UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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POSCO CO. LTD, Petitioner, v. ARCELORMITTAL, Patent Owner.	)	Case No. IPR2025-00370 U.S. Patent No. 10,961,602

REMOTE DEPOSITION OF DR. MICHAEL MILES

Taken on Friday, October 24, 2025
10:02 a.m. to 6:04 p.m.

Reported by: Abigail D.W. Johnson, RPR, CRR, CRC
California, Utah, Idaho, Washington

A P P E A R A N C E S

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I N D E X

EXAMINATIONS PAGE

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E X H I B I T S

EXHIBIT NO. DESCRIPTION PAGE

Exhibit 2020 Michael Miles Publications..... 28
as listed on Google Scholar

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REPORTER'S NOTE: All quotations from exhibits are reflected in the manner in which they were read into the record and do not necessarily indicate an exact quote from the document.

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October 24, 2025 10:02 a.m.

P R O C E E D I N G S

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Thereupon --

DR. MICHAEL MILES,

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

MR. LAMAGNA: Do you want to do appearances first?

For the record, my name is Raymond LaMagna of Gibson Dunn on behalf of Patent Owner ArcelorMittal and I'm joined by my colleague Allen Kathir.

MR. MONALDO: And I'm Jeremy Monaldo from Fish & Richardson on behalf of Petitioner Posco. And I'm joined by my colleagues Alexander Berg and Sangki Park.

EXAMINATION

BY MR. LAMAGNA:

Q. Could you state your full name.

A. My name is Michael Miles, or Michael Paul Miles. I go by "Mike," usually.

Q. Well, I will try just -- out of force of habit, I will try to stick with "Dr. Miles," unless that annoys, you out of respect, either way.

A. It doesn't annoy me, but I'm good with either way.

Q. Okay. What did you do to prepare for today's deposition?

MR. MONALDO: I will remind Dr. Miles not to reveal any privileged communications.

THE WITNESS: I reviewed all of the prior art and I reviewed the '602 patent, the '227 patent. I had discussions with the attorneys at Fish & Richardson. We had a number of discussions, a lot of them last year, I think.

BY MR. LAMAGNA:

Q. And so, without getting into the substance of whatever you discussed -- but who did you meet with to prepare for this deposition at Fish & Richardson?

A. Most of the time, it was Alexander Berg.

Q. Any others?

A. I think I met with Sangki. I don't know if I met with Jeremy prior to this year. So I think it was mainly Alexander and Sangki last year.

And then -- well, this year, in terms of preparation, yes, Jeremy was -- was on the call most of the time in my recollection as we discussed these patents and the prior art.

Q. And just this year, in terms of preparing

for this deposition, how long did you meet with them and when, like, what days?

A. Well, we met -- I think we had one meeting prior to Monday of this week, but then we met on Monday, Tuesday, Wednesday and Thursday of this week.

Q. And approximately how long were those meetings for?

A. So several of the meetings were about two hours. So I would say two of them were about two hours. One of the meetings was about three and a half hours. And then the last meeting was about 90 minutes.

Q. Does that include the meeting that you had the prior week?

A. I don't remember. Our first meeting -- I'm trying to remember if we had a meeting or if it was just email communication. We didn't discuss the patents or the prior art in the first meeting. If we had one, it was just a coordination. And it may have been by email.

Q. So would you say altogether, like, ten hours to prepare for the deposition?

A. Maybe something like that, yeah.

Q. And would that include or exclude any additional time for the purpose of preparing for the deposition that you spent reviewing materials?

A. I also spent time reviewing materials. So I spent time primarily Wednesday and Thursday outside of our meetings, but I probably spent a little bit of time on Tuesday.

Q. About how long altogether?

A. I would say probably about five hours -- five or six hours, something like that.

Q. Okay. And you submitted two declarations total that are at issue in the two IPRs that we are discussing today, the 370 and the 371 IPR; correct?

A. Mm-hmm.

Q. About how long did you spend preparing those declarations?

A. I don't remember. It was last year. Between the two declarations, I'm going to be guessing because I just don't remember, but maybe 30 to 40 hours, maybe 40 hours, something like that.

Q. So about -- the equivalent of a workweek between the two declarations?

A. Yeah, but it is kind of spaced out.

Q. Okay.

A. And again, that's -- that's a guess on my part. I would have to go back and look at my records.

Q. Okay.

A. But something -- maybe something like that.

Q. Do you recall when you were retained in -- as an expert for these IPRs?

A. I remember being retained, yeah.

Q. Do you remember about what month or year it was?

A. I'm thinking it's the early part of 2024. I apologize.

Q. That's okay.

A. I would have to look at the --

Q. I spent a little time going over your, you know, background and experience and CV. And I just had a few questions there.

You have quite a bit of experience, I believe, in solid state joining, specifically in friction stir welding; is that correct?

A. Yes.

Q. And as I understand, friction stir welding is the kind of welding where you join materials without allowing the material to liquefy in the joining processes; is that fair to say?

A. That's right.

Q. And often this can be used to join two different types of material together, like joining titanium to steel, for example.

A. So in traditional friction stir welding, it

is usually employed for similar materials welding. That's the biggest application, so steel to steel, aluminum to aluminum, but there are cases where you can do a dissimilar metals join.

And the bond, in that case, is -- you know, it depends on the application. It is not going to be as good as similar materials joining.

So that's traditional friction stir welding. We developed some IP here of specifically joining of dissimilar metals in a spot joining process that we called friction bit joining.

In that case, we were joining aluminum to steel, primarily aluminum to steel. We also did some steel to steel in the early part of it. We thought about joining titanium to steel, but -- yeah, just a little bit of detail on that.

Q. And friction stir welding involves, like, taking a physical pin and sort of sticking a bit, you know, into the sheets to be -- to be joined?

A. That would be -- that sounds a little bit more like friction bit joining where you have a consumable bit that gets left in the joint.

Traditional frictional stir welding is where you are using a nonconsumable hard tool to stir the material together.

So I have done both of those.

Q. Okay. Now, one of the things that we will talk about that comes up in this case for the patents that are at issue is that these patents involve fairly hard fully martensitic press-hardened steel; correct?

A. Yes.

Q. And in your experience, you don't real use solid state joining or friction stir welding with fully martensitic press-hardened materials; is that fair to say?

A. So we have done it for friction bit joining. And it is not in my publication list, but we have done projects with the auto steel partnership which is -- it is in Detroit. It is sort of the big three auto makers funding joint projects on steel-related topics.

They asked us to do a feasibility study and we did a feasibility study to join aluminum to press-hardened steels. So we have tried it. It was successful in terms of the joint properties, just in terms of their criteria for the strength of the joint.

I have not done traditional friction stir welding in press-hardened steel.

Q. So in the example that you're raising there, that's joining a press-hardened steel to an

aluminum material, it is the example of joining two different materials; correct?

A. That is correct. So the aluminum sheet on top, the press-hardened steel underneath and the friction rivet or the friction bit at high rotational speed, aluminum and then the steel bit joining to the press-hardened steel at the interface.

Q. And then -- you said that was a feasible study.

Was that determined to be commercially or economically feasible as a joining technology?

A. So we did the joining study. I think -- the study was done at the request of my partner, MegaStir Technologies or Mazak MegaStir Technologies. It's a local company and we developed the IP together.

We provided the samples. The testing was done. I think the testing was deemed to be acceptable in terms of joint properties, but I didn't have follow-on work from that.

Q. Okay. So you don't have a basis to know, shall we say, economically or industrially feasible to do that versus technologically feasible?

A. It was technologically feasible. I don't know about the rest. There are a lot of things that go into the commercial part.

Q. And do you know if the material -- the steel material that you were endeavoring to join in that study was a fully martensitic material that had an aluminum alloy coating on it?

A. It was.

Q. Now, you've also worked with, I think, dual-phase steel; correct?

A. That's correct.

Q. And as -- I understand dual-phase steel is a ferritic steel that has small pieces of martensite that are in the steel; is that fair to say at a high level?

A. Yeah. At a high level, you do have ferrite with islands of martensite depending on the version.

So there's a DP 590. There's a DP 780, a DP 980. So the DP 980 has a higher fraction of martensite than the DP 590, but it is always some combination of ferrite and martensite.

Q. And so basically, as I understand the goal with dual-phase steel, is you have a soft iron matrix with hard martensite, like 5 or 6 percent martensite?

A. Yeah. When you get to the high levels of 980 or 1180, your fraction might be closer to 50 percent martensite. Of course, the formability decreases proportionally.

Q. And you've also worked with forming aluminum alloys or magnesium alloys; is that fair to say?

A. That's correct.

Q. And you have also worked with forming stainless steel?

A. We have welded -- we have done friction stir processing of stainless steel. And in terms of the forming of a stainless steel, less of that. Our stainless steel applications were a little more nuclear related, so thick plate.

Q. I guess to just go back a step, we were talking about the feasibility study that you did with joining press-hardened steel to aluminum.

When was that -- when did that occur?

A. I think it occurred -- obviously, I'd have to go back and look, but it has been in the last ten years. So I would say probably eight to ten years ago, maybe around 2015 to 2017, maybe closer to 2017.

Q. And --

A. And I may not be perfectly accurate on that, but it is in that timeframe.

Q. And prior to that feasibility study, had you worked on any joining projects with respect to fully martensitic press-hardened steel?

A. Not prior to that time.
Q. Okay.
A. We had worked on quite hard steels like DP 1180, but we hadn't worked on a boron steel with 1500 megapascal UTS. I was aware of them, but we hadn't had an application where we worked on it.
Q. At a high level, where we talk about the DP steel or the dual-phase steel, that is --
A. Can I correct that for just a second?
Q. Sure.
A. So I hadn't worked on it, but maybe in the -- between the 2013 and 2015, I was doing research with a professor in Korea. And I visited a facility that did -- so we saw hot stamped boron steel lines where they were making B-pillars.

And they were -- they were interested in -- I'm trying to see some of the publications. They were interested in joining of, you know, let's say a light metal or even a high-strength aluminum to a press-hardened steel. And I did a presentation while I was over there.

It would have been in that timeframe based on one of the publications I'm looking at. We didn't do a publication on that, but it was during that time that I was collaborating with this professor.

Q. Anything else that you can think of?
A. I can't think of anything prior to that.
Q. So as I understand, you have, for example, a DP steel, it does not undergo a phase or internal structural change during forming operations; is that accurate?
A. So with a DP steel, that's accurate, other than just typical work hardening. It is not undergoing a phase change in the same way that, for example, a TRIP steel might experience.
Q. And likewise, aluminum alloy or magnesium alloy, those do not undergo a phase change or a structural change during the forming operations; correct?
A. Correct. Other than, yeah, the phase change doesn't happen in a DP steel or an aluminum. It does happen in TRIP steels.
This is a room temperature transformation, but you convert retained austenite to martensite through the forming process so we have done work on TRIP steels.
Q. Actually, you are getting ahead of me.
A. I'm getting ahead of you? I apologize.
Q. That's what I'm going to go to next are the ones that involve some phase transformation.

The same would be true for stainless, well, right? Stainless does not undergo a phase change or internal structural change during forming operations?

A. Correct.

Q. Okay. So in other words, where you are dealing with aluminum alloy, magnesium alloy, DP stainless, they do not alter the crystallographic structure during forming; correct?

A. That's correct.

Q. Now getting on to TRIP steel, I guess that stands for Transformation Induced Plasticity?

A. Correct.

Q. And as I understand, that's -- that's something you have done quite a bit of work with is TRIP steel; correct?

A. A fair amount, yeah.

Q. And you studied, among other things, the forming limits on -- let me take a step back. So TRIP steel, is, I guess, similar in some respects to DP steel in that it has retained austenite in it. And the goal there is to retain that austenite in the steel -- the islands of austenite in the steel product so that it can be there while the -- the product is in service, for example, in an automobile?

