACSR the outer strands are aluminum and the core strand is steel. Bird caging in ACSR can be caused by a sudden

release of tension in the conductor or by the heat from a ground fire.

And there's another sentence that talks about one slide that does exhibit minor bird caging, but what you're seeing here is where some of the aluminum strands have been deformed after they've separated. That's -- you would not apply bird caging to that condition.

Q. And that's because you see evidence of mechanical damage there?

A. Well, yeah. Plus, you know, keep in mind, bird caging has a very characteristic appearance, and this doesn't show that uniform outward defamation. It just shows some mechanical forces after the arcing event that occurred.

Q. You say here in Opinion 9 that bird caging in ACSR can be caused by a sudden release of tension in the conductor or by the heat from a ground fire?

A. Correct.

Q. Can bird -- yeah. Can bird caging also be caused by the movement of a conductor while it's in the air and the wind from contraction and release from that wind movement?

A. From contraction to release?

Q. You're cutting out just a bit.

A. Is that what you said?

STENO

Q. Yeah. From contraction and release from that conductor in the air.

A. No.

Q. Okay. Can a conductor experience bird caging from wind movement in the air?

A. I don't believe so, and I've certainly never seen it.

Q. You've never seen bird caging on a line while it's suspended in the air?

A. I cannot recall an occasion that I have. The times I've seen bird caging is when conductor -- when there's a conductor separation and falls to the ground and mostly it's been heat damaged that creates the bird caging.

Q. So you've never seen an example of bird caging where a line hadn't already come down?

A. I can't say I have. If -- if I'm shown one then I would have to analyze the conductor.

Q. Okay. This is a good point pivoting between opinions to take a break. Let's take ten minutes, sir.

A. Okay.

THE VIDEOGRAPHER: Time is 2:02 p.m. We are off the record.

(A recess was taken.)

THE VIDEOGRAPHER: The time is 2:19 p.m. We

are back on the record.

BY MR. BRISCO:

Q. All right. Thank you, Dr. Fowler.

I'm going to ask you about the areas of movement of a conductor while it's in the air. Does the area of an overhead conductor have its maximum movement near the mid span in windy conditions?

A. Generally, yes, because it's fixed at the ends.

Q. So have you ever seen a fatigue failure in overhead conductors near that mid span?

A. I have not.

Q. We talked earlier about the -- there was more than one line slap event between the north and center phase conductor is your opinion, correct?

A. I remember questions, and I think my answer was metallurgically I can -- I see obvious evidence of one. And then I sort of referred you to perhaps what Dr. Russell might be able to tell, or maybe not, from the recloser data.

Q. Sure.

And earlier you -- the point one of your opinion talks about Kumar referencing 50 strand failure break locations, and that's where you're telling me, well, not saying there's 50 incidents of line slap, but that all 50 of the breaks, of the strand breaks were

caused by line slap; is that correct?

A. Yes.

Q. One --

A. Well, really what I'm saying is I believe at one point Dr. Kumar offered the number of about 50.

Q. Uh-huh.

A. And I'm just saying, every time we saw a wire, a separated strand, there was arcing associated with that from the line slap.

Q. Right. And so a line slap could break more than one slan -- strand, excuse me; is that fair?

A. Yes.

Q. Do you have an opinion as to how many actual line slap events we had between the north and center phase conductor?

A. Boy, that sounds like what I just answered and what I answered previously. I --

Q. It shouldn't be -- give it to me real quick.

I can't tell whether -- it's not 50, because you said one line slap can break more than one strand, and so -- but it's not one because we looked at different locations where you said, that's a line slap, that's a line slap, that's a line slap.

So let me get to my question which is, do you have an opinion as to the number of line slaps that

occurred between the north phase and center phase conductor?

A. You know, I think I know where the problem is. You can have multiple arc areas with one line slap.

Q. Okay.

A. So I don't know the number of line slaps.

Q. Uh-huh.

A. It's certainly one. It could be more. And I think you would probably need the input of Dr. Russell to talk about that.

Q. So do you know how many arc areas you can have for one line slap?

A. I -- I've never heard of a specific number. I mean, sometimes you have multiple areas. Sometimes maybe just one or a few.

Q. Right. Considering the locations of the broken conductors where you show evidence of line slap, is it fair to say we definitively have more than one line slap incident between the north and center phase conductors?

A. I'm not offering a number.

Q. Okay. Do you think that one single line slap event could have caused all of the line slap arc marks and broken strands that we see on these conductors?

A. Potentially, but I would suggest directing that question to Dr. Russell.

STENO

Q. Okay. Do you believe that the use of spacers would have prevented or -- the line slap from occurring?
A. That's beyond the scope of what I've addressed.
Q. Do you know what a spacer is?
A. Yes.
Q. Okay. What's a spacer?
A. It's a nonconductive piece of equipment that's put on two or perhaps more conductors.
Q. What's the purpose of a spacer?
A. To keep the conductors apart.
Q. Okay. Prevent line slap?
A. That potentially can.
Q. Do you know why the north and center phase conductor were able to slap together if indeed they were constructed in compliance with GO 95 or otherwise properly spaced?
A. That's way beyond the scope of anything I addressed.
Q. How about from a metallurgical standpoint, do you know how -- do you know if the conductors were properly spaced at the time of installation such that they wouldn't slap, do you know metallurgically what could have changed with the conductors to allow them to slap?
A. Are you suggesting the conductors changed? Or

are you suggesting that an outside force, like a turbulent wind, is acting on them now?

Q. I don't -- I'm not making any suggestion whatsoever. I'm trying to understand if -- you're saying that the line slapped in this case. So I'm trying to understand, could the lines have always slapped, from date of installation until know in your opinion? Is that a yes or a no?

A. No.

Q. Okay. So what changed metallurgically speaking from the date of installation to the date of the fire when the lines slapped together in your opinion?

A. Nothing.

Q. So --

A. It's always been ACSR. We talked about a section being replaced, but metallurgically, it's still the same metals.

Q. Okay. And how about --

A. You have to realize that the outside force, the turbulent wind, is likely what's causing the line slap.

Q. Okay. But is the turbulent wind elongating the lines?

A. No.

Q. So the turbulent wind is just allowing two lines to reach each other that otherwise are physically

capable of reaching each other; is that fair?

A. That otherwise are physically capable?

Q. Yes, correct. So if you stretched out the lines in a wind event towards each other they would reach each and other slap, correct?

A. Well, you're talking about stretching, which implies from end to end, versus more of a turbulent movement of the conductors due to the wind.

Q. Now, from a metallurgical standpoint, if the lines were insulated lines and slap together would the arcing event occur?

A. It would be less likely. It depends on the severity of the contact and the insulation. And beyond that you should probably ask Dr. Russell.

Q. How about once the line came down to the ground, is a insulated line on the ground less likely to cause an arcing event with the ground?

A. I really haven't thought of that.

Q. I'll give you a moment, it's okay.

A. Well, to the extent you can prevent contact between the conductor and the ground that it would act to reduce the opportunity for arcing.

Q. Yeah. I believe when we saw your span measurement drawing before, I think it was Exhibit 3 -- 4, sorry. Let's see. Well, no. Do you have it in front

of you, sir, your -- oh, it's Exhibit 5, sorry. Yeah. Your Exhibit 5 showed repair splices in the mid span area of the north phase conductor, correct?

A. Yes.

Q. And does that suggest to you that the mid span was previously replaced as a result of line slap damage?

A. It suggests to me it was previously replaced. I don't -- I don't know why it was replaced.

Q. All right. But you don't believe a fatigue failure could have occurred in that mid span area, right?

A. No.

Q. Is there anything else that could have caused damage to that mid span area, besides a prior line slap to you?

A. Something being blown into the line creating mechanical damage.

Q. No trees directly next to this line is there?

A. Not directly next to it, yes.

Q. Okay. Let me look at -- let's look at Opinion Number 7. I believe we covered six in our prior discussions. Number seven says the fatigue strength of the ACSR conductor far exceeds the applied forces, even during windy conditions.

Let me read through these with you, sir, just to make sure we've got them all.

STENO

14:31 The strength of the steel core is sufficient to support the ACSR conductor for a 304-foot span. The applied cyclic stress on the aluminum strand, even for five times the static tension of the conductor, is well below the fatigue strength for 1350-H19 aluminum. The fatigue strength for the steel core is approximately 100,000 PSI and far exceeds the applied cyclic stress. The Number 4, 7/1 ACSR has a rated breaking strength of 2,360 pounds. Citing Lib 001. The applied tension in the conductor for a 300-foot span is 46 pounds. Citing Lib 11879. The steel core carries the majority of the tensile forces due to the higher elastic modules. Steel equals 30 times N to the six PSI, aluminum 10 times 10 to the six PSI in construction of the ACSR. The aluminum strands carry relatively little of the tension forces. The high stresses are at the end of the conductor, where it is attached to the insulator, not mid span. The splices on the north conductor indicate a prior replacement in the mid span area?

Did I accurately read your opinion number seven, sir?

A. Yes. I don't know if you pronounced moduless correctly, but that's the only glitch I heard.

Q. Yeah. Certainly possible. I'll acknowledge that.

STENO

A. Or maybe there was a pause in the transmission.

Q. Yeah. So then -- I read a lot here. Let's see. So tell me the fatigue strength of a steel core of an ACSR conductor?

A. It's about 100,000 PSI.

Q. And what does that mean in terms of, give me a layman's translation of that?

A. Well, that means that that so far exceeds the stresses in the steel core that you're not going to get a fatigue strength -- excuse me, a fatigue crack in the steel core.

Q. Is it fair to say that you believe unless something struck the steel core, such as a line slap incident we have here, even when the aluminum strand -- even if the aluminum strands had broken, you believe the steel core could have held the line?

A. Yeah. The steel core by itself can hold about 1,700 pounds, and the force on the conductor, the applied tension in the conductor is about 46 pounds. So you can -- you can see that the core and indeed the ACSR that has a breaking strength of 2360 far exceeds anything that's applied to it.

Q. Let's see. I'm going to introduce Exhibit 10. It is a document from your file marked ACSR and it is 16-page document.

(Exhibit 034-0010 marked.)

BY MR. BRISCO:

Q. Can you see the first page here, sir?

A. Yes.

Q. Okay. And then on Page 3 there's these handwritten notes. Are these your notes, sir?

A. Yes. Calculations.

Q. Okay. What are you calculating here, sir?

A. Well, what I've done is I've taken the size, namely the diameter and the material properties from the ASTM specifications and from that first document you showed me, and then calculated the area of an aluminum strand and a steel strand, multiplied it times the tensile strength, and that gives you the force that it would take to break an individual strand, whether it be -- I did it for both aluminum and steel.

And then at the bottom I said, well, let's elevate the temperature to 1200 Farenheit, which is about the melting temperature of aluminum. And then I provided another page that shows you the strength of steel at that temperature, and it's about 35 percent of the ultimate tensile strength. So that even at elevated temperature you still have plenty of residual strength.

Q. Gotcha.

So just to make sure I got the math here, if

there's -- if we're not adding heat to the steel core, the minimum strength of the steel core is this 1,000 -- you may not be able to see my cursor -- but in the middle of the Page 3 on Exhibit 10 this 1,705 pounds, correct?

A. Yes.

Q. Okay. And then you add 1200 degrees of heat from the aluminum strand failure, that steel core strength dropped from 1705 pounds to 597 pounds?

A. Yeah. You threw in an extra word or two there. That number is simply, what is the strength of the steel, and therefore the core strand, at 1200 Farenheit. And that's where you come up with almost 600 pounds.

Q. Okay. Now, if the steel core experienced resistive heading, would that resistive heating exceed 1200 Farenheit?

A. Well, the problem you have, if that were to occur, theoretically, then you would see an alteration in the microstructure, and you don't have that.

Q. But first, my question was, is a resistive heating in the steel core in excess of 1200 degrees Farenheit?

A. Well, as the temperature goes up the strength goes down.

Q. Correct. And does resistive heating have a temperature -- resistive heating of a steel core have a

temperature in excess of 1200 Farenheit?

A. You would need to ask Don Russell that.

Q. Okay. But generally, you may have said already when I didn't ask the question, that as the temperature of the steel core increases, the strength of the steel core conversely reduces?

A. Correct.

Q. Let me look at Opinion 8 here, sir. I'm going to read it for the record and confirm I have Opinion 8 correct.

There's not any evidence of a separation arc in the multiple broken areas in the north and center conductors. There is one area of separation on the north phase that exhibited damage due to the arcing when the north and center phases clashed. Separation arc does not occur with a broken strand when there is a parallel conducted path through the remaining strands. ACSR conductor with low voltage and low current does not exhibit a separation arc when there is a mechanical separation, such as a tree falling on the conductor.

All right. I believe we've already talked about that opinion at length today. If there's something that I -- we missed that forms the basis of your opinion, let me know, but I believe we've covered this, correct?

A. Yes.

STENO

Q. Okay. Sir, do you consider yourself an expert in oxidation?

A. Yes.

Q. Okay. Can you educate me on the difference in oxidation of aluminum at ambient temperatures versus high temperatures?

A. Yes. The rate goes up as the temperature increases.

Q. I'm sorry, I couldn't -- mic cut out. Can you say that again?

A. The rate of oxidation goes up as the temperature increases.

Q. Okay. Bear with me one minute, sir. We already covered nine so I'm going to go back and see what areas I missed on my notes.

Sir, we talked about line slap between the north phase and the center phase conductor today. Do you believe there's evidence of line slap between the center phase and the roadside conductor?

A. I didn't see any evidence of it.

Q. Okay. Do you know if the roadside conductor is the same distance from the center phase as the center phase is from the field side?

A. Approximately so.

Q. Okay. Do you know why we see no evidence of --

well, strike that.

Do you have any reason to believe why you have a line slap between the north and center phase conductor but not the roadside and center phase?

A. I can just tell you they didn't come in contact.

Q. Did you see any evidence of linear surface arcing on the surface of the failure area before it failed?

A. Linear, you mean where the arcing was longer than it was wide?

Q. Okay. Now you lost me with that. So why don't I ask you this way.

Do you see any evidence of linear surface arcing on the north phase conductor?