A. So the austenite that is retained is one of

the several phases present in the TRIP steel that someone is going to stamp a part with, it has ferrite, a lot of ferrite. It has islands of austenite, retained austenite, as you say. It has got some martensite and it has got some bainite. So it has a complex structure.

But the retained austenite, for the most part, is going to be converted to martensite during the forming process. So, for example, it is extending the ductility of the part.

The main advantage of a TRIP steel is that you get this high strength. And the transformation of the austenite to martensite during plastic deformation or forming gives it added formability or added work hardening and allows you to make, maybe a part that would be difficult with a DP steel. It typically has a little bit better formability than a DP steel.

Q. So you have a steel that has retained austenite and then during forming, you're saying that austenite is being transferred -- is being transformed into martensite?

A. That's correct.

Q. And so after the part is formed, and now it is in an automobile, let's say --

A. Mm-hmm.

Q. -- is there still retained austenite?

A. You know, we have done studies on transformation rates based on plastic deformation. And there's likely to be some retained austenite. Most of it is consumed during the forming process, but there could be small amounts that exist. And it would depend on the case, you know?

If you are really forming it to its limits in terms of plastic deformation, you are likely to drive that basically zero. But in some other cases, you might have some austenite left over in trace amounts.

Q. Depending upon the forming process, you may have a larger or smaller percentage of the retained austenite that you're starting with being transformed into martensite?

A. That's correct.

Q. It could be most or not most, you know?

A. Yeah.

Q. Okay.

A. Well, it's always going to be most, but in some cases it might drive to a variable level, essentially zero. In some cases you might have a fraction of it left over in different locations in the part.

Q. Right. But the -- when the part starts and it -- what it -- sorry, when it has the retained austenite, that austenite is still islands within a softer ferritic material; correct?

A. Yes. And it may be surrounded by martensite and bainite. It is kind of mixed together, but you have the four components: ferrite, retained austenite, martensite and bainite.

Q. And so likewise, when the product has been fully formed, the martensite will still exist as islands within a softer ferritic material?

A. Correct.

Q. So in a TRIP steel, that's to be distinguished, I guess, from a -- a steel product like -- that would yield a fully martensitic phase transformation during forming?

A. Right. And that's really because you're forming it at room temperature, you know? To obtain a fully martensitic structure would require a quenching operation.

So it would have to be something where you've taken it -- and I'm just speaking generally in terms of the treatment of heat of steel. You know, you take it above the austenite transition temperature. You hold it until fully austenitic and then you quench.

Whether you get a fully martensitic structure is based on the composition and the cooling rate. You have high levels of carbon. It is very possible to get a fully martensitic structure.

You have lower levels of carbon, you can quench as fast as you want and you are not going to achieve fully martensitic.

Q. So in some, the TRIP steel that we are talking about is not subject to forming by hot stamping?

A. Correct. The standard practice is to avoid hot forming by gaining another ductility to allow you to gain or to create a part with the strength that you're looking for without hot forming. That was essentially the objective of the project with General Motors. You probably looked at some of the publications.

We were trying to figure out a way for the TRIP steel to modify the microstructure so they could form a B-pillar without hot stamping. They wanted to look forward and see if they could avoid the hot stamping.

Q. I see. I guess -- so the distinction between -- or strike that.

A distinction between fully martensitic

steel and TRIP steel is that TRIP steel is not subject to forming by hot stamping?

A. Right.

Q. And in this case, it's accurate to say that the -- the patents at issue involve fully martensitic steel that has been press hardened and formed through hot stamping; correct?

A. Correct.

Q. And in that case, the steel that is at issue in this case undergoes multiple phase transformations during forming operations; correct?

A. The steel in the '602 patent?

Q. Yes, in the '602 patent and the --

A. And the '227?

Q. Yes.

A. You first start with the phases that you have at room temperature and then you austenitize. You have one phase at that point.

And then you -- you form it at temperature so that you can get the shape that you need, the ductility that you need and then you quench. And the quench does induce a martensitic transformation.

Q. All right. So the -- so the steel at issue in the '602 and '227 patents undergoes multiple phase transformations during the -- the hot forming

operations; correct?

A. Yeah. It principally undergoes two, I guess, if it works out well from its base material state to fully austenitic and then from fully austenitic to fully martensitic.

Q. Okay. And so this is distinct from, as we discussed earlier, DP steel or TRIP steel; correct?

A. Correct.

Q. And also --

A. Well, TRIP steel, in a sense -- you know, it is undergoing that transformation. If you are wanting to make a distinction between the resulting microstructure being fully martensitic, it is not. But it has a greater proportion of martensite through the transformation of retained austenite to martensite during plastic deformation.

Q. Correct. Right. Right. What I meant to say, as to TRIP steel, like we said, TRIP steel is not the steel that we are addressing with the '602 or the '227 patent; correct?

A. No, it's not.

Q. And likewise, we say aluminum alloy or magnesium alloy or stainless steel, those are not the kinds of steel that are at issue in the '227 or the '602 patents; correct?

A. Correct.

Q. Now, the ArcelorMittal patents at issue here, the '602 and '227 patents, refer to improving weldability?

A. Correct.

Q. Correct.

And specifically with respect to the type of steel at issue here the patents refer to improving weldability -- strike that. Sorry.

With respect to the type of steel at issue with the '602 and '227 patents, the patents refer to improving resistant spot welding; correct?

A. So could we just go to the patent for a minute? If you could direct me to the location, I just want to verify that.

Q. Sure.

A. I'm familiar with the patent, but -- let me just open it.

Q. If we open up -- the pagination is a little different between the patents. If you look at Exhibit 1001 in the 370-case, that is the '602 patent.

A. I'm just trying to -- I am in your system here, but it is not allowing me to open the file.

Q. You can open them on your own computer or look at your paper copy?

A. You have got it open. That's fine.
Q. I can direct you, if it helps.
A. Yeah, that would be great.
Q. Yeah. Let's look at the bottom -- not the bottom of Column 2. Let's -- let's look at the bottom of Column 3?
A. Okay.
Q. Let me find Column 3 here. In Column 3, you will see a description of Figures 1 and 2 of the patents. And I think this is the same in both patents, the same language appears.
Do you see that description of Figures 1 and 2 at the bottom of Column 3?
MR. LAMAGNA: For Jake, have you have to go way down.
THE WITNESS: I'm just waiting for Jake. I apologize. If I can see it on the screen, I don't have to change my glasses.
MR. FRANKS: Do you know what page this is on?
MR. LAMAGNA: Yeah, the columns start further down. Keep going. There we go. Column 3 should be the next page.
BY MR. LAMAGNA:
Q. If we go to the bottom around Line 50, you

see a description of Figures 1 and 2?

A. Yes.

Q. Okay. So we are looking at Exhibit 1001 in the 370 IPR, which is the '602 patent, Column 3, starting at line 50.

Do you see the descriptions of the figures?

A. I do.

Q. Okay. And the end of the last of the Figure 1 description says that the arrangement that is shown in Figure 1 is, quote, "particularly favorable for further welding of the part."

Do you see that?

A. Yes.

Q. And in contrast, we talk about in Figure 2, the last sentence there says, "This succession of layers, (interdiffusion layer and intermetallic layer) yields inferior results in resistance spot welding."

Do you see that?

A. Yes.

Q. And if it helps, let's look at -- you know, the patent represents that they conduct different experiments on weldability.

Do you recall that?

A. In the examples?

Q. Yes. Yeah.

A. Yeah. I mean, we could go to those examples, if you would like.

Q. Let's take a look at the top of Column 13. So it's going to be another five pages down.

And you can see there starting at line 7, it explains, "Resistance spot welding was performed in two situations," and then it describes the situations further.

Do you see that?

A. Yes.

Q. Okay. So does that refresh your recollection that the -- the patents at issue here are addressing improving resistance spot welding?

A. I mean, as I read them, weldability was something that they were concerned with, so, yeah. I mean, they are addressing weldability as something that they want to be sufficiently good, I guess you would say.

Q. And specifically resistance spot welding is the type of welding that they were using in the experiments and referring to in the patent; correct?

A. Yes.

Q. How is resistance spot welding different than friction stir welding?

A. Well, different heat generation, friction

versus electric current and resistance in the material that generates heat and melts the material for a brief period of time.

Q. So would it be fair to say that in traditional welding, like resistance spot welding, you are melting the material. And that's how you are joining it. Whereas you are not melting the material in friction stir welding; correct?

A. That's correct.

Q. So your research, when you've looked at -- strike that.

Your focus and your research on friction stir welding is to join the materials without melting the materials; is that correct?

A. That's correct. And then we've compared those results with situations where resistance spot welding has happened, and that would have been in the similar metals welding situation, not so much in a dissimilar metals situation.

Although, people have attempted to resistance spot weld dissimilar metals with certain techniques with varying success.

Q. And so here with the '602 and '227, one of the problems that they are trying to solve is to improve weldability where you are welding by melting

the materials that you're trying to join; correct?

A. Yeah. Resistance spot welding is welding by melting, that's correct.

Q. Now, let's -- I'm going to introduce I think, what today will probably be our only sort of new to the case exhibit, which is this Exhibit 2020.

(Exhibit No. 2020 was marked for identification.)

BY MR. LAMAGNA:

Q. Do you have a copy of that, that I provided to you on paper there?

A. Exhibit 2020?

Q. It might have been loose in your binder?

A. I have Vaissiere at the back, which is 2021.

Q. Do you have something that looks like what we have on screen?

A. Oh, that one? Yeah.

Q. Yeah.

A. Sorry.

Q. And just -- for the record, just for your convenience, we provided you paper copies of the exhibits that we are discussing today.

A. Great.

Q. Which you are free to consult as you need

at any time, just so you don't -- you're not dependent upon whatever we are showing on the screen.

Is that understood?

A. Yes.

Q. So Exhibit 2020 is a printout of your publications as listed on Google Scholar; is that accurate?

A. Yes.

Q. And this has been annotated to number them in -- and I think they are printed in reverse chronological order.

Does that appear to be the case?

A. Yes.

Q. Okay. One question I had here, I notice that the -- in the top corner there's a reference to the number of citations total. And then an h-index and an i10-index.

Do you see that?

A. Mm-hmm.

Q. I take it that the number of citations total is the number of times that your papers have been cited by other publications; is that fair to say?

A. Yes.

Q. That's an aggregate total?

A. Yes.

Q. And when I look here at Exhibit 2020, I see 141 publications here.

Does that sound about right?

A. Yeah, I haven't counted them. That's probably about right.

Q. Okay. And they span from this year going back to the 1990s.

Is that fair to say?

A. Yes.

Q. And what is an "h-index"?

A. An h-index is -- for example, in this case, 28. I have 28 articles that have at least 28 citations.

Q. I see.

A. Twenty-eight or more. So...

Q. So is that -- let me understand this.

Is higher or lower better in an h-index?

A. Higher is better if you're -- you know, if you're measuring citations of your papers. And I think total citations could be skewed by one, you know, a publication that has a lot of citations and others that don't have as many.

So h-index would be a little bit of a broader measure of publication rate -- or citation rate, sorry.

Q. So for the purposes of sort of evaluating the recognition of your scholarship in the field, do you find h-index or total citations to be the more relevant factor?

A. Probably h-index. I think they are both considered, but h-index is probably a good measure based on what we've discussed.