A. Well, by that you mean it's longer than it is wide?

Q. Sure. We'll go with that definition.

A. I'd have to go back and look at the different areas to see if there are some arc areas that are longer than its width.

Q. Let me ask you this. Does line contact arcing create any weak areas for a fatigue crack to start?

A. Well, that depends on the extent of melting. But then that means that the piece would have to be

exposed to a large number of cyclic stresses for that damaged area to then to generate a crack extension by fatigue. And if that you were to occur then that's where we get back to looking for evidence of striations that would support that hypothesis.

Q. When the line slap occurred in this case according to your opinion that brought the line down, can you explain to me the sequence of events, meaning does the conductor come down immediately after the line slap occurs or is there a longer process taking place?

A. Well, you know, it's not a kind of analysis that can put a specific time sequence to it, except in order for the conductor to come down the core has to be either severed or damaged. And we know the core at the location of separation exhibits melting across the diameter. That's shown in the metallography on Slide 186. And the other aluminum strands in that area show melting damage or increased heat. That's when the conductor comes down. It's -- it's really the core strand that is the majority of the strength for the ACSR.

Q. So but from a --

A. I can arc the aluminum strands, like -- like what happened on the center conductor, but the core strand is sufficient to keep the line up.

Q. Uh-huh.

STENO

A. But we know on the north phase there were two areas where the arcing got to the core strand, and one of them in the more extensive amount of melting is at the area of separation.

Q. But from a timing standpoint how long after the line slap occurred in this case did the line come down, a second or less or much more than that?

A. It would come down as soon as the core couldn't support it and the aluminum strands are either melted or heated.

Q. Okay. And is that time a second or less or much lunger?

A. It's very quick. I don't know that I can put a particular time on it.

Q. Quick housekeeping, sir. I'm going to mark as Exhibit 11 a folder -- I'm sorry -- a document in your file titled, "Metallurgical Photos and Data." It is -- I'm presenting it now, it's a 24-page document that starts with some notes. It's an e-mail from Steven Scordalakis at the top to Fowler, Inc., and some other folks here.

But you see the various melting center phase notes at the top of the page?

A. Yes.

(Exhibit 034-0011 marked.)

BY MR. BRISCO:

Q. What is this document, this 24-page document marked as Exhibit 11?

I couldn't hear your answer if you described the document?

A. Oh, I'm sorry, I didn't hear the question.

Q. Sorry. I just asked you what this document is marked as Exhibit 11.

A. The underlying document is an e-mail that you identified. Then that data was transmitted to me, and these are the notes I made during the initial look at -- at that metallurgical data.

Q. So these are all -- on Exhibit 11 these are all your notes regarding your review of the metallurgical data provided to you by counsel?

A. Yes. That was the first time I looked at it. Just so I knew what was -- what was in that file.

Q. Okay. Then I'm almost there. We've gone through your opinion sheet. I've got some more questions to ask, but I want to -- let's take a break now so I can get my thoughts and things will move a little quicker.

So why don't we take ten minutes now and come back at 3:00 and then move to the finish line there. Sound good?

A. Yeah, that's fine. Thanks.

STENO

14:51 Q. Thank you, sir.

14:51 THE VIDEOGRAPHER: The time is 2:51 p.m. We are off the record.

15:07 (A recess was taken.)

15:07 THE VIDEOGRAPHER: The time is 3:07 p.m. We are back on the record.

15:07 BY MR. BRISCO:

15:07 Q. Thank you, Dr. Fowler.

15:07 Dr. Fowler, can you describe for me from a metallurgical standpoint how wind can impact power lines, such as the ones in this case, over time?

15:08 A. I can just tell you my experience where it shows up, that if you have severe enough wind or turbulence you can have minute movement, where the line is in contact with a porcelain insulator and you can get some wear at that location.

15:08 Q. Okay.

15:08 A. And I've seen occasions for -- with copper conductors, where you can actually get a fatigue failure of at least a strand at the location where it's -- it's usually a tie wire that goes around the insulator and the conductor sits in a saddle on top of an insulator.

15:09 Q. So how -- explain to me how that fatigue failure can occur at the end of a conductor, such as the one we have here? I mean, I'm picturing what you're

saying, kind of like a paper clip kind of moving back and forth over time, and of course, initially there's no break but over time that can wear at a connection point.

Is that what you're describing of the wear at the insulator location?

A. No.

Q. Help me understand.

A. I was talking about copper conductors, but I've also seen ACSR that has worn on the side, and you have an abraded area on the side, where over a period of time and relative movement you can get some wear, relatively light wear, but still detectable wear on the outer side of some of the strands, the aluminum strands.

Q. What does that mean, detectable wear? You mean like you can see it, you can see broken strands?

A. Well, I can after, you know, after it's brought down or I look at it visually or in the laboratory.

Q. But that wear that you're talking about is occurring at the end of the conductor where it's connected to the insulator?

A. Yes.

Q. And that -- and why is the wear occurring there at that location as opposed to mid span for you?

A. Well, you have to realize that at an insulator often the conductor will have sag on both sides of the

insulator. So you have tension force and bending force, and even though they're low level, to the extent you have relative movement, just minute relative movement of the conductor relative to the insulator, you can get some wear at that location.

Q. And what's bending force, is that the idea of the conductor moving, bending back and forth at that location?

A. Well, the answer is yes, but you know what tension is when you pull on it, and bending would be, imaging it going up over an insulator and sagging down on both sides, and you have a little bit of bending force there as well.

Q. Okay. So what's wrong with -- now I'm offended. I like my paper clip example and you didn't like it. Isn't that what's going on with the bending force and the tension, that it's going back and forth until it wears over time?

A. No.

Q. No?

A. A paper clip is a different mechanism. You're grossly bending a piece of metal back and forth so that it's a permanent bend in both directions. Nothing even close like that happens to the conductor on an insulator.

Q. When you -- I skipped over the very beginning

today of walking through your work in this case. We started with your retention July or August of 2023, correct?

A. I believe I referred to a July 27th e-mail, which was the first contact.

Q. Uh-huh.

A. And then I believe about six weeks later I actually received -- you know what I received is that information, that file that you went over just a few minutes ago that had my notes on it.

Q. Oh, right. Okay.

And then at some point you did a site inspection in this case, correct?

A. Right.

Q. Okay. When did that site inspection take place? Was that the time of the transformer inspection?

A. The day before.

Q. Okay. So that was December 5, 2023, would have been your site inspection?

A. Right.

Q. Okay. Who was present for your site inspection?

A. You asked me that earlier. I identified Krsto, Steven, Don Russell and Tom Fee.

Q. Okay. How long was your site inspection?

A. You know, I didn't time it, but it took us all day to drive down there from Reno, do the inspection, which I think probably lasted perhaps three hours, possibly four, and then we drove back to South Lake Tahoe. And basically, that took all day.

Q. But three to four hours actually on site outside the Mountain View Barbecue?

A. Correct.

Q. Okay. And so why did you need to go, as a metallurgist why did you need to go to the scene?

A. Well, it gives me good perspective to where the poles are and the different buildings, eyewitness locations. I wanted to measure the span and I wanted to look at the -- I'll call them landmarks in order to better understand where the conductor fell. I also wanted to look at the relationship from the triplex to the west pole and the service pole, because even though it had been taken down it was restrung. So a variety of reasons.

Q. Okay. Waiting for it to upload, I'm going to mark as Exhibit 12 a document marked, "Scene Photographs" in your file. I'm going to -- I'm going to share my screen instead because the pictures are not oriented properly.

All right. Okay, sir, this is a 36-page

document from your file, this Exhibit 12 marked, "Scene Photographs." And do you see the Page 1 here on the screen of Exhibit 12?

A. Yes.

(Exhibit 034-0012 marked.)

BY MR. BRISCO:

Q. Okay. And I'm going to scroll through them slowly, but do you recognize this set of 36 pages of documents in Exhibit 12?

A. Well, you've only shown me a few, but yes, I do recognize them.

Q. I'm scrolling through them so you can see them to verify it's the same document from your file that's marked "Scene Photographs."

A. Yes. They all look the same.

Q. Uh-huh. I'm going to keep scrolling through them so you have a chance to see them all.

And so these aren't -- you know, I can tell from them but I just want to confirm. None of these are your actual photographs, correct?

A. Correct.

Q. Okay. These are photographs that you compiled from this case and that -- are these your notes?

A. Yes.

Q. Okay. I'm going to go back to the top, but if

you need to see the whole file let me know.

A. You know, I'm okay. Obviously, you're going through the file that we scanned and labeled "Scene Photographs."

Q. Exactly. Exactly.

And when you went to the scene did you walk -- can you describe for me the area of the scene that you walked during your site inspection in December 2023?

A. Well, it would have been along 395, from about the flea market up to the motel that's across from the barbecue place. And then on -- obviously walked by the barbecue place, some of the poles to the east and had -- and then through the gravel parking lot and out in the field. The photograph you're showing is the burnt field that had grown over with grass.

Q. Uh-huh.

A. And out in the field where the west end of the north phase conductor came down.

Q. Gotcha.

And so this field that you walked in, when you went it's three plus years after the Mountain View fire was, what was the condition of the field when you went out there? Was the grass still burned? Or what was the condition?

A. No. The weeds had grown back, but like there

were a couple fence of posts there that show up in the fire investigation photographs.

Q. Uh-huh.

A. One of them was there. The other one was there but it had fallen down. And then through the scene photographs we were able to locate the approximate location where the end of the conductor landed in the field, the end you just passed. Yeah, that end. We were able to locate the approximate location of that.

Q. Okay. And this location where this, what we were calling Item 2 of the north field conductor that landed in the field, this side landed not on the gravel side where Item 1 landed but it landed on the field side in the actual field of grasses, correct?

A. Correct.

Q. When you were out there did you see Tom Fee drop any fire indicator flags?

A. No, I don't recall any.

Q. And I believe you were saying a moment ago you were able to identify the area in the field where this north phase conductor on Page 6 of your Exhibit 12 scene photographs, where that had landed in the field, correct?

A. Yes.

Q. Okay. And how did you do that, just using the Cal-Fire photo that we see here in Exhibit 12, Page 6,

just kind of line that up with where you were standing?

A. Well, that and other photographs.

Q. Right. Okay. And when you were out there three years after the fire, you said I think the vegetation had started to grow back, or can you describe for me the vegetation in the area where the line had fell but three years later when you arrived?

A. Yeah. You know, I have photographs of it, and some of them were scanned as part of your package, and those scanned photographs will show the grass.

Q. Okay. I will -- yeah. I'll pull back up those photographs and see them.

Was Dr. Russell and Tom Fee out there with you the whole three to four-hour inspection?

A. I believe so. They were -- they didn't go anywhere. I, you know, I was doing my work. I didn't necessarily pay attention to all of what they were doing.

Q. Sure. Did they make any comments to you while you were out there as to what potentially could have caused the Mountain View fire?

A. I don't believe so, not at that time.

Q. Did they acknowledge that the power line was a competent ignition source for the Mountain View fire?

A. I don't believe so.

Q. Did they ask you any questions as to whether

you believed the power line was energized when it contacted the ground in this area?

A. Well, I don't know that they specifically asked me that question. I believe by that point we all knew that it was, at least until the recloser shut it down.

Q. Did any other -- in terms of inspections you attended, we've talked about the December 5, 2023, site inspection, and then the inspection of I think the transformer the next day?

A. Yes.

Q. And the piece of sheet metal you looked at the next day.

A. Correct.

Q. Okay. You told me before that was ruled out as being related -- it's ruled out as it's unrelated to the cause of the fire, correct?

A. Yeah. I didn't find a connection between that panel and what I was seeing on the conductor.

Q. Okay. Any other site inspections that you conducted, other than this December 5th inspection?

A. That was the day that I did the site inspection.

Q. Okay. And then on December 7th you attended an examination of the preserved conductors at EAG Labs?

A. Yes.

Q. And that was, December 7, 2023, was the first time you personally saw the failed conductors, correct?
A. Except for the photographs, correct.
Q. Sorry. In person, correct?
A. Correct.
Q. So you obviously did not attend the Evans inspection at Bureau of Land Management in September of 2021, correct?
A. Correct.
Q. And you did not attend the Evans inspection at the Bureau of Land Management in January of 2022, correct?
A. Correct.
Q. And then you didn't personally attend the metallurgical testing of the evidence at EAG Labs in June of 2023, correct?
A. That's correct. I just had photographs from all those inspections.
Q. Okay.
A. But I wasn't personally there.
Q. If you had been involved in this case in June of 2023 when the joint metallurgical destructive testing took place, would you have personally participated in that examination?
A. Wait. You are asking if I had been involved,

would I have been involved?

Q. Would you have attended, personally attended, a destructive exam?

A. Well, if I had been retained before that date and been asked to attend I believe I would have.

Q. Yeah. Do you know if defendants' prior metallurgist, Jerry Zamiski, attended the destructive testing at EAG Labs, as well as the two Bureau of Land Management inspections?

A. He attended one of the BLM inspections and he attended the lab examination.

Q. Do you know what his findings were from the lab examination?

A. No.

Q. Why not call -- well, strike that.

Would it have been important to you to speak to Dr. Zamiski about his findings following the destructive testing in June of 2023?

A. No.

Q. Why not?

A. I was asked to examine the evidence and come to my own findings.

Q. Do you know -- you know Dr. Zamiski from prior metallurgical work?

A. Yes.

STENO

Q. Okay. Is he a well respected expert in the community?

A. I believe he is.

Q. Were you prohibited from contacting Dr. Zamiski to find out what his opinions were in this case?

A. No. In fact, on the 7th I called him, and even though we didn't make contact I wanted some information as to the orientation of some of the samples. And then eventually the technician at EAG provided at least some of that information and then assisted in laying them out. So I didn't see the need to get that information from Jerry.

Q. How about Dr. Kumar? You worked with Dr. Kumar in this field on prior occasions?

A. Yes. I've known him -- I've known both of them many years.

Q. It's a small community, so I figured you guys all know each other.

Same question with Dr. Kumar, does Dr. Kumar have a good reputation in the metallurgic community?

A. Yes, he does.

Q. And then same for Dr. Kumar's lab, EAG, formerly known as SEAL Labs, is EAG and SEAL Labs a lab that has a good reputation in the metallurgic community?

A. Yes, they do.

15:29 Q. So you've used the lab on various prior occasions, fair to say, on other examinations?
15:29 A. Yes.
15:29 Q. So you have no reason to question the accuracy of the data produced by EAG Labs or Dr. Kumar's lab in this case, correct?
15:29 A. In this case I didn't find any reason to. If I found a reason then I would ask him the question.
15:29 Q. Right. I think I'm about done, let me just double-check some of my notes here, sir.
15:30 I don't have any further questions, sir. Other than, do you believe we've covered all of your primary opinions in this case and the basis for those opinions? Obviously, you have your file here with your photographs and documentation, but did we miss any opinions today?
15:30 A. I don't believe so.
15:30 Q. I don't have it in front of me but what we've been doing is calculating -- getting the deposition time on the record and then multiplying by your hourly, and then asking if you can send an invoice to Krsto and Krsto will forward it over to my office to have paid.
15:31 What is your hourly rate for depositions again?
15:31 A. $500.
15:31 Q. Okay. And I'll ask the court reporter, videographer if we can get a time for today's deposition.

STENO

15:31 THE VIDEOGRAPHER: One second. So we went on the record at 9:25 and it's now 3:30, and we took 30 minutes for lunch. So that would be --

15:31 MR. BRISCO: I'm going to have you spot me five minutes just for math's sake. 9:30 to 3:30 minus -- is six hours, minus a half hour. So that's 5.5 hours times $500 an hour.

15:31 Krsto, I got that okay for you?

15:31 MR. MIJANOVIC: Yeah, that works out.

15:31 MR. BRISCO: Okay. Sounds good. So, Dr. Fowler, if you can send an invoice to Krsto for that amount, 5.5 hours times $500, and then we'll get that paid right away.

15:32 And then I appreciate your time in this case.

15:32 THE WITNESS: Okay. Thank you.

15:32 MR. BRISCO: Thank you.

15:32 THE VIDEOGRAPHER: All right. Madame Court Reporter, do you need anything?

15:32 THE REPORTER: Expedites and roughs, the usual?

15:32 MR. BRISCO: Yes. For plaintiffs, yes.

15:32 THE REPORTER: Mr. Mijanovic?

15:32 MR. MIJANOVIC: Yes, please. Thank you.

15:32 THE VIDEOGRAPHER: All right. This completes Volume I of the deposition of Gary Fowler, PhD, the time is 3:31 p.m. We are off the record.

STENO

(Deposition concluded at 3:31 p.m.)

STENO

Declaration Under Penalty of Perjury

I, GARY FOWLER, the witness herein, declare under penalty of perjury that I have read the foregoing in its entirety; and that the testimony contained therein, as corrected by me, is a true and accurate transcription of my testimony elicited at said time and place.

Executed this_____day of _____20__

At _____, _____
City State

_____
GARY FOWLER

STENO

I, CHERYL ORTEGA, Certified Shorthand Reporter for the State of California, do hereby certify:

That the proceeding was taken by me in machine shorthand and later transcribed into typewriting, under my direction, and that the foregoing contains a true record of the testimony of the witness.

Dated: This 19th of February, 2024 at San Bernardino, California.

Cheryl Ortega
CSR NO. 13709

ERRATA SHEET
CHANGES IN TESTIMONY
MOUNTAIN VIEW FIRE CASES
GARY FOWLER
February 19, 2024

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SIGNATURE:_____DATE:_____

GARY FOWLER

Deposition Transcript

Case Number: JCCP No. 5228
Date: February 14, 2024

In the matter of:

MOUNTAIN VIEW FIRE CASES

ARUN KUMAR, PH.D.

CERTIFIED COPY

Reported by:
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SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF LOS ANGELES - SPRING STREET COURTHOUSE

COORDINATION PROCEEDING SPECIAL TITLE (RULE 3.550),	)
MOUNTAIN VIEW CASES	) NO. JCCP NO. 5228

REMOTE VIDEO-RECORDED DEPOSITION OF

ARUN KUMAR

FEBRUARY 14, 2024

REPORTED BY: CHERYL S. ORTEGA, CSR NO. 13709
STENO

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF LOS ANGELES - SPRING STREET COURTHOUSE

COORDINATION PROCEEDING SPECIAL TITLE (RULE 3.550),	)
MOUNTAIN VIEW CASES	) No. JCCP NO. 5228

REMOTE VIDEO-RECORDED DEPOSITION OF ARUN KUMAR, TAKEN BEFORE CHERYL S. ORTEGA, CSR NO. 13709, A CERTIFIED COURT REPORTER FOR THE STATE OF CALIFORNIA, COMMENCING AT 9:19 A.M., WEDNESDAY, FEBRUARY 14, 2024.

STENO

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Evan Krell, assistant, Berger Kahn

STENO

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EXHIBITS

STENO

WEDNESDAY, FEBRUARY 14, 2024

9:19 A.M.

-OOO-

09:19 THE VIDEOGRAPHER: We are on the record. My name is Greg Buhlert. I'm a notary public contracted by Steno. I'm not financially interested in this action, nor am I a relative or an employee of any of the attorneys or any of the parties.

09:19 Today is February 14, 2024. The time is 9:19 a.m. Pacific.

09:19 This video deposition is taken remotely via Steno Connect. The name of the case is Mountain View cases, filed in the Superior Court of the State of California for the County of Los Angeles, Case Number JCCP 5228.

09:20 This is the video recorded deposition of Arun Kumar, PhD, Volume I. The attorney taking this deposition is Krsto Mijanovic. I will know take the role of the attorneys, starting with the taking attorney, Mr. Mijanovic.

09:20 MR. MIJANOVIC: Good morning. Krsto Mijanovic on behalf of Defendant Liberty Utilities.

09:20 THE VIDEOGRAPHER: And defending the depo will be Mr. Brisco.

09:20 MR. BRISCO: Good morning. David Brisco, Cozen O'Connor, for various subrogation plaintiffs.
09:20 THE VIDEOGRAPHER: Okay. Next we have Mr. Robertson.
09:20 MR. ROBERTSON: Good morning. Alex Robertson on behalf of various individual plaintiffs.
09:20 THE VIDEOGRAPHER: Ms. Stevens.
09:20 MS. STEVENS: Amanda Stevens, Schroeder Loscotoff Stevens, for various subrogation plaintiffs.
09:20 THE VIDEOGRAPHER: Next will be Ms. Westerlund.
09:20 MS. WESTERLUND: Audrey Westerlind, Schroeder Loscotoff Stevens, for various subrogation plaintiffs.
09:20 THE VIDEOGRAPHER: Okay. Next we have Mr. Simon.
09:21 MR. SIMON: Craig Simon, Berger Kahn, for plaintiffs. Also with me is paralegal Evan Krell with regard to IT issues.
09:21 THE VIDEOGRAPHER: Ms. Meyers.
09:21 MS. MEYERS: Dana Meyers, Cozen O'Connor, for various subrogating plaintiffs.
09:21 THE VIDEOGRAPHER: Mr. Spreter.
09:21 MR. SPRETER: Geoff Spreter on behalf of individual plaintiffs.
09:21 THE VIDEOGRAPHER: Mr. Maycon.
09:21 MR. MAYCON: Howard Maycon, Cozen O'Connor, on

behalf of various subrogation plaintiffs.

THE VIDEOGRAPHER: Okay. Mr. Julius.

MR. JULIUS: Jason Julius with Baron & Budd for Public Entity plaintiffs.

THE VIDEOGRAPHER: Okay. Ms. Fox.

Okay. I will move on.

Ms. Shkolnikov.

MS. SHKOLNIKOV: Lilla Shkolnikov of Grotefeld Hoffman for various subrogating plaintiffs.

THE VIDEOGRAPHER: Okay. Mr. Casetta.

MR. CASETTA: Paul Casetta on behalf of subrogation plaintiffs.

THE VIDEOGRAPHER: Okay. Mr. Landis.

MR. LANDIS: Paul Landis of Bauman Loewe Witt & Maxwell on behalf of various subrogating plaintiffs.

THE VIDEOGRAPHER: Mr. Gold.

MR. GOLD: Yes. Russ Gold, Fox Law, also with Joanna Fox, for various plaintiffs.

THE VIDEOGRAPHER: Okay Mr. Caine.

MR. CAINE: Good morning. Shawn Caine on behalf of various plaintiffs.

THE VIDEOGRAPHER: Mr. Scordalakis.

MR. SCORDALAKIS: Good morning. Steven Scordalakis on behalf of Defendant Liberty Utilities.

THE VIDEOGRAPHER: Okay. And Mr. Loscotoff.

MR. LOSCOTOFF: Bill Loscotoff for subrogating plaintiffs.

THE VIDEOGRAPHER: Okay. We are ready to proceed. Our court reporter today is Cheri Ortega with Steno. Will the reporter please swear in the witness.

ARUN KUMAR,

having been first duly sworn, testified as follows:

EXAMINATION

BY MR. MIJANOVIC:

Q. Good morning, Dr. Kumar.

A. Good morning, sir. How are you?

Q. Fine. Thank you for asking.

You understand that the -- that this is your deposition as a retained expert in the Mountain View Fire cases?

A. Yes, sir.

Q. And that you've been retained by the plaintiff collectively to provide metallurgical opinions; is that correct?

A. Correct.

Q. Are you prepared to express all the opinions that you intend to express at the time of trial?

A. Yes.

09:23 Q. Obviously, with the exception of any rebuttal opinions that Dr. Fowler may have; is that right?
09:23 A. That's correct.
09:23 Q. Okay. A few minutes before your deposition was scheduled I received an e-mail from Mr. Brisco containing a one-page document that itemizes your opinions. It's entitled, Opinions, Mountain View Fire.
09:24 I'll be attaching that as an exhibit, but let me just ask you, did you prepare that document?
09:24 A. Yes, I did.
09:24 Q. When did you prepare it?
09:24 A. I was working on it for last -- since yesterday and I finished it this morning.
09:24 Q. And during your draft of the opinions, the one-page document containing your opinions, did you have any communications with any attorneys on the plaintiffs' side regarding those opinions?
09:24 A. Yes. Yesterday we had a meeting and I expressed my opinions verbally at that time.
09:24 Q. Who was in the meeting?
09:24 A. There was several people that I do recall. Mr. Brisco and Mr. Maycon, for sure. There were three or four other attorneys. All plaintiff attorneys.
09:25 Q. Did any one of those individuals ask you to prepare a list of opinions?

STENO

A. No, nobody did. But I generally do that so that it becomes easy in the deposition, that I don't forget any major opinions.

Q. Of course.

And recognizing that you would be appearing today to give your deposition and expressing all the opinions that you intend to express at the time of trial, was it your intention to list all of the opinions in this one-page document to -- that way, as you said, you don't forget any opinions?

MR. SIMON: I'm going to object to the question -- this is Craig Simon -- on the basis of vagueness as to all the opinions. Obviously, he's laid out his major categories.

I may ask him a question at trial in the area that may not be the exact wording, but I think if you can clarify your question it would help.

BY MR. MIJANOVIC:

Q. Dr. Kumar, did you understand my question?

A. Yes, I did. And these are the major opinions. There will be a lot of sub-opinions within that, because you can't list everything on one page. And as you mentioned earlier, based on any rebuttal opinions, that would be added to it.

Q. I also reviewed your Power Point. There were

over 200 slides in it. Does that Power Point contain those sub-opinions that you just referenced?

A. Most of them, yes. The Power Point is still under preparation. I generally prepare that so that I have a chronological order of what was done and when it was done and what my major observations were at the time.

So that's what is in the Power Point and still in the making. It will be finalized before the trial.

Q. All right. So what I'll do is attach as Exhibit 1 to your deposition the notice of deposition, which includes a Request for Production of Documents.

Have you had a chance to review that document?

A. Yes, sir.

(Exhibit 028-0001 marked.)

BY MR. MIJANOVIC:

Q. And do we now have your complete file?

A. You sure do, yes.

Q. Are there any -- were there any notes that were part of your file that you have not produced?

A. No.

Q. And have you produced all your photographs?

A. All of them, yes.

Q. All right. I'm attaching as Exhibit 2 to your deposition, it's plaintiffs' expert disclosure. Before I show that to you on the screen, have you had a chance to

review how you were being disclosed in this case before the disclosure was served by the plaintiffs?

A. Yes, I have.

(Exhibit 028-0002 marked.)

BY MR. MIJANOVIC:

Q. I'll show you Exhibit 2.

Dr. Kumar, do you see that on your screen?

A. Yes. If you can enlarge it a little bit, would be nice.

Q. How is that?

A. Perfect. Okay.

Q. Now, this is Exhibit 2, looking at Paragraph Number 8 of Section B it provides, Dr. Kumar will be called upon as an expert to offer opinions on liability and causation within his areas of expertise. And let me stop right there.

Is your letter -- area of expertise, is that metallurgy, sir?

A. That is correct.

Q. Do you consider yourself an expert on reconstruction?

A. No.

Q. Did you conduct any type of reconstruction in this matter to illustrate line slap?

A. The only reconstruction is based on

metallurgical observations I have.

Q. All right. Your disclosure -- strike that.

The scope of your expert disclosure goes on to state that you'll testify on all issues related to metallurgical observation and finding pertaining to evidence collected in connection with the investigation of the Mountain View fire.

When you prepared your Power Point, the one that you produced with your file that's over 200 slides, did you try to include photographs and then itemize what your observations were and your opinions were relating to whatever was depicted in the photograph?

A. Yes. All of that has been put in the Power Point, except the last inspection that happened at Dr. Fowler's place, looking at a place of metal that was corroded.