Q. And what is an i10-index?

A. Number of publications with at least ten citations.

Q. Okay. Do you have a view as to, you know, when evaluating sort of the recognition of one's scholarship whether the h-index or the i10-index is a more relevant factor?

A. I think the h-index is considered a more relevant factor.

Q. Okay. Well, you certainly have a number of publications. It's, you know, very admirable. That is a lot of work, no doubt. That wasn't really a question.

A. No. Thank you.

Q. So in looking over these, do any of the publications here address work or research that was done with fully martensitic press-hardened steel?

A. I don't think there is in this list.

The -- the work that I alluded to earlier was a feasibility study.

Q. Okay. But to your knowledge, you have not published on work or research related to fully martensitic press-hardened steel; correct?

A. I think that is correct.

Q. And --

A. I can't remember if we had something in a conference presentation, but I think you may be correct.

Q. And the -- is -- strike that.

Is it also accurate that you have not published on work or research where you were authoring, setting or experimenting with hot stamping parameters for alloy-coated steel?

A. Correct.

Q. And just for the sake of our whole conversation today, when I refer to "hot stamping parameters" or "requirements," you understand that I'm talking about heating rates or curves, temperature targets and holding temperatures, holding time, stamping or contact time, cooling rates and time; is that fair to say?

A. So I haven't studied those in these, you know, kind of aggregating those in this research list.

If you look at those issues in some cases individually, I have experience with heat treatments of steel and, for that matter, heat treatments of aluminum, aluminum and steel.

Q. Right, and I'm talking about --

A. And so --

Q. Apologies, sorry.

A. I was going to say the issues that I read about in the '602 or the '227 patent are issues that I have a good grasp of just because of my background in materials science and the things that I teach in my classes.

So I guess I would say that I feel comfortable with those topics, but if you're aggregating those together in a hot stamping format, optimized or done parameter studies in hot stamping, they are not in my list of publications.

Q. Okay. And just for clarity, I just wanted to sort of level set and make sure we are talking about the same thing. So when --

(Off the record.)

(Technical difficulties.)

(Recess was taken.)

BY MR. LAMAGNA:

Q. So Dr. Miles, just for sort of level

setting, I want to make sure that you and I are using the same -- and understanding the same wording.

When I refer to "hot stamping parameters" or "requirements," that would include, for example, the heating rate, heating curves and temperatures, correct?

A. When you say "heating curve," you know, what I looked at was primarily a start temperature, a target temperature, and I don't know if there was a curve in there. There could well be. But yes, those are two.

You are talking about the rate at which we go from room temperature up to a target temperature in the -- in the furnace.

Q. Yeah, that would be part of the parameters, whether that is a curve or straight like, but the heat rate or curve, I guess should say?

A. Yes.

Q. And the target temperature and the holding temperature, it would be fair to say that would be a parameter or requirement in hot stamping as well; correct?

A. Yes.

Q. And so the stamping and contact time and cooling rates and cooling times, those would also fall within -- constitute hot stamping parameters; correct?

A. Yes.

Q. Okay. Can you think of any other parameters or requirements with respect to hot stamping processes that I have left out of those general limits?

A. Not really. I don't know if you mentioned the time to go into the furnace into the stamping dye. There is a little bit of time there. I was just thinking about the line.

There is a robot that takes the steel and places it into the stamping dye. And I think that's also a time that is considered to be important. It can't be too long, for example.

Q. So we will call that the transfer time?

A. Transfer time, I apologize.

Did you already say that?

Q. No, I didn't.

A. Okay. Okay.

Q. So to sum up, when I refer to hot stamping parameters or requirements, you understand that that would include heating rates or heating curves, temperature targets and, you know, holding temperatures, transfer times, holding times, stamping and contact time, cooling rates and cooling times; correct?

A. Yeah. You have covered -- as I go from

left to right through the sequence, I think that you have covered the key ones.

Q. And it is accurate to say that you have not published any research or work authoring setting or experimenting with hot stamping parameters or requirements for aluminum alloy-coated steel; correct?

A. Correct.

Q. Now let's turn to your tenure at BYU.

You started as an assistant professor at BYU in 2001; correct?

A. That's correct.

Q. And since then, you became both an associate professor and a full professor at BYU?

A. That's correct.

Q. So basically, you have been a professor there for the last, say, 14 years or so?

A. Oh, you mean, like a full professor?

Q. No, just a professor in one form or another?

A. Yeah, the last -- about 24 years.

Q. Oh, I'm sorry. My apologies.

A. No worries. No worries.

Q. If I could do math, I wouldn't have been a lawyer.

Since 2001?

A. Since 2001, exactly.
Q. And you have been a full professor since 2013; correct?
A. Yes, I think that's correct.
Q. And this is where you have done substantial research on solid state joining specifically friction stir welding and TRIP steel and dual-phase steel; correct?
A. You mean since 2013?
Q. Or since 2001.
A. 2001.
Q. Your time as a whole at BYU?
A. Since 2001, that's correct.
Q. Okay. I mean, was there a different focus of your research between 2001 and 2013 when you became a full professor?
A. No, it was a lot of the same things. I think we were one of the first to really do friction stir welding of steel. It is very challenging. And incidentally, whether this is relevant, in some of those early papers, we showed that you could weld at a temperature in the two-phase region rather than fully austenitizing the material.
And so it showed some flexibility in the different phase transformations that you could target

as the specimen cooled down after welding. That was fairly novel.

I think that may have been alluded in the patent the idea that you don't fully austenitize. But in a temperature where you might be in a two-phase region, I don't think that is relevant. I just noticed it because we had experience doing that in friction stir welding of steel.

Q. Now other than the feasibility study we spoke about earlier, has any of your research or work at BYU involved working with fully martensitic steel?

A. I don't believe so. We -- I guess I can qualify that a little bit.

When we make joining bits, there are times where we are trying to achieve something like a fully martensitic structure. And we use a super quench in order to try to achieve something like a fully martensitic structure in terms of the hard material.

That would be not in the case where we are joining aluminum to steel, but that would be in a case where we are actually trying to penetrate a piece of steel with the joining bit and then weld that piece of steel to another piece of steel.

Q. So you want the joining bit to be very hard; correct?

A. Exactly.
Q. So you worked with martensitic drill bits; correct?
A. Essentially, yes, joining bits.
Q. But your research at BYU has not involved working with fully martensitic aluminum alloy-coated steel; correct?
A. Correct.
Q. And your research work at BYU has not involved hot stamping aluminum alloy-coated steel; correct?
A. Correct. I want to qualify briefly. We did talk about that feasibility study. And I think you mentioned that was the one example where I was working with a -- in a joining process working with an aluminum coated hot stamped boron steel.
Q. Right. In that instance of the feasibility study in 2017, you were not involved in hot stamping of the aluminum alloy-coated steel; correct?
A. Correct.
Q. And you were not, in that feasibility study, involved in designing or determining the hot stamping requirements or parameters for the alloy-coated steel; correct?
A. Correct.

Q. And in your research at BYU, you have not been involved with experimenting with hot stamping parameters or requirements for aluminum alloy-coated steel; correct?

A. Correct.

Q. And in your work at -- and research at BYU, you have not been involved in designing or determining heating, holding or cooling parameters to obtain specific layered phase structures in aluminum alloy coatings for steel; correct?

A. Correct.

Q. I understand that you have also got quite a bit of funding for your research; is that fair to say?

A. Yes.

Q. You have got funding from the National Science Foundation, the Department of Energy, NASA. You have collaborated with companies like General Motors, Honda, Oak Ridge National Lab, Megastore Technologies; is that correct?

A. That's correct.

Q. Other than the -- well, is -- would the feasibility study that we spoke of in 2017 fall within what you considered to be your -- your funding or was that a separate thing?

A. Well, I think we were hoping to get

funding. And we did a feasibility study to see -- because we have done prior work in other alloy combinations, and megastore was hoping we would get funding to move towards something like commercialization.

So like I said, I think we -- we had a technical success, but it didn't move forward as a commercial activity.

Q. So the feasibility study that we spoke of in 2017 did not result in funding for you; correct?

A. No, but we got other -- yeah, we got other funding from the auto steel partnership, but that one we did not get any follow-on funding. We got funding to do the work, the feasibility study. We didn't -- I can't remember if -- excuse me -- what the -- what the expectations were of my partner, but we were paid to do the feasibility study.

I think that the purpose of that was the auto steel partnership was creating this broad set of results that their partner companies could look at and say, Okay, if I want to achieve something, I have got these different possibilities or these material combinations. It was something like that.

Q. So setting aside the feasibility study in 2017, your funded work or research does not involve

fully martensitic steel; correct?

A. Correct.

Q. And your funded work has not involved authoring or experimenting with hot stamping parameters or requirements for aluminum alloy-coated steel; correct?

A. Correct.

Q. And your work has not involved hot stamping aluminum alloy-coated steel; correct?

A. Correct.

Q. And just to close out my questions, your funded work does not involve designing or determining heating, holding or cooling parameters to obtain specific layered phase structured in aluminum alloy coatings for steel; correct?

A. Correct.

Q. Let's go now to your private employment before you started at BYU.

A. Okay.

Q. After your PhD, you worked for -- is it Pechiney Research?

A. Yes, Pechiney.

Q. And Pechiney in France is a company that does aluminum cans in packaging; is that correct?

A. So that's one of their activities. It was,

general speaking, an aluminum company from producing primary aluminum to producing different alloy plates and downstream products like beverage cans.

Q. And so you were working, at that time, with producing aluminum or aluminum alloy sheets or products; is that fair to say?

A. So I was a user of those products. For the first nine months or so, I was in the technical center in Grenoble.

I was mainly doing the modeling of the forming of aluminum for packaging purposes. And then, when I moved to Chicago, I was continuing that activity, but then starting to go more into the factory environment in support of tooling and other issues within the factories.

Q. So you were in Grenoble right there by Switzerland?

A. That was where -- yeah, that is where the technical center was.

Q. I have heard it is beautiful there. I have never been.

A. It is nice.

Q. You could walk to Geneva? Is that right near Geneva?

A. You can drive there. I'm trying to

remember. It is 90 minutes, maybe.

Q. I was joking when I said "walk." A car would be more efficient.

A. Yeah, it's close.

Q. And then you moved to working for a subsidiary American National Can, Pechiney, that is outside of Chicago; right? Correct?

A. Yep.

Q. And so again, you are working with aluminum materials; correct?

A. Correct.

Q. So forming aluminum into products?

A. Correct.

Q. And then you, I guess, changed jobs in 1998, still working for American National Can, but this time in Idaho; correct?

A. Correct.

Q. And so you're still working with aluminum and forming aluminum products; is that fair to say?

A. That's correct.

Q. And then I think your last job before going to BYU was -- is working with the company that purchased American can, which is Rexam?

A. Yep.

Q. And that would also be working with

aluminum and forming aluminum products; correct?

A. Correct.

Q. And so in your private employment between your PhD and your employment at BYU, you were not working with fully martensitic steel; correct?

A. Correct.

Q. And --

A. Other than incidentally with tooling and things of that nature that might be really hard. I wasn't working with -- if you're talking about a hot stamped boron type of a steel, I wasn't working with that.

Q. Right. I mean, exempt -- you may have been using a tool or a drill bit that was fully martensitic steel; correct?

A. Yeah, correct.

Q. What I mean to say is you're not doing work to manufacture or form products from fully martensitic steel; correct?

A. Correct.

Q. And during your work in the private sector from 1995 to 2001, you were not involved in authoring, setting or experimenting with hot stamping parameters or requirements for aluminum alloy-coated steel; correct?