Q. Okay. And then your designation goes on to state that you will also be called upon to opine with regard to photographs and video testimony and documents provided by Liberty, its employees and former employees, third party witnesses and other third parties related to the Mountain View fire.

With respect to that broad designation does your list of opinions that you prepared this morning contain any opinions on that topic?

STENO

A. Not yet, but based on the testimony of all the other experts for Liberty, that will be appended.

Q. All right. I'm trying to print a PDF of your Power Point, but it's voluminous and it may take some time.

A. Yes.

Q. So in the meantime I may refer to it, okay, and then later on we'll attach it if we're ever successful in printing it to PDF.

A. That would be fine.

Q. So what I've done, I've attached as Exhibit 3 to your deposition your opinions -- it's a one-page opinion sheet that you prepared this morning; is that right?

A. That is correct.

(Exhibit 028-0003 marked.)

MR. MIJANOVIC: Let me take a little detour here for a second, a housekeeping issue.

That Power Point is over two gigabytes. Is that something that we can attach in native format as an exhibit?

MR. BRISCO: That was not for you, Dr. Kumar. That's for the Steno folks.

THE WITNESS: I understand.

MR. MIJANOVIC: Does Steno -- does Steno know?

I don't want to break the platform.

MR. McCULLOGH: This is Greg McCullogh. I believe you can turn on the -- you can upload the file, it just may take awhile. You just won't be able to display it through the platform, but you should be able to upload it.

THE VIDEOGRAPHER: That's correct.

MR. BRISCO: It's up to you, Krsto. Maybe I would suggest doing a share screen if you want to use it, and then we deal with the upload at the end, but I don't know if it's going to mess with your computer while you're trying to do that.

MR. SIMON: If you send it to Greg McCullogh, I think he can turn it into a PDF for Krsto.

MR. MIJANOVIC: Yeah. I think you guys should have it already.

MR. BRISCO: Yeah. It's in the --

MR. MIJANOVIC: Should I do that --

MR. BRISCO: Yeah, I'll --

(Speaking simultaneously.)

MR. MIJANOVIC: -- in the meantime that would be great.

MR. BRISCO: Yeah. I'll text with Greg and make sure he has access to it and work with him on it.

MR. MIJANOVIC: All right. All right.

BY MR. MIJANOVIC:

Q. Sir, so I have on the screen Exhibit 3, which is a list of opinions. Are you prepared to go through these opinions?

A. Sure.

Q. So the first opinion you have listed, sir, is that the field side conductor between pole number one and pole number two failed at a distance of 133 feet, and then in parentheses you say, plus the cut section length from pole number one to ground on the east side. You go on to state that the failure occurred at prior progressively fatigued cracks, aluminum strands of the 71 ACR aluminum conductor, steel reinforced conductor. And then final separation in the steel core with some tensile necking followed by separation arc.

Is that your first primary opinion?

A. Correct.

Q. You reference that the failure occurred at prior progressively fatigued cracked aluminum strands.

Can you explain how you went about determining that?

A. Yes. So when we did the optical microscope and electron microscope examination of all the cracked aluminum strands, keep in mind there are multiple, multiple strands which have cracked, we were only able to

look at few of them in the electron microscope. But the balance were all examined in optical microscope.

And combination of those, which is in my Power Point, by selected photographs, because there were over a thousand photographs taken. Selected photographs show different individual strands which have cracked and they show fatigue cracking prior to this failure.

Q. So you're saying that there was cracking on the strands of the field side phase before the actual conductor came down to the ground; is that correct?

A. That is correct, multiple cracks.

Q. And how did you make a determination as to whether those cracks existed prior to the line coming down versus existing as a result of the line coming down?

A. Okay. So there are several observations that combine to give you that final conclusion on that. First of all, fatigue cracks occur over time. They don't occur instantly. So fatigue cracks leave different types of footprint if you want to call it, which under metallurgical observation would show that they are either a flat fracture on the strands or an angled fracture, depending on whether they are a straight fatigue or torsional fatigue.

Those occur over a long period of time, and multiple cracks after separation, when they get

separation arc, because the separation arc only occurs when the conductor is energized. And that happens after the separation occurs.

And if the two failed ends are close to each other, the electricity is still -- it wants to jump through and causes what is called separation arc.

In other cases where the separation occurs and the two ends separate very quickly, those surfaces were oxidized. And oxidation occurs over a period of time. So you combine these two observations as far as the fracture goes.

And then the next observation you see is on the surface to see if there is any side arcing, for example, by line slapping, or by mechanical damage or by some other means which may have started fatigue, and none were found.

We also did not find any major necking of aluminum conductors.

So in absence of all of those observations and presence of others, you conclude that they were progressively fatiguing one by one. And as one aluminum strand cracks, the second one and the third one goes after that, because the loads increase on the balance of the conductor, and the process continues until final separation.

STENO

Q. So are you able to place a date or an age on the cracks based on your observations?

A. No, sir. I don't think anybody can.

Q. In other words, can you tell whether a fatigue crack occurred two years ago versus one year ago versus six months prior to the fire?

A. No, that is not possible, because oxidation depends on the environment and the amount of oxygen attacking the aluminum surface. So all of that becomes very difficult for anyone to date it.

All we can say is it did not happen at the time of failure. It happened way before that, because oxidation takes time.

Q. So when you examined the wire -- well, let's talk about that. When did you first examine the strands that had, in your opinion, fatigue cracks that predated the fire? When did you first examine those conductors?

A. Okay. So that's where the Power Point comes in handy. The very first examination we did was at BLM office on September 8, 2021. That was the initial examination.

Q. Is it your understanding that BLM took possession of the conductors until those conductors were produced on September 8, 2021, for the parties to inspect?

09:42 A. That's my understanding.
09:42 Q. And do you have any information as to how BLM stored the conductors while the conductors were in its possession?
09:42 A. No, I don't.
09:42 Q. You understand that this incident occurred on -- strike that.
09:42 You understand that the subject fire occurred on November 17, 2020; is that correct?
09:42 A. Correct.
09:42 Q. The incident occurred on November 17, 2020, but the BLM exam number one occurred on September 8, 2021. So given that time period are you of the opinion that any cracks in the strands of wire would be subjected to oxidation?
09:43 A. That certainly would take risk, yes.
09:43 Q. And it depends on the environment in which the conductors were stored; is that correct?
09:43 A. That is correct. But that oxidation would be common to the entire surface, not just the fractured surface.
09:43 Q. You're of the opinion that you would have an equal amount of oxidation to the surface as well as to the fractured surface during the time that BLM maintained possession of the conductors?

STENO

A. That is correct. And if you look at the surface of the conductor, they are not that oxidized as compared to the fracture surface.

Q. And because you observed oxidation on the fractured surface of the strands than on the outer surface of the strands themselves, you concluded that greater oxidation on the fractured surface was because that was exposed to an environment that would have caused greater oxidation to the fractured surface; is that right?

A. That is correct.

Q. And so it's just a -- you're, in essence, observing an area that had more oxidation and concluding that that crack must have been there before the fire because that's the only way you can explain the greater oxidation; is that right?

A. That is correct. And that is coupled with the fact that the surfaces on -- the fractured surfaces are typical of fatigue fractures. That does not happen just by storing it. That had happened before that.

Q. So you're saying that -- strike that.

Did you just say that the fractured surfaces are a result of fatigue fracture?

A. That is correct.

Q. And when you say fatigue fracture can you

explain what you mean by that?

A. Fatigue fractures occur with alternating stresses, where the stresses go up and down repeatedly over a long period of time. So initially the fatigue cracks nucleates, which takes a long period of time. After nucleation they start going, and the growth is what is seen on the fractured surfaces.

Q. And what is causing the fatigue fracture, if you have an opinion on that issue?

A. In overhead conductors it is the movement of the conductors.

Q. So you're of the opinion that the field side conductor experienced fatigue fractures in the strands based on the movement of that conductor over time, and that fatigue fracture occurred prior to the subject fire?

A. Right. And similar observation was done on center conductor also, by the way.

Q. But is it correct that you're unable to place a date on when the fatigue fracture occurred on the strands in relation to the subject fire, correct?

MR. BRISCO: Asked and answered.

You can answer.

THE WITNESS: Yeah. The only answer I can give you is that those fatigue cracks occurred before the final fracture during the Mountain View fire.

BY MR. MIJANOVIC:

Q. So the fatigue fracture could have occurred the day before; is that correct?

A. No, sir.

Q. All right.

A. It takes more.

Q. It could --

A. Fatigue fractures take a long period of time.

Q. But can you give me a best estimate as to when the fatigue fractures on the field side phase occurred prior to the subject fire?

A. I don't believe I can give a date on that.

Q. What -- are you able to give a best estimate?

A. Best estimate is that it happened before the Mountain View fire because of several observations we have which is in the Power Point.

Number one, as I mentioned earlier, that the surfaces are cracked in a manner that are typical of fatigue, either the torsional fatigue or straight fatigue. They're oxidized. And some of the ends are arced, electrically arced, which is called a separation arc. And that occurs when the conductor is energized before the failure.

Q. I'm just going back to this question about when in relation to the fire those fatigue fractures existed.

09:48 Are you able to state to a reasonable degree of metallurgical science and certainty that those fatigue fractures were present a year prior to the subject fire?

MR. BRISCO: Objection. Asked and answered multiple times.

THE WITNESS: I don't believe I can give exact, or anybody, any metallurgist can, in months or years, anything like that. The only thing we can answer is that it takes long period of time. And all conductors, overhead conductors are known for this kind of failure, which occurs over several months and years.

BY MR. MIJANOVIC:

Q. Are you able to give an estimate as to the length of time it takes for the oxidation to build up on the fractured surface of the strands of the conductor?

A. No, sir. Not exact dates, no.

Q. What about generally speaking, like an estimate, are you able to do that?

A. Generally speaking, it takes months and years, yes.

Q. You're not able to narrow it down any more than that; is that correct?

A. That is correct.

Q. Have you ever given -- have you ever given an opinion -- just by looking at oxidation on a conductor

have you ever given an opinion as to how long it would have taken for that oxidation to build up?

A. I don't recall.

Q. Is that within your expertise to provide an opinion as to how long it took certain oxidation to build up on an aluminum strand of a conductor?

A. I have looked at hundreds of conductors over my career, and the fracture surfaces depend on the time it takes for oxidation to take place. The oxidation becomes darker as the time becomes longer. And oxidation is shinier, if you want to call it that, as compared to the longer period.

But relatively speaking, you can talk about those. You can never come up with an exact number, because it depends on the environmental conditions.

Q. Are you aware of any studies that discuss this issue by, in essence, placing a date on oxidation present on a fractured surface of an aluminum strand?

A. I've never seen one.

Q. Would you have to speculate as to whether that oxidized -- strike that.

Would you have to speculate as to whether the oxidation on the fractured surface of the aluminum strands you're referencing were present a month before the fire occurred versus two years before the fire

occurred?

A. I'm not speculating any exact number. It could be months or years.

Q. But you don't know which; is that right?

A. That is correct, sir.

Q. And is that because there are too many factors involved, for example, environmental conditions, how it was stored, humidity levels, things of that nature?

A. All of that, yes.

Q. And how many of these fatigue cracked aluminum strands did you observe where you are of the opinion that those cracks predated the fire?

A. Many. And if you continue reading in the opinions you will come to that. Let me see.

If you look at Item Number 4 in the opinions, within eight and a half feet only -- not the entire length, we looked at 133 feet. Within only eight and a half feet there were 25 fractured aluminum strands close to the main failure on the field side conductor.

Q. So are you of the opinion -- are you of the opinion that within that eight feet where you have the approximate 25 fractures, are you of the opinion that those fractures existed on the field side phase before the wire went down?

A. That is correct, because fatigue fractures

don't happen instantly. It takes a long time.

Q. Are you able to direct me in your Power Point that was part of your file, are you able to direct me to the slides that depict the oxidized fractures on the aluminum strands that you believe predated the subject fire?

A. Sure. Give me a second, please.

Q. Sure.

A. Or a minute maybe.

MR. McCULLOGH: This is Greg McCullogh.

The -- Dr. Kumar's Power Point has been uploaded as Exhibit 28-0004 as requested, but remember, it will not be able to be displayed within the Steno platform. You'll have to do a screen share to view it.

MR. MIJANOVIC: Thank you. I appreciate that.

MR. SIMON: Any time you need him, Krsto, just let me know. We'll be glad to do all the technical stuff for you.

MR. MIJANOVIC: Great. Thank you for that. That's a lot of help.

THE WITNESS: Okay. Just a few typical ones, I can identify where they are. I'm sure there are more but at least I can show you some.

BY MR. MIJANOVIC:

Q. Okay.

A. If you go to Slide Number 163, please. I don't know who is going to pull it but --

Q. I can display it, just so we can confirm that we're looking at the same page. Hang on a second.

A. Sure. Sorry, it's not 163. It's 103. 103.

Q. All right, sir, I'm displaying Slide 103 of Exhibit 4 on the screen. Do you see it?

A. Yes.

(Exhibit 028-0004 marked.)

BY MR. MIJANOVIC:

Q. Let me see if I can enlarge that a bit. All right. There you go.

A. Yes.

Q. All right. So I see -- these are two -- do you want to call them photographs?

A. Micrographs taken in the electron microscope.

Q. Let's focus on the micrograph on the left side. Please explain what in this micrograph tells you that the fatigue fracture in your opinion predated the subject fire?

A. Well, the surface looks oxidized, and the way you can see that it, you do not see the fractured surface. You see a flat surface, a fracture, with small oxidized material on the surface. And the right side is the back scatter electronic measure at the same location

taken at 500 times magnification.

So that surface does not show a fracture surface. It shows an oxidized surface because of these small outside particles on the surface.

Q. Is there anything else about these two micrographs that tell you that the fracture depicted in these two micrographs predated the subject incident?

A. We also took energy dispersive spectrum on the surface, which is not in the slides at this time, which shows very high oxygen peak also along the aluminum.