A. Correct.
Q. And during your -- those years from 1995 to 2001, you were not involved in hot stamping aluminum alloy-coated steel generally; correct?
A. Correct.
Q. And during those years, from 1995 to 2001, you were not involved in designing or determining heating, holding or cooling parameters to obtain specific layered phase structures in aluminum alloy coatings for steel; correct?
A. Correct.
Q. Now, you got your bachelor of science in metallurgical engineering and a master's in metallurgical engineering as well; correct?
A. Correct.
Q. And then you also, in France, at the French School of Mines, got your PhD; correct?
A. Correct.
Q. Also in material sciences and engineering?
A. Correct.
Q. And my understanding is that that is a very respected school for material sciences, the -- the School of Mines in Paris; is that fair to say?
A. I think it is.
Q. It's -- the -- the Harvard of metallurgical

engineering in Paris.

A. Well, I don't know. It's a good school for materials.

Q. So it would be fair to say -- let me ask you this: Did -- with respect to your PhD or your master's or your bachelor's degree work, you didn't specifically conduct research or work with aluminum alloy-coated steel; correct?

A. Correct.

Q. And with respect to your PhD, master's or bachelor's you didn't conduct any work with specifically hot stamping aluminum alloy-coated steel; correct?

A. Correct, yeah. During my master's, I did conduct formability testing on coated steels, but it was, like, a couple of different galvanized steels and the forming was at room temperature.

Q. Right. So you were not -- during your PhD or master's or bachelor's work, you were not hot stamping aluminum alloy-coated steel; correct?

A. Corrected.

Q. And during your educational work on your PhD, master's or bachelor's, you were not designing or setting parameters or determining the settings or requirements for hot stamping processes involving

aluminum alloy-coated steel; correct?

A. Correct.

Q. And during your PhD or your master's or your bachelor's, you were not designing or determining heating, holding or cooling parameters to obtain specific layered phase structures in aluminum alloy coatings for steel; correct?

A. Correct.

Q. Now, I notice you have at least four U.S. patents and maybe a pending application; is that fair?

A. It's something like that, yeah.

Q. Which is at least four more than I have.

And those patents involve friction stir welding or, you know, solid state joining or, like, closure technology, putting a lid on a can; is that fair to say?

A. Yes.

Q. So the patents that you have did not fully work with martensitic steel; correct?

A. Correct.

Q. And the patents you have don't involve authoring setting or experimenting with hot stamping parameters for aluminum alloy-coated steel; correct?

A. Correct.

Q. And the patents or patent applications that

you have, do not involve hot stamping aluminum alloy-coated steel itself; correct?

A. Correct.

Q. And the patents or applications you have do not involve designing or determining heating, holding or cooling parameters to obtain specific layered phase structures in aluminum alloy coatings for steel; correct?

A. Correct.

Q. Now, I know that you've been a -- I want to say an expert in other proceedings related to ArcelorMittal patents; correct?

A. Correct.

Q. Either these patents or other related patents; is that fair to say?

A. That's correct.

Q. So setting the expert retentions that you've had with respect to ArcelorMittal's patents, how many other matters have you been retained as an expert in with respect to metallurgy, approximately?

A. So the expert for Burr & Forman was an automobile spot welding IPR. So I mean, there was, I guess, some metallurgy in that one.

The expert for Covington & Burling was a trade secret lawsuit where specific steel compositions

were alleged to have been stolen from U.S. Steel. And I was looking at all of the different operating parameters for producing those steel alloys that had been patented by U.S. steel.

I was working on behalf of a Chinese steel company. So that was fairly heavily steel metallurgy process oriented in terms of how the steel was -- was made. The heat treatments in order to produce things like dual-phase steering wheel or TRIP steel, that's what that was about.

And then I think that's -- that's it in terms of metallurgy.

Q. So none of the cases -- well, strike that.

None of the cases that you worked on as an expert involved hot stamping aluminum alloy-coated fully martensitic steel; correct?

A. Correct.

Q. And the cases that you worked on as an expert, did not involve authoring, setting or experimenting with hot stamping parameters required for aluminum alloy-coated steel; correct?

A. Correct.

Q. And the cases that you worked on as an expert did not involve the heating, holding or cooling parameters needed to obtain specific layered phase

structures in aluminum alloy coatings for steel; correct?

A. Correct.

Q. Just to take a step back, like I said, you have -- we -- we talked about your substantial experience in joining technology; correct?

A. Correct.

Q. It would be fair to say that during your career in education, you have not been involved in setting or determining or designing or experimenting with hot stamping parameters for aluminum alloy-coated steel; correct?

A. Correct.

Q. And it's fair to say that during your career in education, you have not operated yourself or overseen the operation of hot stamping aluminum alloy-coated steel; correct?

A. Correct.

Q. And it's fair to say that during your career in education you have not been involved in setting or determining the characteristics or requirements for the base steel itself that is to be coated with aluminum alloy or -- for hot stamping; correct?

A. Correct.

Q. And during your career in education, you have not worked on or set or determined the characteristics or requirements for aluminum alloy coatings for the purpose of coating steel to be hot stamped; correct?

A. Correct.

Q. And during your career and education, you have not been involved in setting the characteristics or requirements for the aluminum alloy coatings on steel after they have been hot stamped; correct?

A. Correct.

Q. And during your career in education, you have not worked on a research the formation of intermetallics in aluminum alloy coating on steel during the hot stamping process correct?

A. Correct.

Q. And during your career and education, you have not worked on or researched designing or determining the heating, holding or cooling parameters to determine specific phase structures in aluminum alloy coatings to steel; correct?

A. Correct.

Q. And during your career and education, you have not researched or worked on controlling the diffusion of layered phase structures in aluminum alloy

coatings on steel; correct?

A. Correct. The only thing that I have done that maybe has some relationship with what you just mentioned is -- and you can decide if this is relevant -- in the friction bit joining aluminum to steel, as the bit is rotating rapidly, plunging through the aluminum and bonding with the steel on the backside, the side of the bit does react with the aluminum and form an intermetallic of aluminum and iron which constitutes, maybe, a secondary bonding mechanism in the process. The primary one being the steel-to-steel bond on the backside.

Q. But you have -- it is fair to say that during your career in education, you have not researched or been involved in studying the diffusion from the base steel in -- to create layer phase structures in the aluminum alloy coating on the steel, the diffusion between the base steel and the coating --

A. Correct.

Q. -- that -- sorry. We are talking over each other.

A. Sorry. Yeah, that's correct.

Q. That is the little bit of latency of the Zoom. You know, it creates that problem.

Let's go to -- I defer to you, if you have

an electronic copy yourself on the computer versus using -- whatever works for you. We are going to go through some exhibits.

A. Okay.

Q. These are also -- all of the things that we are going to look at is in the paper binder that I sent you, if that is more convenient for you.

A. Okay.

Q. I want to turn to your report that is Exhibit 1003 in the 370 IPR. This is the IPR for the '602 patent.

A. Okay.

Q. Let me just pull up my own version of it.

A. I'm going to input a code real quick.

Q. Microsoft is very helpfully trying to resize everything on my screen and so then it blocks you all out. Sorry about that. Give me one second to find myself.

Let's go to Paragraph 15 where you talk about the level of skill in the art. Why don't you take a moment to look at Paragraph 15. What is fastest for you? You can look at it on paper, on your own computer independent or our technical leader here from Veritext will put some of this on the screen as well.

A. Okay.

Q. Whatever is easier. Take a moment to look at Paragraph 15.

A. Okay.

Q. And this is Paragraph 15 of Exhibit 1003 is where you describe the requirements for a person of skill in the art in the field of the '602 and '227 patent; correct?

A. Yes.

Q. And in your view, a person of skill in the art would have some educational background, at least an undergraduate degree in something related to metallurgy such as material science, manufacturing engineering, mechanical engineering or the equivalent; correct?

A. Correct.

Q. In your view of the person of skill in the art in addition to educational background would have at least two years of experience working in metallurgy; correct?

A. Correct.

Q. And you do not narrow or specify any particular type of metallurgical experience that would qualify someone to be a person of skill in the art of the '602 or the '227 patents; correct?

A. In this paragraph, I haven't done that.

Q. Okay. So, for example, if a steelworker at

a plant has an undergraduate degree in mechanical engineering and two years of experience melting materials to make molten iron, they would qualify as a person of skill in the art, in your view, as stated in this paragraph with respect to the '602 and '227 227 patents; correct?

A. Broadly speaking, that would qualify. I think you could consider, you know, somebody with this background and two years of experience as having a variety of different experiences in the metallurgy field. Metallurgy being a field where you learn about material properties and heat treatments and diffusion as general principles in different alloy systems.

Q. Okay. But for someone who has a degree in manufacturing engineering, for example, and two years of experience melting materials to make molten iron in a -- in a -- you know, iron forge, they would qualify as a person of skill in the art in your view; correct?

A. If you're -- if you're restricting it to that, then I would say that, you know, my view of a person of ordinary skill would include -- you have described somebody that falls under the description of Paragraph 15, but there certainly could be other experiences that that person would have in their two years of experience.

But what they would have is they would have a solid background in materials and, you know, the -- the basic elements of materials, heat treatments, alloys, diffusion, those are topics that we cover in those educational degrees.

Q. So you're saying that -- just to clarify your answer, when somebody gets, for example, a bachelor's degree in manufacturing engineering, they would have some exposure to basic understanding of alloys and steelmaking?

A. So alloys and, I guess, steelmaking, but they probably have more background in alloys, material selection, the basics of material science, crystal structures, heat treatments in different alloy systems, diffusion.

They do go into the common coatings on materials, you know, diffuse-based processes like carburizing, nitriting or galvanizing. So they have got to have experience in those areas.

Q. In school you're saying?

A. School, yeah --

Q. But just --

A. -- at the level of a class, at the level of a lab, yeah.

Q. And I'm just trying to understand just to

confirm. So it's your understanding that, for example, a steelworker with a bachelor's degree in manufacturing engineering and two years of experience working with a blast furnace would qualify as a person of skill in the art in your view with respect to the '602 and the '227 patents; correct?

A. So, I guess, working in metallurgy and the way that I look at it would be not really blast furnace because that's more of an operations thing. It doesn't require, necessarily, a metallurgy background.

But metallurgy would be working in the elements of metallurgy as -- as taught in a general materials science class or a metallurgy class in the areas that I talked about, so looking at microstructures, looking at heat treatments. Actually using their metallurgy background in their work.

Q. So would --

A. Melting steel doesn't require a metallurgy degree. Operating a blast furnace would be more of an operations or production-oriented thing.

Q. And just to clarify, what we have written here in Paragraph 15 does not require any specific metallurgical experience; correct?

A. Right. But when we see "metallurgy," we mean using the elements of metallurgy that were taught

in classes on the topic, not necessarily doing operations within a factory that wouldn't require that background.

Q. Well, looking at this from the other side, in your opinion, to be a person of skill in the art of the '602 or '227 patents, the individual would not need to have any experience with, for example, aluminum alloy-coated steel or hot stamping; correct?

A. Correct.

Q. And --

A. I mean, you could, but that wouldn't be required based on how Paragraph 15 is written.

Q. Correct. Yeah. So --

A. But they might have experience doing ancillary type of things where their understanding could be relevant.

Q. Right. I'm just trying to understand the boundaries of it. What is required is what I'm trying to identify.

A. Okay.

Q. Do you follow what I'm asking?

A. Yeah.

Q. And so to be a person of skill in the art in your view the individual -- strike that.

To be a person of skill in the art of the

'602 and the '227 patents, the individual would not need experience in aluminum alloy-coated steel or its hot stamping; correct?

A. Not specifically the way this is written.

Q. And to be a person of skill in the art of the '602 and '227 patents, in your view, a person would not need to have any experience working with fully martensitic steel; correct?

A. When you say "metallurgy," it implies a knowledge of something like a -- that is such a fundamental things in metallurgy that they would certainly have a knowledge of. Whether they have experience -- direct experience in that two years after school, it's not included in this paragraph, but they would certainly have a knowledge of martensitic steels and the concept of a fully martensitic steel.

Q. I don't consider myself to be a metallurgist. In fact, I'm fairly certain that I'm not. And I would not qualify under anybody's definition of a person of skill of the '602 and the '227 patents.

Do you follow that?

A. Yeah.

Q. However, I have heard of fully martensitic steel, and I can, you know, read the Wikipedia, you

know, version of it. So I understand the -- the -- I have heard of it and I know of it.

Do you see that distinction?

A. Yes.

Q. But I don't have any personal experience researching or working with martensitic steel as a metallurgist if that makes sense.

A. Right. But if you have somebody with a -- one of these degrees and two years of experience working in metallurgy, either through their background that they would have had in manufacturing, engineering or mechanical engineering or material science, they would have experience and understand quite well the concept of a martensitic steel or a fully martensitic steel because we cover those concepts.

They are -- they are part -- and they might well be a part of a laboratory exercise where a material is heat treated through a heating phase and then a quenching phase to obtain a microstructure.

I'm just trying to help you understand my thought process on -- on this definition.

Q. No, I appreciate that. And like I said, I want to focus not on what might be or what is optional, but what is required.

So as I understand it, while a person of

skill in the art might be aware of or learned about fully martensitic steel, in your view, in order to be a person of skill in the art in the '602 or the '227 patent -- patents, the individual need not have direct experience researching or working with fully martensitic steel; correct?

MR. MONALDO: Objection. Asked and answered.

BY MR. LAMAGNA:

Q. You can still answer. The counsel has to put the objection on the record.

A. So my -- okay, my -- my thought process here is that during the course of the undergraduate degree in these areas, they are going to have direct experience in the various steel microstructures that exist, including fully martensitic steels.

And it's likely that, at least in my experience in our laboratory exercises, the students go through a heat treatment lab where they austenitize and quench a material and then relate that to the microstructure. So it is always a function of composition and cooling rate. So they learn those principles which are fundamental to metallurgy.

That's my -- my view of, you know, the toolkit that they would have with them as a part of

their degree. And then, if they are working in metallurgy, you really are sort of bolstering the things that you learned. I don't include, you know, operating a blast furnace or melting steel as acquiring knowledge in metallurgy. That is kind of at the edge of what I consider metallurgy.

Metallurgy would be actually working in the area of materials and their properties and microstructures including heat treatments, including microstructure of property, relationships, that sort of fundamental metallurgy type of work.

Q. Okay. So in your opinion, however, a person of skill in the art of the '602 or '227 patent would not need to have any direct experience or conducted research authoring, setting or experimenting with hot stamping parameters or requirements for aluminum alloy-coated steel; correct?

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: So it is within the realm of the knowledge base of someone with a degree of material science, manufacturing engineering or mechanical engineering and two years experience working in metallurgy.

///

BY MR. LAMAGNA:

Q. So it's your testimony that somebody with a manufacturing engineering degree and two years of -- strike that?

It's your testimony that everybody with a manufacturing engineering degree, say, and two years working in metallurgy, necessarily has experience authoring, setting or experimenting with hot stamping parameters for aluminum alloy-coated steel?

A. No.

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: But they have the background to understand the phenomena in -- in the hot stamping process.

BY MR. LAMAGNA:

Q. I guess, let me -- I'm going to try to distinguish in these questions between what someone might have learned in a book or what they might have, you know, understood some underlying principles and actual direct experience or research.

Do you follow that distinction?

A. Yes.

Q. So it is true that in your experience, to be a person of skill in the art of the '602 or '227

patent, one does not need to have any direct experience or directly conducted research in authoring, setting or experimenting with hot stamping parameters for aluminum alloy-coated steel; correct?

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: Correct. Because such a person has -- has a background with the fundamental knowledge of the phenomena that are brought to bear in -- in a hot stamping process. So they would understand, you know, the heat treatment.

It's actually fairly routine in terms of its description. And the -- the consequences, it's really emanating from composition and cooling rate which is something that is covered extensively and more than one class in manufacturing, engineering and mechanical engineering and material science.

So you're asking, do they -- you know, would they necessarily have experience with that direct process? No, but they have the toolkit to understand it and to have insights into the phenomena that occur during the process.

BY MR. LAMAGNA:

Q. I'm -- I'm not asking what they would have understood or what sort of insight they might have.

I'm simply asking whether certain experiences or research experience is required or not. So it's -- you're answering -- I just want to -- so we can get out of here early today --

A. Yeah.

Q. -- I'm asking a narrower question.

A. I said it is not required and then I qualified it.

Q. Yeah. And so just to clarify, in order to be a person of skill in the art of the '602 or '227 patent, in your view, the metallurgist does not have to have actual experience hot stamping aluminum alloy-coated steel; correct?

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: Correct. You know, with the qualification that I have already sort of talked about in terms of the background of -- of a person of ordinary skill.

BY MR. LAMAGNA:

Q. And in your view, a person of ordinary skill in the art of the '227 or '602 does not need to have any experience or conduct any research in designing or determining heating, holding or cooling parameters needed to obtain specific layered phase

structures in aluminum alloy coatings; correct?

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: Correct, with the same qualification about background, toolkit from education, which is -- they are going to understand diffusion. They are going to understand heat treatments.

BY MR. LAMAGNA:

Q. I guess here is the -- okay.

But for the fact that I do not have a degree in material science, would you consider me to be a person of skill in art because I understand diffusion and heat treatments?

A. But this person of ordinary skill has trained as an undergraduate in these topics. They had classes and labs to help them understand heat treatments and diffusion. Diffusion is really a fundamental material science concept in metals and metal alloys.

Q. So in your --

A. I understand what you're asking. And I'm just trying to explain my thought process in the definition of a person of ordinary skill. You're asking if they had the exact experience as described in the '602 or the '227.

And I'm saying I don't say that in Paragraph 15, but what I do say is, have an undergraduate degree in an area where they would have received training understanding insight into the phenomena that occurred during the hot stamping process --

Q. So what you --

A. -- with martensitic steel.

Q. What you are focusing on here is that they have classes that they took from their undergraduate degree where they would understand principles like diffusion and heat treatment; correct?

A. Correct.

Q. And they have -- in your view, a person of skill in the art has -- in their bachelor's degree, would understand the different phase states of iron-based material such as austenite or martensite; correct?

A. Correct.

Q. And in your view, that undergraduate experience that they have would give them the insight and the understanding necessary to understand hot stamping parameters for aluminum alloy-coated steel or parameters for obtaining phase layers in aluminum alloy-coated steel; correct?

A. I think that's correct. I think they have the background to understand those phenomena.

Q. Okay. So beyond understanding the phenomena, in your view, someone with an undergraduate degree in metallurgy would be capable and qualified to author, set and determine hot stamping parameters required for the manufacturing of aluminum alloy-coated steel; correct?

A. I think their background qualifies them to make contributions in that area.

Q. Well, I'm not asking if they could contribute. I'm saying -- if I understand you correctly, it's -- your view is that someone with a two-year degree -- I'm sorry. My apologies. Someone with a bachelor's degree in manufacturing engineering would have the foundational knowledge necessary to author hot stamping parameters for aluminum alloy-coated steel; correct?

A. So I think that's correct. Although, you know, you have got an undergraduate degree. You have got two years of experience working in metallurgy. Which when I say "metallurgy," I mean the actually field of metallurgy, which is understanding alloys, microstructure property relationships, mechanical properties, heat treatments and so forth.

I see that person as having the ability to -- to understand and make contributions in the hot stamping process and a coated steel hot stamping product.

Q. And again, I want to focus on this so that -- I don't want to focus on contributions. I could make a contribution, I'm sure.

I want to understand -- this is sort of a yes-or-no question.

In your view --

A. Yes.

Q. -- would --

A. Yeah, I was going --

Q. Let me ask a question so we have a clean record.

A. Yes.

Q. In your view, an individual with a bachelor's degree, for example, in manufacturing engineering and two years experience in metallurgy would have the -- the foundational knowledge and experience necessary to author or set hot stamping parameters for the hot forming of aluminum alloy-coated steel; correct?

A. Yes.

MR. MONALDO: Objection. Asked and

answered.
BY MR. LAMAGNA:
Q. And in your view, a person with a four-year degree in manufacturing engineering and two years of experience working in metallurgy would have the foundational knowledge necessary to be able to design and determine heating, holding and cooling parameters necessary to obtain specific layered phase structures in aluminum alloy coatings for steel; correct?
A. I think that they would have --
MR. MONALDO: Objection. Asked and answered.
THE WITNESS: -- the foundation to understand the art in those areas.
BY MR. LAMAGNA:
Q. Okay. I'm not -- again, I want to distinguish it.
MR. LAMAGNA: And with all due respect, Jeremy, I don't think that these questions are asked and answered. I think that I'm asking these for the first time.
BY MR. LAMAGNA:
Q. Dr. Miles what I want to distinguish here is the ability to understand, which is something that, like, a lawyer like me can do. I really can understand

a lot of this. You would be shocked. And something of being capable of actually doing the thing -- there's a difference, I think -- do you follow the distinction I'm making about being able to comprehend what is happening and being able to actually create something?

A. Yes.

Q. And so --

A. I think for me, those two things are linked together.

Q. Right.

A. If you understand something, you are in a position to create something. And my thoughts on this topic really come from my experience with undergraduates at my university doing research as undergraduates. And the types of things that I've seen them do and are capable of doing. So...

Q. And so, in your view, someone with an undergraduate degree in manufacturing engineering and two years of experience anywhere in metallurgy would have the capability and the experience necessary to design and determine the heating, holding and cooling parameters necessary to obtain specific layered phase structures in aluminum alloy coatings for steel; correct?

MR. MONALDO: Objection. Asked and

answered.

THE WITNESS: I think they certainly would be in a position to understand the art in those areas.

BY MR. LAMAGNA:

Q. Okay. Respectfully, that is not my question.

A. Your question is -- yeah, go ahead.

Q. My question is whether they would be able to design, author or set the standards themselves, not understand what is going on. So let me ask my -- my question again.

In your view, someone with an undergraduate degree in manufacturing engineering and two years of experience anywhere in metallurgy would have the capability and the experience necessary to design and determine the heating, holding and cooling parameters necessary to obtain specific layered phase structures in aluminum alloy coatings for steel; correct?

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: So through -- with their background and experience through experimentation, I think they have the ability to do that.

BY MR. LAMAGNA:

Q. Okay. Fair enough.

MR. MONALDO: I think that we have been going for about an hour, Ray, I don't know if it would be a good time for a break.

MR. LAMAGNA: Let me ask one other parallel question to close out this line, one or two.

BY MR. LAMAGNA:

Q. And so likewise, in your understanding, someone with an undergraduate degree in manufacturing engineering and two years of experience anywhere in metallurgy would have the capability and the experience necessary to design and determine the parameters and requirements necessary for hot stamping aluminum alloy-coated steel to result in a fully martensitic aluminum alloy coated products; correct?

A. Correct.

MR. MONALDO: Objection. Asked and answered.