Q. It shows very high what, sir?

A. Oxygen peak. Because just by looking you can't tell it's aluminum oxide. It could be aluminum chloride, for example. But when you do EDS analysis, you can tell if it's an oxide or not. And the EDS analysis, which I think I'll include in my Power Point eventually.

Q. When you say that the EDS shows a very high oxygen peak, what's the significance of a very high oxygen peak to your opinion that these -- that the fracture depicted in Slide 103 predated the subject fire?

A. So the oxygen, coupled with aluminum, you can see that's aluminum oxide, and that's what gives you that conclusion. And the fracture -- see, oxidation occurs after the fracture. So fracture predates the failure, because fatigue does not occur instantly. Fatigue occurs

over long period of time. And that cannot happen by sitting or mishandling or any type of environmental control by BLM.

So the fracture had already occurred prior to oxidation. So you need to go back to the origin of the surface, how was the surface created. It was created by a fracture process, not by oxidation process. Oxidation is a secondary thing that happens afterwards.

Q. So looking at these two micrographs on Slide 103, you are of the opinion that the fracture occurred as a result of the movement of the conductors over time; is that correct?

A. Right. By a process of fatigue.

Q. And is there anything in the two micrographs that would suggest to you that the fractures depicted occurred as a result of impact?

A. No. There's no impact on this. As a matter of fact, there are micrographs taken of the conductor on the surface, those would be before these slides, to show what the surface condition was before we even went to electron microscope photos. The surfaces do not show that issue. Fractures are pretty clean on the surface. When you look at optical micrograph on the site of these conductors at the area of the failure.

MR. MIJANOVIC: So we're going to take a short
STENO

break. We're on the hour here and I need to recharge these earbuds regularly, otherwise, they're going to fail on me. So let's take --

MR. BRISCO: Ten minutes, Krsto, or how much do you want?

MR. MIJANOVIC: Ten, please.

MR. BRISCO: Okay.

MR. MIJANOVIC: Thank you.

THE VIDEOGRAPHER: The time is 10:00 a.m. We are off the record.

(A recess was taken.)

THE VIDEOGRAPHER: The time is 10:15 a.m. We are back on the record.

BY MR. MIJANOVIC:

Q. Dr. Kumar, we left off discussing these two micrographs, which are depicted on Slide 103 of Exhibit 4.

Do you recall that?

A. Yes.

Q. Other than the amount of oxidation that you observed in these two micrographs, what other evidence are you relying on to opine that the fracture depicted in these two micrographs existed on the field side phase prior to the fire?

A. Okay. For that you need to look at each one of

these conductor strands, which have failed from the surface, in optical microscope, and look at the condition of the failure, the angle of the fracture and other details. It's not just one micrograph.

Before we go further, if you recall my testimony that the oxidation could be studied by EDS analysis, as a matter of fact in my Power Point I do have another one, just on Page 111 of my Power Point.

Q. Before we -- before we leave these two micrographs, do you have the EDS analysis for these two that we can reference?

A. I may have it in the file, I don't have it in the Power Point. But another one I have in the Power Point.

Q. Let's go to the one that you want to go to. Is it five -- 111?

A. 111. Yes, please.

Q. All right.

All right. So I have on the screen two micrographs depicted on Slide 111 of Exhibit 4; is that correct?

A. Correct. So this one also showed oxidation on the surface. And then the next slide shows the EDS analysis of the surface, which is 112.

Q. So before we leave Slide 111, you're of the

opinion that the fracture depicted on this aluminum strand depicted on Slide 111 existed before the subject fire; is that correct?

A. That is correct.

Q. And is it the same answer that you don't know how many months or years before, but you just know it was before, correct?

A. That is correct.

Q. Is there anything else, any other significance in these two micrographs that support that opinion, other than the level of oxidation that you're observing?

A. Yes. The right slide is at 500 magnification, which is equivalent to the previous slide that we saw. You see the oxidation on the surface. And then when the you the EDS analysis you get more information, which is in the next slide, which is 112.

Q. So now we're looking at Slide 112, and this relates to the two micrographs depicted in Slide 111; is that correct?

A. Yes. It is taken on that fractured surface. The fractured surface EDS analysis shows the chemical composition. And the three main elements you see here are aluminum, oxygen and zinc.

So the interesting information that you get here is that the zinc vapors they deposit from the arced

surface on to the fractured surface, that means the fracture had to be occurring at or before for the zinc to deposit.

Now, zinc deposit comes in from the steel core, which is in the center, which is steel coated with zinc for corrosion prevention. And when you do the arcing the zinc vaporizes, because the zinc vapor melting point is very low. It vaporizes and gets on to the fractured surface.

So what we have here is aluminum oxide along with zinc oxide side on the surface.

Q. Let me see if I can paraphrase that.

So you're of the opinion that the presence of a zinc deposit on the fractured mark on the aluminum strand indicates the fracture occurred prior to the fire because that zinc deposit can only come from the zinc coating on the steel core?

A. After arcing because zinc has to vaporize to redeposit on the surface.

Q. So --

A. And for that, energy need -- this end needs to energize. And keep in mind this is on the -- on the -- let me see. This is Item Number 1, which is on the east pole, and after failure you don't have that kind of arcing capability on that surface, because that side does

not have the same energy as the failed side on pole number two.

Q. So are you of the opinion that the fracture on the aluminum strand depicted in Slide 111 was near a location where there was an arcing event with the steel core; is that correct?

A. Correct. That is correct.

Q. And as a result of that arcing on the steel core you would have vaporized zinc coating on that steel core, deposit on the fracture of the aluminum strand; is that correct?

A. Yes, sir.

Q. And so you're of the opinion that because the deposit of the zinc on that fracture of the aluminum strand occurred, that the fracture must have predated the -- it must have predated the subject fire by some months or years; is that correct?

A. Right. And also predated the arcing on the steel core. And keep in mind that this location is where actual separation occurred.

Q. All right. Any other -- do you have any other observations that support your opinion that the fracture predated the subject fire by some months or years, other than the EDS analysis, as well as the micrograph you referenced on Slide 111?

A. Oh, a lot more than that.

First of all, this is a fatigue fracture. Fatigue fractures don't occur in one day or one instant. It occurs over a period of time. So the fracture had to occur in fatigue first before all this happens.

Q. You're saying that the fatigue fracture had to occur first to create the spacing along the fracture for the zinc deposit to reach that area?

A. You got it, yes.

Q. But you don't know -- you're not able to date or age that fatigue fracture. The best that you can say is it occurred months or years prior to the fire; is that correct?

MR. BRISCO: Asked and answered.

THE WITNESS: That's correct.

BY MR. MIJANOVIC:

Q. Okay. Sir, do you have any other examples where you can reference micrographs, as well as related EDS analysis to support the same opinion?

A. I think we have several of these, except they cannot all go in the Power Point because of it's already 200 plus slides. So if you want individual ones I think they can be pulled out from my actual file.

Q. Let me see if I can ask it this way. When you went through the analysis of the field side conductor

looking at these fractures on the aluminum strands were you categorizing the fractures in terms of whether they preexisted the day of the fire?

A. All the fatigue fractures preexisted before the fire, because they occur over a period of time.

Q. How many fractures do you estimate predated the fire? And I'm focusing on these aluminum strands.

A. Many. So in the slide -- let me see one. If you go to Slide Number 21, please.

Q. What's the significance of Slide 21?

A. A lot. And the reason being -- reason being you have so many of these aluminum conductor strands that have failed near the main failure area, which is on the left side, which shows failure area west. This is actual separation point of the conductor connected to pole number one.

So at the end it shows 3-4. That means you have three aluminum conductors at one location and then other four a little bit further, six inches away from it. And then you have two. Then another two. Then another four. Another -- so all of these combined give you 25 aluminum conductors all within eight and a half feet.

And there were several more beyond on the right side towards the east pole.

So this area has a lot more failed conductors

as compared to the balance of it, but the balance of it also has it. So we found failed aluminum strands on the right side of this section that I'm showing here and on the left side on Item Number 2 also, away from the failed area there were several.

And then similar failures were on center conductor in different locations. So if you look at the total number, I don't have it in front of me, but there will be way beyond 50, I would say, if you combine all of them.

Q. And just referencing the 25 aluminum conductor strands that failed within eight and a half feet from the failed west end, are those documented in your file somewhere where we can locate the 25?

A. Yes. They are actually in the same slide. If you just go back on the slides, I'll show you each one of them.

So if you go --

Q. I'm just looking -- I'm just looking for slide numbers that I can associate these 25 aluminum conductor strands to the photos somewhere in your file?

A. Absolutely. So if you go to Slide Number 12.

Q. All right.

A. So in Slide Number 12 what you have is three failed aluminum conductors. This is on the main failure.

So if you recall on the slide I had 3-4, so these are the three from that.

Q. Okay. Thank you.

A. Then the next slide will show the other four failed aluminum strands, which is Slide Number 13. So here we see four aluminum and one steel, this is the main failure area.

Then the next one slide would be Slide Number 14, which is at one feet nine inch on that slide, and we see two failed conductors. You can see the two aluminum. The top one shows the black arcing also, which is the arcing damage while it's energized.

Next Slide Number 15 shows another two failed aluminum conductors.

If you go to the next one, 15.

Q. All right.

A. You can see the two failed aluminum conductors separated and they're melted at the end by parting arc.

Then you go on to --

Q. Let me stop you there.

On Slide 15, the two separated conductors that are melted at the end, you're of the opinion that that occurred prior to the fire?

A. Way before fire, yes.

Q. All right. And how long before the fire are

you able to date these conductors in terms of when that occurred?

A. No, I cannot date these 25 failed strands as to when they failed, one after the other.

Q. All right. Go ahead, sir.

A. So next slide would be 16. And here, you can't see all of them, but there are four aluminum conductors that have failed. And you can see the black arc, which tells you that they were energized after fatigue fracture occurred, which is caused by the parting arc.

Next slide would be at five feet six inches, which is Slide Number 17. Here you see --

Q. All right. Go ahead.

A. -- the two failed aluminum conductors.

Q. Okay.

A. Next slide is at Slide Number 15 at six feet three inches.

Q. Slide 18?

A. Next one, 16. No. 18. I'm sorry. 18, you're right.

Q. Go ahead.

A. This one shows another two failed aluminum conductors here and then bent over.

And then next Slide Number 19 has four failed aluminum conductors. And this one shows the black

arcing. The one before this. I think you can jump to Slide 19.

Q. I'm on Slide 20 now.

A. Yeah. If you go back to 19, please.

Q. Okay.

A. 19 has four failed aluminum conductors and all of them have black separation arc. And if you look at the left side you can see a little bit bird caging also there.

And now, if you go to Slide 20, it --

MR. SIMON: And, Cheri, did you get the word bird caging?

THE REPORTER: I did. That's been in other depos. Thank you, though.

THE WITNESS: Okay. Good.

And Slide Number 20 shows another failed two conductor strands at eight feet six inches.

So that -- then you go to the next slide and that's a compilation of all of these slides together, which shows the 25 strands. And they show the distance where the photographs are taken.

BY MR. MIJANOVIC:

Q. Thank you.

And is there corresponding EDS analysis for all of these or is it just some of them?

A. Not each one of them because it's just too many.

Keep in mind, this is examination being done on day one in the field at BLM. Eventually all of the conductors were sent to EAG Laboratories and electron microscope studies were done on some of these, not all of them.

Q. So with respect to these 25 aluminum conductors are you of the opinion that all of them exhibit fatigue fractures, in other words, the reason they fractured was due to fatigue?

A. That is correct. Fatigue. Some show oxidation on the surface. Some show arcing on the surface by the parting arcs. So those are all typical of fatigue fractures.

Q. Are any of these 25 related to the subject incident after the line separated and struck other lines or struck the ground?

A. No, sir.

Q. Are there any other slides, Dr. Kumar, of -- that supports your opinion that these 25 aluminum conductor strands that you went over from Slide 12 to Slide 20 are related to fatigue fractures that predate the incident?

A. Yeah. The seven strands which are actual

10:37 failure and they were examined in detail in the electron
10:37 microscope. So those were done. And then some of these
10:37 other ones were examined in detail in the electron
10:37 microscope in the lab, and they're photographs as you go
10:37 in the Power Point.
10:37 Q. All right. We started off with your first
10:37 opinion, and I'm referring to the one-page list of
10:38 opinions that's marked as Exhibit 3. And so we started
10:38 off focusing on this first opinion that you had, that the
10:38 failure occurred at prior progressively fatigue cracked
10:38 aluminum strands, and that then the final separation of
10:38 the steel core occurred.
10:38 Is that -- are you describing, for instance,
10:38 what occurred at the separation point?
10:38 A. Right.
10:38 Q. All right.
10:38 A. And -- and behind it. We covered another
10:38 opinion also while we were discussing this Item Number 4,
10:38 I believe.
10:38 Q. When you say Item Number 4 are you saying
10:38 bullet point four?
10:38 A. Yes. Bullet point number four. Remember, we
10:39 talked about all those 25 conductors, strands.
10:39 Q. Understood. Thank you.
10:39 So focusing on Exhibit 3, if you go down to the

fourth bullet point, that opinion is that there were 25 fractured aluminum strands within eight and a half feet of the failed end of the conductor toward pole number one. What you're telling me is we just went over that opinion and your support for that opinion by referencing Slides 12 through 20; is that correct?

A. And a few others, yes.

Q. All right. Thank you, sir.

Now, as part of this fourth bullet point opinion that starts off -- starts off referencing the 25 fractured aluminum strands, the last sentence of that opinion states, several failed ends of the aluminum strands show dark discoloration due to arcing, indicating that the fatigue failures occurred while the conductor was fully energized prior to the final failure.

Do you see that?

A. Yes.

Q. The reference to the conductor being fully energized prior to the final failure, are you referring to that event occurring at some time before the subject fire?

A. Yes, sir.

Q. So the conductor being fully energized prior to the final failure, the final failure that you're referring to is not on November 17, 2020, it's at some

point, whether it be months or years, prior to the date of November 17, 2020; is that correct?