BY MR. LAMAGNA:

Q. And so because of that, in your view, the description you have in Exhibit 1003, Paragraph 15, your declaration, does not need to be amended. There's no additional experience or specialized experience that is necessary for a person to be skilled in the art of the '602 or '227 patents; correct?

A. So, based on our discussion, my

qualifications of what those terms mean, I think that person is capable of the things that I've talked about so I don't see a need to amend Paragraph 15.

Q. Okay.

MR. LAMAGNA: Let's take a break as requested.

(Recess was taken.)

BY MR. LAMAGNA:

Q. Dr. Miles, I want to talk a little bit about some of the terms that are used in the patent, the concepts that are used in the '602 and the '227.

Is that okay?

A. Yes.

Q. So one of the words that comes up is the requirement of there being "layers."

Do you know what I'm referring to?

A. Yes.

Q. In the context of the '602 and the '227 and the context of the aluminum alloy coating, how would a person in the skill understand the word "layer"? What would they understand that to mean?

A. I think that I would like to quickly refer to the patent.

Q. Yeah, and you can look at Exhibit 1001 of the 370, the '602.

A. The '602 patent? Okay. Could you -- are you talking about the layers in -- in the figure?

Q. Sure. We can look at that or in Claim 1, there is a description of certain layers in Claim 1. And there is also Figure 1. So we can look at Figure 1, if you would like.

A. How would we understand the layer?

Q. Yeah, just the term "layer" itself. What do you understand -- strike that.

How would a person of skill in the art of the '602 and the '227 patent understand what it means to constitute a layer in the context of those patents?

A. Okay. A layer would be characterized by a composition and if the figure -- the compositions have different shadings when they are etched and looked at under a microscope.

Q. So if we look -- sorry, go ahead.

A. Go ahead.

Q. Sorry. Why don't we -- and we can put it up on the -- on the screen here. If you scroll upward on to the earlier pages, I think you will see some pictures. And there's a Figure 1 that is a few pages earlier. We look at that, like I said, you can look at your paper copy, if you would like. There you go.

A. Yeah.

Q. Looking at Figure 1 of Exhibit 1001, you see that there are different strata of gray shadings in the image; correct?

A. Yes.

Q. And so the top of that image is the aluminum alloy coating; correct?

A. The superficial layer?

Q. No. I mean, in general --

A. Oh, I see.

Q. -- the upper -- I don't want to say "layers," but the upper shadings are the aluminum alloy coating; correct?

A. The collection of the four layers, yes.

Q. And those are divided into -- or shown as different grays in -- in this image, this black-and-white image; correct?

A. Yeah, different shades.

Q. And so when you were describing the layers that the '602 and the '227 refers to, we are seeing that reflected in the different shading here in Figure 1; correct?

A. Yeah. I see different shades in the different layers. You know, the first layer is a little bit interesting because it looks fairly uniform. But there's this small portion that has a slightly

different shade before you go into the next layer, which has a darker shade, but, yeah, they have different shadings.

Q. And so what does the different shading that we are seeing signify?

A. Well, I think different shading is -- indicates the composition. Because typically, when you're looking at a micrograph like this, they would have polished very carefully. And then you would do an etch with something like nitol to reveal the microstructure.

So the reaction of it with the composition of the material gives you a shade.

Q. So each of these different shaded bands that we see here in Figure 1 represent a different composition?

A. So potentially different, but also -- you know, the case of the intermediate layer and the superficial layer, those compositions are not super far apart, however, they are different.

I think the shading is an indication visually of the layer, but you would have to do some kind of characterization to really know what that layer was composed of in order to understand what is the composition of the layer.

Q. And --
A. And --
Q. Sorry.
A. Go ahead.
Q. What type of characterization would you do to understand what the layer is composed of?
A. You could do EDS or x-ray diffraction techniques, fairly common techniques to get at composition.
Q. And is that, like, a line scan?
A. So EDS is a line scan.
Q. Okay. And so that would tell you what the composition is at one specific point, at one cross section, if you will, or vertical line; correct?
A. Correct.
Q. If you needed to characterize the -- the band as -- as a whole, that that same composition carries through the band. You would need to do a few line scans, correct, to just confirm that point?
A. To get an average. That would give you an average. You would see how consistent the composition was from left to right.
Q. Is there -- when you -- when you label something as a layer, is there -- strike that.
You would agree that in labeling something

as a layer, there would have to be some consistency across the band that we are seeing; correct?

A. Yes.

Q. And in addition to consistency and composition across the band, would there been a consistency in phase or cubic structure?

A. So if you're talking about across the band from left to right or vertically across the thickness --

Q. Across the band from left to right.

A. So, you know, loosely speaking, yes. I mean, there could be some variation in that. But I would expect to see some consistency in the composition going left to right.

Q. Do -- is it fair to say that what we are seeing here is different bands represents different phases of material?

A. So it could be different phases. Although, we know that -- when you go from the interdiffusion layer to the superficial layer, we definitely have different compositions.

In order to get it crystal structures, you would have to do a different type of analysis. You would have to do something like an EBSD, but to composition. We could do line scans.

Q. Okay. So to -- what I'm understanding -- let me -- strike that. I just want to make sure that I understand what you're saying here.

So here is my question: In order for these to be layers, each of these layers has a different composition, but not necessarily a different phase?

A. When you say "phase," you're saying a combination of composition of crystal structure?

Q. Correct.

A. So the composition itself could be responsibile for the shadings that we see, but is it possible that they are different crystal structures or different phases as you go between the bands? Yes.

You could have, you know, different crystal structures in the different compositions. Although, it isn't absolutely required, just depending on what has been formed in a layer.

Q. So when we see the differences in gray shading here in these bands, we know that each of these bands has a consistent, but different from the other, band composition; correct?

A. Yes. Although, if you look at the intermediate layer and the superficial layer, they have a similar shading. It doesn't mean they have to have the same composition, perhaps the composition could be

closer between those two layers then the composition between the interdiffusion layer and, let's say, the intermediate layer.

Q. Understood.

A. Yeah.

Q. In other words, simply because the things look like they are similar grays to our eyeballs, doesn't mean that those two different bands are the same composition; correct?

A. Correct.

Q. So to determine that, you would take, you know, you could, for example, take a few line scans and look at the compositional differences between the bands to determine how similar or dissimilar the compositions are; correct?

A. Yes.

Q. When we are seeing these differences in grayscale, the shading, it does not tell us whether or not there are differences necessarily in crystallographic structure.

There could be or there may not be?

A. Correct. But, you know, when you look at shadings that are quite different, you know, and you're looking at potentially different phases, if they are indeed different phases then they would have different

crystal structures in addition to the different composition.

In other words, if you think about steel, for example, you have got ferrite which has a certain crystal structure. And you have martensite which has a different crystal structure but very, very close to the ferrite. And they have different properties, but it's sometimes hard to resolve using a technique like EBSD which is a pretty good technique, whether you're looking at martensite or ferrite, very easy to tell if you are looking at martensite or austenite. Austenite is phase intercubic.

So there would be an example where you could have something that looks like the same crystal structure but it has different properties and different local composition.

Q. Okay. But for the purposes of me just looking at this image here where we see these different shading tones, the different tones identify that there are different compositions across the band, but not necessarily different phases.

We would have to do additional investigation to determine whether the phases are different?

A. I think so. I mean, it's -- it's probably

likely that you have different phases, but you have to verify that with characterization.

Q. And so when we look at a layer the way it is used here, you're understanding is that a person -- strike that.

You're understanding is that a person with a skill in the art looking at these patents and how they use the term "layer" would understand that to be a band of material of different compositions, horizontal band of material of -- of consistent but different compositions from band to band; correct?

A. Yeah, that would be one -- one element of how you would characterize that for sure.

Q. Are there any other requirements that you would need to put into the term "layer" to understand the word "layer," as you've used it in this case?

A. I think that's likely sufficient. You could always go further and characterize all the crystal structures, but I think from the composition standpoint, you could define a layer for our purposes here.

Q. And so here, we see the lower layer is referred to as an interdiffusion layering; correct?

A. Right.

Q. Now how would a person of skill in the art

at the time have understood the term "interdiffusion"?

A. Interdiffusion would be -- you have got two different materials in contact.

For example, you have got, in this case, the aluminum silicon coating on a boron steel substrate. So the boron steel substrate is mainly iron. And the aluminum silicon coating is mainly aluminum.

And if you get into a temperature where diffusion starts to happen, you have got concentration gradients. So a person of skill in the art would know that thermo-dynamically the concentration gradient will be reduced.

And the way that it is reduced is that the iron is going to diffuse into the aluminum, and the aluminum is going to diffuse into the iron. So that would be the concept of interdiffusion.

Q. And for example, Figure 1, the interdiffusion layer, the diffusion layer is the layer in which you've had that exchange of iron and aluminum; is that correct?

A. So as I've looked at these terms, you have got diffusion happening through all the layers. You have got iron migrating into the different layers.

So in that respect, the diffusion is

happening through the whole layer. And so the interdiffusion layer is not the only layer in which diffusion is happening, but it's -- they've chosen to call it that perhaps because that's where the -- that's the one closest to the interface where you had iron and aluminum in contact in the precoating type of situation.

Q. Okay. I guess what I'm wondering is if you're looking at a piece of prior art and you are looking at an SEM that is reproduced, how -- what would you look for to confirm yes or no whether there is a diffusion layer?

A. Well, you do a line scan.

Q. And what would you want to see in that line scan?

A. You would want to see the composition as you go from the base material, which is the steel across the boundary, which may have moved during the diffusion process and then all the way out to the surface of the superficial layer.

So you could really see what -- how the composition varies from the base material through the layer that has developed in contact with the base material.

Q. So to your understanding --

A. Through the coating, I guess you would say, the coating. That includes the layers.

Q. So to your understanding, the diffusion layer here as used in the '602 and '227 patent would be the layer that is proximate to the base steel which you have diffusion having occurred?

A. So that's the first layer. And diffusion has occurred. But diffusion has also occurred in the intermediate layer and the intermetallic layer as iron has migrated up through the aluminum and started to form compounds with aluminum and silicon.

Q. Yeah. Understood. And that brings us to the intermediate layer.

How do you characterize what it means to be an intermediate layer? What does that mean to a person of skill in the art?

A. So, I mean, intermediate would be a layer partway through the coating. That's kind of a simple way of looking at it.

Q. Would it have any other requirements?

A. So, you know, you would -- you would have to characterize that layer.

"Intermediate layer" is a little bit of a generic term compared to Layer (c) which is called the al-rich intermetallic layer that gives you a little

more information, not balmy information, but a little but more then something like "intermediate."

Q. So I guess that raises the next question, which is: What would a person in the skill of the art understand constitutes an intermetallic layer?

A. It would be a layer with intermetallic compounds in it.

In this case, you have got aluminum. You have got silicon, and you've got iron. But given those components, I mean, it wouldn't be necessarily the only layer that has intermetallics. Those would form in other layers as well. But perhaps that layer has a characteristic that would -- in this case, they say "al-rich intermetallic layer." That's how they characterize it.

Q. So is it fair to say that the intermetallic layer is a layer that is composed of two or more metals or a metal and a nonmetal alloy like a silicon alloy?

A. That's a -- that's a definition of an intermetallic. You know the arrangement of the atoms, with those three atoms how they are arranged would give you the type of intermetallic, but certainly that could be a definition.

Q. So to your understanding, in order to be an intermetallic layer, the layer would have to be

composed of two or more metals or a nonmetal alloy like a silicon alloy; correct?

A. So that's likely what's going on. I think when I looked at the labels of these layers, you know, they didn't -- they didn't really give the labels in such a way that they fully characterize what's in the layer.