A. Yes, sir.

MR. MIJANOVIC: Okay. I got some feedback there for a moment. Did the court reporter capture the question and answer on that?

THE REPORTER: Yes, I did. It sounded like wind chimes but I got everything.

BY MR. MIJANOVIC:

Q. Sir, going back to Exhibit 3, that first opinion indicates that the failure occurred at prior progressively fatigued cracked aluminum strands of the ACSR conductor and then final separation in the steel core with some tensile necking following by a separation.

That last clause, that last sentence you're talking about the final separation in the steel core with some tensile necking followed by a separation arc, are you referring to the steel core separating as part of this incident?

A. Yes.

Q. And when you reference the separation of the steel core with some tensile necking, what does that mean?

A. So if you go back to the process you have seven aluminum strands surrounding the center steel core. As

10:43 all seven aluminum strands separate, all the loading is going through the steel center core, as well as the electricity wants to go through the steel core as well. But steel core gets resistance heating, because it is not as good a conductor as aluminum is. So by resistance heating that area becomes hot.

And when steel becomes hot it becomes more ductile. And when it becomes ductile it will start pulling because the conductor is still holding the entire strand together, the entire line together. So then it starts pulling, and that pulling causes the tensile necking while the separation is taking place in a ductile manner at an elevated temperature and of the steel core. And then final separation. And as soon as it separates it creates arcing because the electricity still wants to jump through.

Q. So at the point of this separation of this steel conductor are you describing a scenario where all seven aluminum strands have already separated at that location?

A. Correct.

Q. And when you say the aluminum strands have separated at the location where the steel core separated, is the separation of the aluminum strands bird caging or is it actual fractures along all seven strands?

A. These are actual fractures. Now, one of the aluminum strands may have stayed along with the steel and separated at the end as well. It's not that all seven had completely separated. Because if you look at the ends, one of the aluminum strands shows a ductile failure also. So it could have been that only five or six of then have failed and fatigued, and then one aluminum and steel eventually fails at the very end.

Q. And you're describing the tensile necking occurring as a result of heating of the steel due to the energized conductor; is that right?

A. Yeah. Due to resistance heating, yes.

Q. So you're describing aluminum strands being separated and thereby not being able to conduct the energy. Now the energy is going through the steel core, causing resistance heating and necking thereafter; is that right?

A. Yes, sir.

Q. Now, was there -- the tensile necking that you observed was that at the actual separation point of the steel core?

A. That is correct.

Q. And before there was separation -- well, strike that.

Was the separation of the steel core due to the

tensile necking or was it also due to line slap?

A. No. Due to tensile necking.

Line slap occurs only on the outer surface of aluminum strands, not on the steel core, because it is covered by seven aluminum on all sides. So if you see line slapping, it would be on the outer surface of the aluminum strands. And none of these seven strands at the failure point show anything, any surface arcing due to line slap.

Q. So you're of the opinion that the steel core separated on the field side phase due to tensile necking that resulted from a high resistance -- that resulted from high resistance as a result of some of the aluminum strands being separated and having less of an ability or no ability to conduct electricity or energy; is that right?

A. And hold the load also.

Q. All right. Do you have an opinion as to whether the steel core in and of itself was designed to withstand any of the load on its own without the strands themselves?

A. It can hold the load if it is not heated. At room temperature it will be okay. But as I said, when energy is going through the conductor, as aluminum strands separate the energy wants to go through whatever

10:48 1 is left over. The steel is still a conductor but not as
10:48 2 good conductor as aluminum is. So you get resistance
10:48 3 heating in that location where you have severed aluminum
10:48 4 strands. And that becomes soft and that's why it cannot
10:48 5 take the load anymore.
10:48 6 Q. And do you know the threshold level of
10:48 7 resistance heating that's necessary to soften the steel
10:49 8 core, such that you're compromising its ability to hold
10:49 9 the load?
10:49 10 A. I haven't seen any study like that and I
10:49 11 haven't done any.
10:49 12 Q. All right. So when you say that resistance
10:49 13 heating resulted in the steel core to become soft, do you
10:49 14 know at what point that occurred?
10:49 15 A. At -- at the very end of separation time. As
10:49 16 soon as all the aluminum strands have given up and maybe
10:49 17 even just one left over, the loading is going to
10:49 18 concentrate on the remaining steel and aluminum, whatever
10:49 19 is left there. And since all the energy wants to go
10:49 20 through there, there will be resistance heating, because
10:49 21 it's not conducting uniformly along the seven conductors
10:49 22 as it was supposed to.
10:49 23 Q. Have you done any calculations on your opinion
10:50 24 as to the level of resistance heating necessary to soften
10:50 25 that core and ultimately result in the tensile necking

you described?

A. No, sir.

Q. Have you -- strike that.

Are you aware of any studies that discuss this topic?

A. I have not seen any. I've seen describing the same way as I'm describing, but not any calculations, if you want to call it that.

Q. Have you yourself done any independent testing to confirm your theory?

A. This has been seen many times on many other occasions. This is not the first time.

Q. But have you done testing of your own, in other words, sending a certain amount of energy just through the steel core that didn't have intact strands surrounding the steel core, and then you would actually witness the tensile necking and softening of that steel core?

A. No, sir.

Q. Were you able to calculate the tensile force on the field side steel conductor before separation?

A. No, sir.

Q. Did you assume a certain amount of tensile force on that steel core prior to separation?

A. Qualitatively the amount of loading will keep

10:52 increasing as the aluminum strands are severing. So it will keep increasing in that direction.

Q. But aside from it -- aside from it keeping increase -- strike that.

You're of the opinion that the more aluminum strands are fractured the greater the tensile force on the steel core; is that correct?

A. Greater the tensile force on the steel core and the remaining aluminum, as well as the electricity going through will start concentrating in that area where the aluminum strands have severed.

Q. Have you ever performed any calculations as to how much more tensile force is being exerted on that steel core, as -- as that ACSR wire loses the aluminum strands that surround the core?

A. No, I have not.

Q. And how many aluminum strands in your opinion were fractured around the area where the field side phase separated due to the tensile necking?

A. Okay. Let me look at one more photograph here.

So the answer to that is four to five aluminum strands have already severed before this final failure. And the way I answered that question is by looking at Slide Numbers 12 and 13.

Q. Okay. I have up on the screen Slide 12, the

three failed aluminum strands associated with the west end field side phase. Were those at the separation point of the field side phase?

A. Yes. They are one separation point, yes.

Q. So my question is, were these three stands depicted on Slide 12, were those actually located in the area where the steel core separated due to tensile necking as you described?

A. No. Steel core was about six inches behind it.

Q. On which side?

A. On the right side of the photographs.

Q. You said the steel core was six inches behind it. I'm envisioning that the steel core separated due to tensile necking six inches away from the fractured aluminum strands depicted in Slide 12, and I want to know, is it six inches west or east of the location where you have the aluminum strands depicted in Slide 12?

A. East, towards the east. To -- to show it I want to show you another slide where both ends are together, not separated like this, so it's easy to visualize that way.

Q. Thank you.

A. Give me a second, please.

Q. Yes.

A. You can kindly pull Slide Number 69. So in 69

the slide that you have on the screen right now you can see the right side is Item Number 1 and left side is Item Number 2 coming together. And the very end of Item Number 1 on top are the three aluminum strands, which is in the Figure A at the very top in the middle somewhere.

And then the balance of the aluminum conductors, four of them, and the steel core is on the right side, where the end, the black mark end is. The black mark end is the one from Item Number 2, which is on the ground.

Q. Thank you, sir.

A. Sure.

And then if you want to go one step further, maybe I'll take you there now before you ask the question. Figure 168 I think gives some more depiction of that.

Q. One --

A. Slide Number 168. 168.

So in this slide I have tried to put the two ends together. The BLM Item Number 4 is connected to the west pole number two on the left side, and then BLM Item Number 1 is connected to the right side, which shows the three aluminum and four aluminums and steel at one point.

And then if you match it, the arc end of the two aluminum and steel are where the four aluminum steel

are on the other one. So they're --

Q. Slide 168, this supports your first opinion on Exhibit 3; is that right?

A. That is correct, it does.

Q. Okay. Did you locate any evidence of line slap at the location of where Item 1 and Item 2 separated?

A. There was no line slap in this area. There were line slap in other locations but not here.

Q. Where the steel core -- strike that.

Do you have photographs of the steel core or micrographs or the steel core for both ends of where Item 1 and Item 2 connected?

A. Yes. Yes, I do.

You can start at Slide Number 1 -- 105. So in 105 you can see the second failed location. Remember, the three aluminum strands separate which are fried at the bottom and cut on the left side, but on the top you can see there are four aluminum and one steel right in the center of the photograph.

And then the next slide after this shows a detail of the steel with the tensile necking. This is the left photograph on the top. And then we have electron microscope views of that as well done later in the study.

Q. What slide is that?

STENO

A. I'm looking for that. Just one moment, please.

Okay. That will be Slide Number 122. Where in this photograph on the left side of the micrograph you can see the tensile necking, and then on the right side you can see a little detailed view of the fractured end and the tensile necked area.

Q. And do you have the corresponding side that connected to this steel core on Slide 122?

A. Yes. So that will be on Item Number 2.

Now, Item Number 2 was so badly oxidized we did not do electron microscope work on that, but there are optical photos and I'll show you that.

Actually, we did. So if you go to Slide Number 150. 150, please.

This is the mating end on Item Number 2, which is browned and discolored. But still you can see them necking in the fractured surface at the end of the steel core.

Q. Was this a separation of the steel core that resulted in the line to go down?

A. Yes, sir.

MR. MIJANOVIC: Okay. I see we're at 11:07. Why don't we take another short break and come back at about 11:17.

MR. BRISCO: Sounds good.

STENO

11:08 THE VIDEOGRAPHER: The time is 11:08. We are off the record.

11:19 (A recess was taken.)

11:19 THE VIDEOGRAPHER: The time is 11:19 a.m. We are back on the record.

11:20 BY MR. MIJANOVIC:

11:20 Q. We are back from a break, Dr. Kumar. Are you ready to proceed?

11:20 A. Yes, sir.

11:20 Q. Going back to Exhibit 3, which is your list of opinions, I have them on the screen. We're going to the second bullet point where you opine that after failure and separation the energized failed end toward pole number two on the west side fell and arced with ground, creating a fire with arcing damage at and near the failed end of the brown discoloration over a long length of the downed conductor.

11:21 Do you see that?

11:21 A. Yes, sir.

11:21 Q. The part of this opinion where you opine that the west side fell and arc with ground creating a fire, that portion that the downed energized west side conductor caused a fire, what is the causation of that based on?

11:21 A. So I looked at the photographs taken by

Cal-Fire during their investigation, as well as Jeffrey Hinds, H-i-n-d-s, his video and photographs, and based on that it looks like there's a lot of dry brush in the area where the conductor fell on the -- just next to the road. And if you have energized end of conductor, the electricity coming from the west side, that end is still energized while it hits the ground, so you get what is basically arcing between the phase to ground. And that arcing is strong enough to create a fire for dry brush.

Q. As a metallurgist do you ordinarily provide -- ordinarily provide origin and cause opinions?

A. I'm not opining on origin and cause at all. What I'm opining here is that we have a live energized conductor end, which is hot. And when it arcs, because we have arcing spot on the end and on the side, when it arcs it will create enough heat for a fire to ignite.

Q. All right. So you're of the opinion that there's sufficient energy there to ignite a fire, assuming you have a competent fuel package that it comes into contact with; is that right?

A. That is totally correct.

Q. And do you know where exactly in the field the separated end of that west conductor, where that first landed on the ground?

A. I don't know where it first landed, because

there was a lot of wind and it was moving around if I recall the video taken by Mr. Hinds, but that was taken after failure obviously. So exactly at the time of failure, I don't know exactly where it went down.

MR. SIMON: And this is Craig Simon. I want to just try to get us all on the same page. It's an objection on vague and ambiguous.

When you say failed end in your question, Krsto, are you talking about from the pole to the tip, that's the failed end, as opposed to the failed tip?

Could you have the question read back, Ms. Reporter?

(The question was read as follows:

Q And do you know where exactly in the field the separated end of that west conductor, where that first landed on the ground?)

MR. SIMON: Okay. So separated end was the word you used. Could you help us with whether you mean the entire strand from the separation point back to the part laying on the ground, or are you talking about just the tip or otherwise in your question?

BY MR. MIJANOVIC:

Q. Dr. Kumar, did you under understand my question?

A. Yeah. I think you said failed end. So the end

means the entire length toward the end, not just the tip.

Q. Well, let's start off with Mr. Simon's request for clarification. Do you know where the tip of the west side conductor that fell to the ground, do you know where the tip of that conductor made contact with the ground?

A. Not exactly, no. It made contact with the ground, that much we know. There's arcing at the tip and arcing on the side several inches behind that tip also. So all of that tells you that that entire area was arcing with the ground.

Q. So based on the electrical activity from the tip and some distance back from the tip of that west conductor, you can tell that there was electrical activity due to contact with the ground; is that accurate?

A. Right. And that arcing is on the surface, which is typical of arcing with the ground.

Q. But as far as the location along the ground where that arcing occurred, is it correct that you don't have an opinion in that regard?

A. That is correct.

Q. Your third bullet point indicates after failure the failed end of the conductor toward pole number one on the east side shows no arcing of the failed end with ground for any mechanical damage.

STENO

Do you see that?

A. Yes.

Q. Is that your way of simply saying there's no electrical activity on the east side of that downed conductor?

A. After the failure.

Q. After the line went down, correct?

A. Correct.

Q. Going back to that second bullet point where you reference arcing damage at and near the failed end and brown discoloration over a long length of the downed conductor, that brown discoloration, do you have an opinion as to what caused that?

A. The brown discoloration only without arcing would be when the conductor is laying on the ground and there's fire around it basically.

Q. So the brown discoloration is evidence that the conductor was resting in an area where combustibles reached open flame and were impinging on the conductor itself?

A. That would be correct.

Q. The fourth bullet point refers to that 25 fractured aluminum strands that we covered?

A. Yes.

Q. The last sentence of that opinion indicates

several failed ends of the aluminum strands show a dark discoloration due to arcing indicate that the fatigue failures occurred while the conductor was fully energized prior to the final failure.

My question to you is, on this one, the dark discoloration, could any of that dark discoloration simply have been caused by the fire?

A. No, sir. These are very localized right at the tip where the fracture is. And I think we've gone through those slides, but if you want I can pinpoint again where I'm talking about.

Q. No, that's fine. I think you covered it earlier. I just wanted that clarification.

A. Yeah. And this discoloration is blackish in nature and not brownish in nature, by the way, from arcing.

Q. Right. And your opinion didn't have that level of detail, which is why I was following up.

A. Got it.

Q. The next bullet point indicates, although there is evidence of line slapping on the field side and center conductors, there is no line slapping in the failure area of the field side conductor.

Are you -- are you saying that there's no evidence of the field side conductor slapping with the

11:31 center phase?

A. No. I'm saying it is not slapping in the area of failure. It is slapping, and there's evidence of slapping elsewhere, but not in the area of the failure.

Q. Did you participate in reconstructing the placements of the field side phase next to the center phase to be oriented in the fashion that you believe they were oriented when they were up in the area prior to the fire?

A. There was an attempt made by all the experts at BLM, which is one of the slides I have in my Power Point also, where people lined up all the conductors where they thought it was as it would have been up in the air.

Q. What slide is that?

A. Okay. That would be Slide Number 58.

Q. All right. I have Slide 58 up on the screen.

Do you see it?

A. Yes, sir.

So this was done at BLM where things were laid on the ground approximately in the same position. The top two failed ends are BLM Item Number 1 and 2, right one being on the east side, left one being on the west side. Then the one conductor below, which has wrapping on it, has some arcing, which is the center conductor. And the one at the bottom is the roadside conductor.

STENO

Q. Did you participate in the decision making on how to orient these items, Item 1 and Item 2, in relation to that center conductor, did you participate in that process?

A. Yes, I did.

Q. And how did you make a determination on how to line up those three items?

MR. SIMON: I'm going to object to the question as vague and ambiguous and misstates evidence. You just said how did you make the determination, but the previous question is did you participate. So any answer he gives you as to how it was done is going to be with putting it as his only determination, and I think it's an unfair question.

Could you rephrase?

MR. MIJANOVIC: Sure.

BY MR. MIJANOVIC:

Q. Dr. Kumar, what involvement did you have, if any, in contributing to the discussion of aligning Items 1 and 2 with Item Number 3 as depicted in Slide 58 of Exhibit 4?

A. Okay. So everyone knows that Item Number 3 of the BLM was at an unknown distance. It was a 26-feet long section with some arcing on it, but it did not have any marking on it as to where it was cut. So people were

sliding it back and forth, left to right, to see where it lines up.

And the consensus of the group was that there was some arcing in this area, which may be aligned with this area, and it was selected and further investigated back in the lab where we found that the arcing in the center conductor in that location where the failure is, is not consistent.

Q. Are you saying that the ultimate decision that the group made in terms of how to line up these three items, based on that decision there was no corresponding arc on the center phase to correspond with the separation point of Item Number 1 and Item Number 2?

A. Right. Because this was further examined in the lab. When he examine in the lab we lined up again in the same location, and we found the arcing that we see on the center conductor was not at that same location, it was further away.

Q. And because the -- there's no corresponding arc on the center conductor to correspond with the separation point of Item 1 and Item 2, did you consider that maybe the group didn't line them up properly?

A. That's a possibility, but I am only looking from the metallurgical standpoint, because there was one question whether the separation occurred at a slapping

point between the two. And the line slap between center and field side conductor, had it happened in that location, we would see evidence of line slap on the failed ends of the field conductor, which we did not find.

Q. So you're saying regardless of the orientation of the center conductor, there was no evidence at the separation point of the field side phase to support line slap at that location?

A. That is correct.

Q. Was there any evidence of line slap on the field side phase anywhere remote to the separation point?

A. Yes, there was.

Q. Where was that?

A. On the center conductor.

Q. On the field side phase.

A. Oh, on the field side.

On the field side there is a lot of slapping near pole number two, which was examined and I have tons of photographs in my presentation also in the -- I'll show you which photographs they are.

Q. Other than the evidence of line slap near pole number two, was there any evidence of line slap along the field side conductor at any point along the span?

A. Somehow I recall there was and I'm trying to

find a slide which may show that.

MR. SIMON: And, Krsto, I don't know if he was looking for something else when you then asked him a question while he was looking and now he's looking for what you're asking for. It's hard to tell.

THE WITNESS: Craig --

BY MR. MIJANOVIC:

Q. Dr. Kumar, can you tell us what you're searching for?

A. I understood the question that is there any line slap on the field conductor away from or near pole number two; is that correct?

Q. Yes, sir. Yes, sir.

A. So that's what I'm trying to look for.

MR. BRISCO: I'll just add while he's looking an objection. It's vague and ambiguous, because we have a splice in that location, but presuming your question means outside of the splice on the field side phase.

THE WITNESS: Okay. Slide Number 108. 108.

BY MR. MIJANOVIC:

Q. All right. What's the significance of Slide 108?

A. So Slide 108 shows the surface melted spots, which are typical of line slapping because they are on the upper surface of the aluminum strands on one side

only.

Q. How far is this location from the point of separation?

A. Let me look at that. It's close to it but not at it.

If you go to Slide Number 104, the right side photograph where the tie is, it's near that. So it's going to be about six inches from the failed end, from one failed end, and 12 inches from the other failed end.

Q. So the evidence of line slap on the field side phase is six inches from the failed end?

A. Six inches from one failed end. Remember, there are two failed ends here, one with the four aluminum and steel frame and the other with the three aluminum strands, which are even six inches beyond.

Q. And let's just take that one at a time.

So the failed end on the east side, how far away from that failed end are the indicators of line slap?

A. Okay. So if you look at the first photograph here, A, on the left side on the slide that is -- that you have. The very left is the three failed ends. So from there it is about 12 inches. And then there are the four failed ends, which would be about four inches from there.

STENO

Q. So based on how the center phase and the field side phase were oriented by the parties as a group, of which you participated, is it your opinion that there was no corresponding evidence of line slap on the center phase?

A. There's no corresponding line slap in the center phase in the area of the failure.

Q. Was there a corresponding area on the center phase for the areas depicting line slap in Slide 104?

A. It would be more in Slide Number 108. So this area, which is away from the failed end, could correspond to the line slap on center conductor.

Q. And the arc spots in Slide 108, how far is that from the separation point?

MR. BRISCO: Objection. Asked and answered.

Go ahead.

THE WITNESS: We just answered that. It's 12 inches from one end and four inches from the other end.

BY MR. MIJANOVIC:

Q. All right. Thank you.

A. Sure.

Q. I just wanted to give David an opportunity to object.

MR. BRISCO: You're doing so well, Krsto, I had

to make sure you know I was paying attention.

THE WITNESS: It looks like everybody is paying attention, so that's good.

BY MR. MIJANOVIC:

Q. Yeah. All right. The next bullet point of your exhibit -- of Exhibit 3, which contains the opinions that you itemized for us, indicates that failed and arced ends of the aluminum strands on both field side and center conductors failed due to fatigue as evidenced by flat fractures and torsional fatigue with angled flat fractures followed by either oxidation or separation arcing and melting.

Do you see that?

A. Yes, we have discussed that.

Q. So in this paragraph you're describing failed and arced ends of aluminum strands on the center conductor; is that right?

A. On both field side and center.

Q. So are you of the opinion that the center conductor contained failed strands due to fatigue?

A. Yes, at many locations.

Q. And maybe I missed this earlier, but the 25 instances of failed aluminum strands due to fracture that predated the fire, how many of those 25 were associated with the center conductor?

A. None. Those were all on the field side.

Q. So how many of -- how many instances of fractured aluminum strands that predated the fire did you find on the center phase?

Q. Okay.

A. So we start at Slide Number 196. 196.

So this is the first location. Item Number 3, by the way, is the center conductor. That is that 26-foot length section that they had cut out. And this one had a broken conductor, separated aluminum end, and one tiny little one half an inch long section. Both ends were arced on the long one and the short one. And they separated during the handling at the lab. When they were being unwrapped these just fell out. But that's one.

Then the next one shows at Slide Number 202. You can see how aluminum strands are cracked, at least three of them you can see on this side.

And then the next slide shows a different location, which is 202.

Q. 203?

A. I mean 203. Sorry.

You can see how they are broken. These are all in the center conductor and they are arced, and you can see the blackening at the end.

And you go to 204. 204, actually, is the same

conductor, just rotated on the back side.

And then 205 is another location. Here you can see broken conductors with melted ends arced, and no line slap in this area.

So those are the original ones in that 26-foot section.

Q. You're of the opinion that these broken strands on the center conductor predated the subject fire?

A. Correct. Because this conductor was still up in the air.

Q. Are there any others related to that center conductor?

A. There might be but we only examined in detail the 26-foot section that was cut out by BLM.

Q. Sir, we're going to go to your next opinion on Exhibit 3. It reads, the field side conductor also revealed line slapping damage with surface arcing from approximately nine feet to 21 feet from the west end near pole two, consistent with arcing with the service line after failure. There was one splice on the surface drop conductor indicating prior repair.

Do you see that?

A. Yes, sir.

Q. Now, the reference to prior repair, was that in your opinion a repair as a result of the November 17,

2020, incident, or was that a repair that existed prior to the subject fire?

A. It existed before that.

Q. Before the fire?

A. Right. Because the line was taken down right after the fire.

Q. The service drop was taken down right after the fire?

A. That's my understanding, yes.

Q. The -- your opinion that the field side conductor also revealed line slap damage with service arcing from approximately nine feet to 21 feet, and you associate that with the contact of the service line, are you indicating that after the field side phase failed that there was a recoil of the west side of that field side phase that made contact with the neutral on the service line?

A. That's exactly correct.

Q. What do you base that on? Did you just correlate, you know, an arc mark on the neutral to service line to a location on the west side field side phase?

A. No. You can't locate exact which arc mark was created by the field line. But there are multiple arcing spots in that area between nine feet and 21 feet from the

11:59 1 west end. Keep in mind there's additional distance
11:59 2 because there was some distance I understand from the
11:59 3 pole down to the ground to be added to this number.
11:59 4 So it would be close to pole number two, and
11:59 5 when the recoil takes place it will contact multiple
11:59 6 locations. It could be on the pole. It could be on
11:59 7 the -- anything else. But nonetheless, there was arcing
11:59 8 on the service line, which cannot be consistent with any
11:59 9 other surface conductors touching in that location, other
11:59 10 than the failed end.
12:00 11 MR. MIJANOVIC: I think this is a good stopping
12:00 12 point for a quick lunch. 30 minutes or what does
12:00 13 everyone think?
12:00 14 MR. BRISCO: Dr. Kumar, is 30 minutes okay with
12:00 15 you?
12:00 16 THE WITNESS: Yes, that's okay.
12:00 17 Krsto, can I ask you, how long more you think
12:00 18 you need to go?
12:00 19 MR. MIJANOVIC: Probably another hour.
12:00 20 THE WITNESS: Okay. Then that's fine.
12:00 21 MR. MIJANOVIC: Okay. All right. See you guys
12:00 22 back at about 12:30.
12:00 23 THE WITNESS: Okay.
12:00 24 MR. BRISCO: Thank you.
12:00 25 THE VIDEOGRAPHER: The time is 12:00 p.m. We

STENO

12:00 1 are off the record.
12:29 2 (Lunch recess.)
12:29 3 THE VIDEOGRAPHER: The time is 12:34 p.m. We
12:34 4 are back on the record.
12:34 5 BY MR. MIJANOVIC:
12:34 6 Q. All right. Dr. Kumar, we are back on the
12:34 7 record from a short lunch.
12:34 8 Thus far, are there any opinions that you would
12:34 9 like to change that you expressed in the first part of
12:34 10 your deposition before we took a lunch?
12:34 11 A. No, sir.
12:34 12 Q. I believe we left off where you opined that the
12:35 13 field side conductor recoiled and made contract with that
12:35 14 service drop; is that right?
12:35 15 A. Yes, sir.
12:35 16 Q. The next opinion is that both the field side
12:35 17 and center conductors between pole one and pole two had
12:35 18 multiple fractured conductor strands. And let me just
12:35 19 stop there in terms of that opinion.
12:35 20 The multiple fractured conductor strands, is
12:35 21 that what you've been testifying to thus far in terms of
12:35 22 the fractures in the field side and center conductors
12:35 23 that predated the subject fire?
12:36 24 A. That is correct.
12:36 25 Q. You also -- as part of your opinion you

indicated that the both the field side and center conductors between pole one and pole two also had numerous arcing spots due to line slapping. Stopping there in terms of that opinion.

Is that your opinion, that there was evidence of multiple arcing spots due to line slapping, that evidence, does that predate the fire or is that as a result of this fire?

A. The line slapping has to be predated, because both lines need to be energized for that.

Q. So you're indicating that the field side phase and the center phase had multiple spots due to line slap that predated the November 17, 2020, incident?

A. Correct.

Q. And where -- where are the photos that evidence that?

A. There are quite a few in my Power Point slides. We showed you some of them but not all of them. I can -- I can tell you where the line slaps spots would be, for example, in center conductor, we can show you Slide Number 206, 207.

Q. All right. Let me just put it up on the screen here.

A. Okay. Yeah. 206, please.

Q. All right. I have 206 on the screen. So the

two photographs there, where was -- where did you find that evidence along the center conductor?

A. That is -- keep in mind this was a 26-foot long section. So we don't know exactly where BLM cut it, but they placed about the center of the conductors. And from one end it's 19 feet 11 inch to 20 feet two inches.

Q. So you don't know where the center 20-foot piece section of conductor that's depicted in 206, you don't know where that was along the center phase; is that correct?