I would -- I would focus on composition with line scan. We know from the -- from the prior art that we have intermetallics forming in this coating and this particular layer has intermetallics in it.

Q. And by "intermetallics," you mean, in other words, that this layer is composed of, say -- it has both iron and aluminum in it, for example?

A. It would have iron and aluminum if those are the constituents.

Q. And --

A. And I think from the prior art, we see silicon also in that layer.

Q. Okay.

A. In a layer that -- this -- this looks like layers in the prior art where we have got silicon in that third layer or fourth layer, depending on how you -- how you would count.

Q. So the intermetallic layer would have in it

some combination of iron, aluminum and silicon alloy; correct?

A. Based on the appearance of this and the appearance of the coatings in the prior art that were made with aluminum silicon coatings, my recollection is that that's aluminum, silicon and iron.

So intermetallics form in different combinations. There could be different combinations in different layers. We have got iron, silicon and aluminum in this coating in different concentrations based on the prior art as this particular coating looks like some of the coatings I have reviewed in the -- in the prior art in terms of this layered structure.

Q. If we look at this -- what I'm hearing from you, and correct me if I'm wrong on this, is that the intermediate layer would also have aluminum, iron and silicon in it as well; correct?

A. So I don't know if it has silicon. It certainly could. You would have to do a line scan and determine the composition of those layers. And then you would -- you would know.

Q. So in order to determine the composition of the layers, we would take a few line scans across this SEM and see: Do we have sort of a consistent composition of a certain density, shall we say, or a

certain mass percentage of iron, aluminum and silicon?

A. Yeah. We could take several line scans and see what the composition is in a given layer.

Q. And I guess my point is, it would be fair to say that in both the intermediate layer and what is labeled here in Figure 1 as the intermediate layer and the intermetallic layer, you would have at least two of iron, aluminum and silicon; right? That's likely?

A. I think that it is likely especially given the correspondence of this coating with ones that I have seen in the prior art where the compositions have been characterized.

Q. So given that the intermediate layer and the intermetallic layer would both have some combination of iron, aluminum and silicon in them, what distinguishes the two other than their position in the strata?

A. The fractions of each in a given layer.

Q. And so --

A. If the fractions are different, then you are going to have different material properties including the appearance of the layer after etching.

Q. So what would need to be different about the proportions of aluminum, iron and silicon in order to qualify as an intermetallic layer versus an

intermediate layer? Is there a percentage requirement or difference?

A. So those -- those terms are kind of generic. I think what we are observing in this coating is a correspondence with coatings in the prior art that have very similar layered structures. And so those compositions have been characterized, and we see that they have different compositions.

And so you characterized the layer according to its composition. And what you call it, you know, A, B, C, D is less important than how you've characterized it.

Q. Well, first of all, when you say, you know, fractions of each element, are you referring to the relevant mass percentage of that element?

A. Well, in the prior art, I've seen a mass percentage. Basically we know the primary constituents are -- in these layers are typically aluminum, iron, silicon, but there could be some other elements in there.

So the mass percentage, as long as, you know, you're talking about line scans in a given layer, you're characterizing it with, I guess, with respect to the same denominator, but --

Q. I'm just going -- you said "fractions." I

want to make sure I understand what you mean by "fractions."

What did you mean to convey with "fractions"?

A. It could be weight percent or mass percent.

Q. And so is there a specific weight percent or mass percent of particular metal elements that are required in order to constitute an intermetallic layer versus just and intermediate or superficial layer?

A. I can -- I can only refer to the prior art as I compare these layers to very similar instruct under oath in the coating in the prior art where those compositions have been characterized.

Those compositions can vary a little bit as -- as I have seen in the prior art for a given layer, but the composition essentially characterizes the properties of the layer. That's how I would look at it.

You know, intermediate and the superficial layer in this coating, if I compare this coating to the prior art and I make a correspondence to those layers, I may find that, you know, the intermediate layer and the superficial layer have not the same compositions, but closer in terms of the percentages of each element versus something like the intermediate layer and the

interdiffusion layer, further apart.

Q. Let me take a step back since you referred to the prior art.

In other words, what you're saying is that the way you can identify if something qualifies as an intermetallic layer in the prior art is if it's essentially identified as an intermetallic layer; correct?

A. So -- I mean, all of these layers have some intermetallics. I don't know that how we label the layer is important versus how we characterize it in terms of composition.

Q. Right, and I guess that's my -- that is my question is how would we characterize an intermetallic layer as distinct from an intermediate layer?

Is there a certain additional compositional requirements of an intermetallic layer over the intermediate layer?

A. So, again, intermediate layer doesn't mean a lot to me. Looking at this, it gains meaning when I compare this to the prior art where that layer has been characterized or the correspondence of what's being called the intermediate layer here, and the corresponding layer, a similar layer that I have seen in the prior art.

And that's got a composition. I can look at that and understand it. Composition certainly -- composition and thermal history give us properties. So that's how -- that's how I would look at that.

Q. Let me break that down. So if we are looking at the prior art and the prior art defines a layer as being an intermetallic layer, then you would, as a person -- you know, from the person of skill in the art's point of view, consider that to be understood to be an intermetallic layer; correct?

A. Well, if it's identified as an intermetallic layer, then I'm assuming there are intermetallics in the layer, but doing the scan to understand the composition is how I get the information about that layer.

So just the label could give me a clue as to what's in that layer, but it doesn't necessarily, based on the comparison of this coating with similar prior art coatings, interdiffusion layer could have a meaning that you could possibly understand, generally speaking.

Intermediate layer doesn't really have a meaning other than, you know, it's partway through the coating. Superficial layer, again, is kind of a -- did you include that it is on the outside, interfacing

with -- as a surface. I -- I would have a tendency to want to know the compositions and to characterize it that way for each -- for each layer.

Q. Okay. Fair enough. Let me just break it down into different cases.

To your understanding, the easy case would be where you look at the prior art and there is a layer that is identified, and that layer is characterized in that art as an intermetallic layer. That would be an easy case; right?

A. How would it be characterized as an intermetallic layer?

Q. Like what we see here in Figure 1. There would be -- there would be a --

A. But are you referring to a characterization technique other than a line scan that would tell us, oh --

Q. Apologies. Let me rephrase my question.

If you are looking at prior art and the prior art identifies a -- what has the presentation of a layer in an aluminum coating, that the prior art identifies as an intermetallic layer, using that word, saying this is an intermetallic layer, then as a person of skill in the art, you would understand that to be -- or from the perspective of a person in the skill of the

art, you would understand that to be a -- disclosing an intermetallic layer?

A. Well, could you give me an example in the prior art? We have got a couple of different pieces here.

Q. I want to look at -- let's look at what is in front of us, the Figure 1, right? Figure 1 here says "(c)." It points to something that appears to be a layer and it says it is an intermetallic layer; correct?

A. "Al-rich intermetallic layer," that's how they have labeled it.

Q. Okay. There is some indication that this is disclosing an intermetallic layer; correct? That's what it says -- those words are present?

A. Yeah.

Q. Okay. So what I'm just trying to understand is -- we had a different piece of prior art and there was an SEM. And in the description of the SEM somewhere it said this is an intermetallic layer.

That would provide us evidence that a person of skill in the art would understand that that was an intermetallic layer; correct?

A. In terms of being characterized by a line scan in the SEM?

Q. No, I'm -- let me take a step back.
A. Okay.
Q. Way back. I simply want to know if I'm looking at a piece of prior art, I'm looking at an SEM, how to tell if there is an intermetallic layer or not. That is what I'm trying to drive at. How do we know if this is an intermetallic layer or not?
I assume that there's easier cases and there's harder cases. And do you see what I'm saying? I'm trying to start with the easy case and say, Okay, if you have a line scan, like we have here in Figure 1, and there is something that looks like an layer and there is an arrow that points to it and it says intermetallic layer, that gives us an idea that that is disclosing an intermetallic layer.
So let me just phrase that into a question. That's what I'm trying to drive at.
A. Okay.
Q. And then we will go to the harder ones where there is not easy labeling. All right. So where you are looking at a -- here is my question.
Where you are at an SEM image, and you see something that presents as a layer, and that layer is described in the prior art in the reference as being an intermetallic layer, a person of skill in the art would

understand that that's an indication that that is disclosing an intermetallic; correct?

A. I would like to see the -- an example that you might be referring to in the prior art. The word "intermetallic" gives an indication that there is intermetallics in the layer for sure, but --

Q. Using the example that is front of us right now, we have an SEM. We have the presentation of layers. And you would agree that where it is described here as an intermetallic layer, that that is an indication that this is a layer with intermetallics in it; correct?

A. That would be -- that would be how I would read it.

Q. Okay. Now, going the other way, if I don't have that description here on Figure 1, if I just have this image, without the words describing it, what would I need to know to determine whether there is an intermetallic layer present?

A. I would need to know composition.

Q. Okay. So for that, as I think you testified earlier, you would take several line scans and determine the relevant compositions of the layers that you're seeing in the image; correct?

A. Yeah. I would look at, you know, weight

percent, mass percent of each element in the layer.

Q. Okay. And then, assuming that there is some, say, aluminum and iron in both the darker and the lighter layers that we are seeing here, how would you know that one of those is an intermetallic layer, specifically?

A. So this is where the layers don't have a lot of meaning to me because if we have -- if each layer has a different composition, a different proportion of silicon and aluminum and iron, there is a lot of different intermetallics that can form based on the proportions.

So they have chosen to call the third and the fourth later the al-rich intermetallic layer. In the -- I mean, in the context of what I'm looking at here and I compare that to intermediate layer or interdiffusion layer, and I know there is aluminum and iron and silicon, or at least aluminum and iron in certain proportions, I know that intermetallics are likely to form with those proportions.

So I could have intermetallics in different layers, but here it is calling out that I have got an al-rich intermetallic layer. If we look at the composition, that might be a label that is appropriate. The intermediate layer has a different composition.

And the interdiffusion layer a different composition.

So I'm really looking at those layers in terms of their compositions and labels don't mean that much in terms of their properties. The composition and the thermal history would give me a better idea of the properties.

Q. I guess here's the challenge that I'm having.

What I hear you saying is that iron and aluminum can be any of the different layers, including the intermediate layer or other layers. I understand that.

So other than the label, is there any additional requirement that causes a layer to rise to being a so-called intermetallic layer distinct from its neighboring layers?

A. I don't know. You are saying that a particular type of intermetallic qualifies it versus the intermetallics in the other layers?

Q. I guess -- let me be clear. I'm not saying it one way or another. I want to understand what your understanding is, in part, because you're the expert and I'm not.

So let me ask it this way: In conducting your analysis in this case, what construction did you

apply to the term "intermetallic layer"?

A. I compared this coating with prior art coatings that look similar in some of the prior art. Like Takagi, there is compositions for each layer.

So if you have got a similar starting point with an aluminum silicon coating, precoating on boron steel that has been designed for hot stamping and you go through a similar thermal history then the layers should have similar properties including the -- the formation of intermetallics in the -- in the different layers.

Q. So when you say you compared this coating with prior art coatings that look similar, you're referring to the coating in Figure 1 of the patents; correct?

A. Yes. And also in -- in the claims.

Q. And when you say that it looks similar, you're saying that -- they present similarly here in this image, on the grayscale layering of the light coloring?

A. This is a visual representation of what's described in the claims of the patent.

Q. Well -- and you have in front of you a copy of the '602 patent?

A. Yes.

Q. But where does the '602 describe the molecular -- I'm sorry. Let me start over. Feel free to take a look at any part of the patent.