A. That is correct.

Q. But the arcing that was evidenced on that 20-foot center phase that was identified as Item 3, is it your opinion that the arc spotting on that 20-foot piece of center conductor was not related to the November 17, 2020, event?

A. That is correct.

MR. BRISCO: I'll object as vague and ambiguous as to related to. He testified earlier it isn't in the failure area.

MR. MIJANOVIC: Well, let me just clarify the question.

BY MR. MIJANOVIC:

Q. Dr. Kumar, in Slide 206 there's two photographs depicting arc spotting; is that right?

12:40 A. Yes.
12:40 Q. Do you have an opinion as to whether that arc spotting occurred as a result of the downed line that occurred on November 17, 2020?
12:40 A. No. It happened prefire.
12:40 Q. And when you say it happened prefire, when prefire? Are you able to date it?
12:40 A. No, I cannot date it. It would have to be when it was energized and contacted the adjacent conductor.
12:40 Q. So when the field side phase came down, if that field side phase was energized and made contact with the center phase would the arc spotting be consistent with that event?
12:41 A. It will be only consistent on the Item Number 2 connected or toward pole number two, because pole number one would not have the energy for that.
12:41 Q. So when the field side phase separated, the separated part attached to the pole number one would not be energized; is that right?
12:41 A. It would not have energy to cause arcing, yes.
12:41 Q. You're saying the east side conductor attached to pole one could not have caused the arc spotting depicted in Slide 206; is that accurate?
12:42 A. That is accurate. And it's possible that this arcing occurred with the roadside conductor, which had

been replaced before.

Q. So what are the options that the arc spotting occurred with the roadside phase as well as the field side phase while it was energized?

A. Metallurgically I cannot differentiate between the two. But since roadside conductor has been replaced, there's no way of knowing it.

Q. So are you able to state to a reasonable degree of scientific certainty as to which conductor made contact with the center phase to result in the arc spotting depicted in Slide 206?

A. From the location shown here, since it is not consistent with the same distance on the field side conductor, it is more likely than not that it contacted the roadside and arced.

Q. You cut out there, I caught bits and pieces of that?

MR. MIJANOVIC: Cheri, did you hear all that?

THE REPORTER: I did, would you like me to read it.

MR. MIJANOVIC: Yes, please.

(The record was read as follows:

A From the location shown here, since it is not consistent with the same distance on the field side conductor, it is more likely than

not that it contacted the roadside and arced.)

BY MR. MIJANOVIC:

Q. Sir, when you say it's not consistent with the field side conductor, why do you hold that opinion?

A. Because there's no corresponding spot on the field side in that location that BLM had identified.

Q. You continue on in your opinion stating that both -- well, strike that.

Let me just restate your penultimate opinion here.

Both the field side and center conductors between pole one and pole two had multiple fractured conductor strands, numerous arcing spots due to line slapping and repaired spliced sleeves, indicating old and aged conductors that should have been replaced similar to the roadside conductor.

Do you see that?

A. Yes.

Q. So your conclusion that the field side and center phase were old and aged conductors, is that based on the fractured strands and arc spotting that you described earlier in the opinion?

A. That is correct.

Q. Do you have an opinion as to the reason for the repair splice sleeves?

A. I unfortunately don't know because I haven't seen the records of when and how they were repaired. But repairs are always done when there is a section of the conductor which is not good because of either prior fractures that they had seen in the inspection and they cut that section out and put new one in.

And they have done that in the center conductor, as well as in the field side conductor. So both shows splice. The only one that had no splice was the roadside. It was new from one end to the other and no arcing.

Q. Your last opinion on Exhibit 3 indicates, any equipment, for example, spacers, dampeners, that reduces vibration in the conductors, will reduce the conductors' stresses for fatigue fractures and eliminate line slapping.

Do you see that?

A. Yes, sir.

Q. What's that opinion based on?

A. Well, fatigue fractures occur when you have higher amount of movement in the conductor under load due to a different wind conditions over a period of time. So when you -- when you combine the conductors then all three phases will have to move together, which makes it a little more difficult in wind as compared to single

conductor.

So it reduces the amount of oscillation and vibration, and that will cause reduced amount of stresses, which will reduce the fatigue fractures.

As far as line slapping is concerned, when the distance is maintained, you do not slap between the two lines because of the spacers in between.

Q. And given your opinion that spacers and dampeners would have eliminated some of these risks, is that something that's within your purview as a metallurgist?

A. As a metallurgist over the last 40 years, I worked with many transmission and electrical engineers in these fire cases, and this is what their solution has been recommended. So this is from that. It's not a metallurgical opinion, but it is a peripheral opinion that I have the experience with.

Q. So you have historical experience working with experts in the utility industry that had the expertise in this area, and you obtained your knowledge from working with them over time; is that accurate?

A. That's accurate.

Q. And so your opinion is based on views held by experts in the utility industry with whom you've worked with as a metallurgist; is that right?

MR. BRISCO: I'm just going to object to the question as vague, when you say your opinion, as if you're categorizing that entire length of that opinion. He's talking about a portion of the opinion where he gathered the opinion from other experts. Certainly as a metallurgist, Kumar can talk about the vibrational effects on metal parts from vibration alone.

But go ahead, if you understand, you can answer.

MR. SIMON: Do you understand -- I'm objecting -- this is Craig -- on that same basis. Vague and ambiguous.

Krsto, I think if you ask him whether as a metallurgist he knows whether vibration will reduce fatigue, that's different than asking him, do you know whether dampeners or spacers will reduce vibration. So when you say your opinion, I'm not sure what you mean.

MR. MIJANOVIC: Madame Court Reporter, can you just read back the question?

(The record was read as follows:

Q And so your opinion is based on views held by experts in the utility industry with whom you've worked with as a metallurgist; is that right?)

THE WITNESS: And my answer, is that what we're

waiting for?

BY MR. MIJANOVIC:

Q. Yes, sir, if you understand the question.

A. Yes. So as a metallurgist, and if you read it carefully it says, any equipment that reduces vibration. So anything that reduces vibration will reduce the fracture and fatigue, which is metallurgical opinion.

How this equipment works is not my expertise, but it will -- if any equipment that reduces vibration, it will reduce fatigue.

Also, if the distance is maintained between the two lines then line slapping will be stopped. That's general engineering. You don't have to be a metallurgist for that one.

Q. So with respect to your use of vibration and conductors, that phrase in that last opinion, do you hold the opinion that the fractures that you observed, for example, in the field side phase, that those fractures were caused by vibrations in the conductor that is the field side phase?

A. Yes. And the vibration would be induced by the wind over a period of time.

Q. So the fractures you testified about earlier as existing in aluminum strands surrounding the steel core both in the field side phase and the center phase, those

fractures, in your opinion, were caused by wind induced vibrations in both conductors?

A. Yeah. Anything that causes fatigue. So wind induced vibrations, it will be thermal expansion, contraction, it will be galloping, it will be swinging, it will be what they call dancing up the conductors, all of that will create unlimited vibrations and those will cause fatigue, because the stresses will be increased and decreased ultimately which cause fatigue.

Q. And are you of the opinion that the fatigue you opine existed in the field side and center phase conductors prior to the fire were caused by that laundry list of items you described?

A. Yes, that is correct.

Q. And are you able to discern which of those items caused the fatigue in the aluminum strands prior to the fire?

A. You cannot identify individually. It's a cumulative effect.

Q. Over what period of time?

A. Over long period of time, months and years.

Q. Anywhere from a few months to several years?

A. Correct.

Q. And then your opinion that including dampeners along the span between pole one and pole two, is it your

opinion that it would have reduced the vibration that results in the fractures you testified about?

A. It will reduce. Anything that will reduce the stress will reduce that problem of fatigue.

Q. All right. Have you performed any testing of your own to determine how much the dampeners would reduce vibration in the conductor, such as the one that you reviewed in this case, how much would that actually reduce the vibration?

A. No, sir.

Q. Have you reviewed any studies in that regard, peer review studies?

A. There are papers published. I haven't reviewed it for this case, but I'm sure they are in my library somewhere.

Q. And do you have any particular dampeners in mind, a make or model number, that you believe are specific to the subject conductor along a 300-foot span that should have been used?

A. No, sir. That's not my area of expertise.

Q. Same question as to spacers?

A. Same answer.

Q. All right. Have we gone over all your primary opinions that you intend to express at the time of trial?

A. Yes, I believe we have gone through all of

them, yes.

Q. Are there any other primary opinions, Dr. Kumar, that we haven't covered? And there may very well be in this long Power Point that you produced as part of your file, but I just wanted to give you an opportunity to add any more to the list of primary opinions we attached as Exhibit 3?

A. I think this is a good list of primary opinions. There are a lot of sub-opinions which are within the Power Point.

MR. MIJANOVIC: All right. Let's take a short break and let me just check my notes, and I think we are going to be done. Five minutes?

MR. BRISCO: Yeah.

MR. MIJANOVIC: Thank you.

THE VIDEOGRAPHER: The time is 12:56 p.m. We are off the record.

(A recess was taken.)

THE VIDEOGRAPHER: The time is 1:04 p.m. We are back on the record.

BY MR. MIJANOVIC:

Q. Give me one second, Dr. Kumar. I closed out that Power Point and I had one other question.

A. Sure.

Q. I'll show you Slide 186.

STENO

A. Okay.
Q. Do you see it on the screen?
A. Yes, sir.
Q. Are these, Item 1 and Item 2, is this where they mated?
A. That would have mated at some point in time before the failure, yes.
Q. Okay. Is this the steel core?
A. That is correct.
Q. And as I recall earlier you testifying about the separation being due to tensile necking where Item 1 and Item 2 mated; is that accurate?
A. That is correct.
Q. And is this the same two ends that you indicated previously that there was evidence of tensile necking?
A. Correct.
Q. But on the description on each one of these, what do you call these? What kind of photos are these?
A. These are optical micrographs.
Q. So the micrographs on the left side you indicate arced end of steel core, do you see that?
A. Yes.
Q. I thought I asked you earlier where there was evidence of tensile necking, I asked you if there was

evidence of arcing at that location, and I thought you said no?

A. No. No.

MR. BRISCO: Misstates prior testimony.

You can answer.

THE WITNESS: No. There's arcing on both ends, and I don't believe I testified that there was no arcing.

BY MR. MIJANOVIC:

Q. Okay. So are you of the opinion that the center core separated due to tensile necking or was it arcing or was it both?

A. Both. First it goes through tensile necking and then arcing by separation arc.

Q. So is it true that Slide 186, this is evidence of separation arcing?

A. Separation arcing at the tip. And you can see the tensile necking a little bit. On both sides you can see that the surface, especially at the bottom line, you can see a little rotation near the fractured surface. Same thing on the left side.

Now, we have pictures of these before they were cross-sectioned also, and they both show tensile necking, and I think we went through each one of them.

Q. Okay. So is it accurate that what's depicted in Slide 186 there's no evidence in either one of these

micrographs of core separation due to arcing from an adjacent energized line?

A. That is correct. Yeah.

First of all, keep in mind that the center core is surrounded by seven conductors. So the conductors need to be severed first before anything else happens to the center core, as far as line arcing is concerned with another line.

Q. Okay. Sir, have we now talked about all the opinions you intend to express at the time of trial, with the exception of rebuttal opinions and possibly sub-opinions related to your primary opinions?

A. That is correct.

Q. Okay. I don't have any other questions. Thank you very much, Dr. Kumar.

A. Thank you very much.

MR. BRISCO: Thank you, Dr. Kumar, for your time. No questions on our end.

MR. SIMON: Do we want to just put the amount of money you're going to pay?

MR. BRISCO: If we can get the time on the record.

THE VIDEOGRAPHER: Hold on one second.

MR. SIMON: What time did we start? Let's just deduct the 30-minute lunch. What time did we start, like

9:00?

MR. MIJANOVIC: 9 o'clock.

MR. SIMON: Let's say, 9:10 to 1:10, less a half hour.

And what's the hourly rate, Doctor?

THE WITNESS: It's 525 per hour.

MR. MIJANOVIC: I have three and a half hours times 525.

MR. SIMON: Dr. Kumar, could you prepare a bill with a W-9 and send it to David so that he can send it to Krsto so that we can make sure Liberty pays you?

THE WITNESS: Okay. I'll have my office do that.

MR. BRISCO: Thank you, Dr. Kumar.

We can conclude the deposition now, and we'll have a housekeeping matters to handle on our end.

THE WITNESS: So I can sign off then?

MR. MIJANOVIC: Yes, sir.

MR. SIMON: Let's have a reading. Let's do the reading off the record.

THE WITNESS: Sure.

THE VIDEOGRAPHER: Okay. Before we go off the record, Madame Court Reporter, do you need anything?

THE REPORTER: No.

THE VIDEOGRAPHER: Okay. This ends Volume I of

13:12 the deposition of Arun Kumar, PhD. The time is 1:11 p.m.
13:12 We are off the record.
(Deposition concluded at 1:11 p.m.)

STENO

Declaration Under Penalty of Perjury

I, ARUN KUMAR, the witness herein, declare under penalty of perjury that I have read the foregoing in its entirety; and that the testimony contained therein, as corrected by me, is a true and accurate transcription of my testimony elicited at said time and place.

Executed this_____day of _____20__

At _____, _____
City State

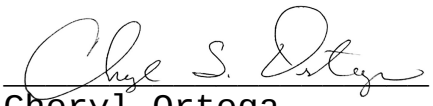
_____
ARUN KUMAR

STENO

I, CHERYL ORTEGA, Certified Shorthand Reporter for the State of California, do hereby certify:

That the proceeding was taken by me in machine shorthand and later transcribed into typewriting, under my direction, and that the foregoing contains a true record of the testimony of the witness.

Dated: This 14th of February, 2024 at San Bernardino, California.



Cheryl Ortega
CSR NO. 13709

ERRATA SHEET
CHANGES IN TESTIMONY
MOUNTAIN VIEW FIRE CASES
ARUN KUMAR, PH.D.
February 14, 2024

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SIGNATURE:_____DATE:_____

ARUN KUMAR, PH.D.