A. Okay.

Q. Here is my question.

Where does the patent describe the composition of the intermetallic layer, the relative percentages of aluminum, iron or silicon?

A. It -- it describes -- so I'm just looking at the claims in Claim 13. It says the intermetallic layer comprises the following components by weight based on total weight. And it has iron, aluminum and silicon weight percentages. That's composition.

Q. So are you saying that in order to determine whether an intermetallic layer was present in the prior art, you compared it with the disclosure in Claim 13 of the '602 patent?

A. So you could go to the prior art and -- I mean, I did that comparison in my declaration. We could take a look at that.

Q. Again, what I'm trying to understand is not -- let me start over.

I'm trying to understand what your benchmark is, what's your construction.

You are saying you compare to the prior

art, but I want to know your starting position.

So before we get to the prior art, what are you starting with as an understanding as to what constitutes an intermetallic layer?

A. So the only thing I'm starting with without additional information is the label for the layer, which says it's an intermetallic layer.

I need to know the composition. The patent describes the composition. If I compare that composition to a layer in a similar position of a coating, in the prior art, I can notice a similar -- a similar composition. That gives me an idea of -- of what I'm looking at.

Q. Okay. So you're starting off by noting that in Figure 1 of the asserted -- of the challenged patents, there is an intermetallic layer identified; correct? That's your starting point?

A. Well, that's my observation by looking at the figure.

Q. Okay. And then you are comparing the compositional features of that layer in that embodiment in the '602 and the '227 to the prior art; correct?

A. I'm comparing it to the prior art, yeah.

Q. Okay. So what other data from the '602 or '227 are you taking in that comparison? We have

established -- let me -- we have established that, to begin with, you are looking at Figure 1; correct?

A. I'm looking at Figure 1 and the corresponding compositions --

Q. Okay.

A. -- and the claims.

Q. When you say the "corresponding compositions," where in the patent are you drawing the corresponding compositions that would constitute your understanding of an intermetallic layer?

A. The claims for the compositions are stated.

Q. So in the '602, can you identify for me those claims?

A. Let me go back to the '602 patent.

Q. Using that as an example.

A. I lost my place here. Sorry. Okay. So if I go to the claims, we have got the compositions of the layers label in Figure 1 and 11, 12, 13, 14, 15, 16.

Q. I want to focus on just the intermetallic layer. So the intermetallic layer is listed in Claim 13; right?

A. Claim 13, yeah.

Q. Is it --

A. Yes. The intermetallic layer comprises the following components based on total weight, 62 to

67 percent iron, 30 to 34 percent aluminum, 2 to 6 percent silicon.

Q. Okay. And I think Claim 16 also discloses something about the intermetallic layer; correct?

A. Yes.

MR. MONALDO: Ray we are in the 1:00 p.m. hour for Dr. Miles.

MR. LAMAGNA: Let me finish this up.

BY MR. LAMAGNA:

Q. And I think Claim 29 also.

A. 29? Yes.

Q. So in construing what it means to be an intermetallic layer, what is required of an intermetallic layer, you looked at Figure 1, you looked at Claims 13, 16 and 29 to identify the compositional elemental compositional percentages there; correct?

A. Yeah. You don't have to label it intermetallic layer. You could just label it C. It would have essentially the same meaning based on composition of thermal history. That's what determines the property of the layer, not the -- not the label.

Q. I understand that. I simply say if someone has gone and labeled it, that makes it easier, doesn't it, for the purposes of a disclosure? Strike that.

I'm trying to understand your process. I

just want to kind of close this out as to what you did to identify whether or not something you saw in the prior art constituted an intermetallic layer.

And your benchmark, as I understand, was first, looking at Figure 1 of the patent, and second, looking at the compositional limits in Claims 13, 16, and 29 of the '602 patent. And then when you look at the prior art seeing if those are met in the prior art; is that fair to stay?

A. With respect to the prior art, if we are really comparing the layered structure and finding the layer in the same position and comparing the composition to say, these layers are likely to have the same properties.

Q. Right.

A. Because all of these layers are going to have intermetallics. They have chosen in the patent to label it "al-rich intermetallic layer," but to me that doesn't give you much.

Q. I understand. You are finding it in the same position and you are comparing the composition; correct?

A. Yes.

Q. And by "composition," you mean the relative elemental composition in mass percent; correct?

A. Weight percent, yeah.
Q. Sorry, weight percent.
So what I want to understand is when you say comparing it, comparing it to what? And my understanding is you have identified the percentages listed in Claims 13, 16 and 29 of the patent; correct?
A. Yes. And you know, if -- if disclosures in the prior art or claims in the prior art have essentially the same ranges of composition for iron, aluminum and silicon, then, to me, it's likely that the layers are going to have similar properties because similar thermal histories are described.
So if I compare the thermal histories described in -- in the patents, I can find similar thermal histories in the prior art with similar compositions, precoatings on a substrate that is essentially the same or similar. I know that for physics I'm going to get a similar result.
Q. Okay. So in -- when you talk about the similar elemental composition, is there any other place in the Exhibit 1001 that you are drawing from to inform the percentage boundaries to define what is an interdiffusion [sic] layer?
A. "To define an interdiffusion layer"?
Q. Yes. Just the -- I'm sorry. My mistake.

I'm sorry. The intermetallic layer.

A. Okay.

Q. Let me start over.

A. Okay.

Q. In evaluating the prior art to determine whether or not an intermetallic layer is present, in defining the construction you're using, you said that you were looking for an elemental composition that is similar to what is reflected in the patents asserted in this case; correct?

A. Yeah. But the composition has to be accompanied by -- of that layer, it has to be accompanied by the fact the starting precoating had a similar composition, that the steel substrate was the same or similar, and that the thermal history is similar.

If I compare the thermal histories and the patents, the composition of the steel substrate, the starting composition of the precoating, I know that if the thermal history is largely the same, I'm going to develop this layered structure where this third layer or fourth layer is going to have very similar composition just based on physics.

Q. So I really want to get us out to lunch. I'm really trying to ask a simple question.

I'm trying to understand when you say elemental compositional percentage is numbers?

A. Yeah.

Q. I just want to try to understand what the source is of those numbers. I just want to understand what the source is of those numbers.

So I understand there are a lot of other things you may consider, and we can cover that after lunch. But I just want to lock down the source of the numbers; okay?

So let me -- in evaluating the prior art to determine whether or not an intermetallic layer is present, you are looking for the presence of specific percentages of aluminum, iron or silicon that fall within the ranges identified in the patents; correct?

A. So I'm looking at these patents. I'm looking at Figure 1 to look at the layer structure, the morphology. And I'm looking at the compositions identified in the claims that correspond to those layers. You know, in this case, the intermetallic layer.

Q. And those are Claims 13, 16 and 29; correct?

A. Right. And then I go to the prior art to see --

Q. Before you get to the prior art -- before you get to the prior art, inside of the patent, is there any other place where you are looking for compositional data that is informing your construction of the intermetallic layer?

A. I mean, you've got the base material compositions, but they are so predominantly high in iron that I -- I just don't believe there's any difference in the resulting coating, whether you start with, for example, composition 3 or composition 4, I know I primarily have got iron as a steel substrate. It is mainly iron.

MR. LAMAGNA: All right. Let's break for lunch. I'm not trying to be. We will come back to this after lunch. I think that we all just need to grab lunch.

THE WITNESS: Okay.

MR. LAMAGNA: How long do you want for lunch?

THE WITNESS: Thirty minutes.

MR. LAMAGNA: Let's go off the record.

(Recess was taken.)

BY MR. LAMAGNA:

Q. Apologies for revisiting this. When we broke for lunch, we discuss what it means to be an

intermetallic layer.

Do you recall that?

A. Yes.

Q. Is it your view that an intermetallic layer does not have a commonly understood meaning to someone of skill in the art of the '602 or '227?

A. So someone of the skill in the art is going to understand that an intermetallic layer has intermetallics in it, I think. That would make sense. But there's a lot of different types given the possible combinations of the elements that are present. And that's why I go back to wondering about the composition and thermal history in order to have an idea of what the properties are and what that -- what intermetallic might potentially form.

I don't know that I -- that I know what that intermetallic would be, but I know that some intermetallic will form under those conditions.

Q. Well, let me go back to 2019. That was one of the years that I think you had done some work in -- as an expert in a different IPR proceeding related to ArcelorMittal patents.

Do you recall that?

A. Yes.

Q. There was a '683 patent, I believe, that

was at issue.

Do you recall that?

A. Yes.

Q. And in 2019, you submitted a declaration suggesting the invalidity of that patent.

Do you remember that?

A. Yes.

Q. And in that declaration, you provided a proposed construction for the term "intermetallic layer," which I believe is also in that patent.

Do you recall this?

A. I think so.

Q. And I don't have the whole document with me --

A. Yeah.

Q. -- but I will read you the excerpt.

A. Okay.

Q. So from Paragraph 61 of your 2019 declaration in the '683 patent IPR you said [reading] quote, In my opinion, a POSITA would have understood "intermetallic layer" to mean a layer composed of two or more metals or of a metal and a nonmetal in an alloy.

A. Yes. We used a -- I think a dictionary definition of intermetallic.

Q. Okay. And I believe that the patents at issue here, the '602 and '227, share a common, you know, priority period with the '602 patent. We are still talking about that 2005, 2006 early timeframe; correct?

A. Mm-hmm. Yeah.

Q. Would you agree here -- still today, here we are a couple of years later, that a person of skill -- let me rephrase it.

Would you agree that a person having ordinary skill in the art of the '602 and '227 patents would, back at the time of their priority, have understood "intermetallic layer" to mean a layer composed of two or more metals or of a metal and a nonmetal in an alloy?

A. I think that's reasonable.

Q. Okay. Now, in order to determine whether or not that is satisfied in the prior art, one of the things I think you said is that if you start with a similar composition, you know, the same composition of base material --

A. Mm-hmm.

Q. -- and the same composition of aluminum alloy coating --

A. Mm-hmm.

Q. -- and you subject them to the same hot stamping requirements, the same thermal history, you are going to yield a similar result; is that fair to say?

A. Yes.

Q. Okay. So what I understood you to say, correct me if I'm wrong, in this case, in forming your opinions, one of the things you did was to go -- to determine -- strike that. Let me start over.

To determine whether or not the prior art asserted in this case disclosed an intermetallic layer, one of the processes that you went through was to look at the base steel and coating compositions in the prior art and characteristics and the thermal history in the prior art and compare it to the '602 or '227 patent; is that accurate?

A. No. I kind of did the opposite. I compared the thermal history and the compositions in the process in the '602 and '227 patents with the prior art and looked at the similarities so that if -- if I look at a composition in the '602 patent and I find that composition in the prior art and I find the same thermal history or similar thermal history in the '602 or '227 patents in the prior art, then I would expect to achieve the same result.

Q. Okay. Let me restate -- let me rephrase it, but flip it. I did it, perhaps, backwards.

A. Okay.

Q. What you did, in this case, was to look at the composition and characteristics of the base steel and the coating, the precoating that is disclosed in the '602 and '227 patents and then the subsequent thermal history as you described, the hot stamping process that they went through.

A. Mm-hmm.

Q. And the resulting, you know, elemental compositions of aluminum, iron and sill and compared that to the prior art?

A. Yep.

Q. And let me just understand why those components are required for your analysis.

To start with, as I understand, if you are saying you are taking the same or similar material and you're subjecting it to the same heating processes --

A. Yeah.

Q. -- you're going to yield the same result?

A. Yes.

Q. Okay. And you need to know what the starting material is, the base steel and the coating, what those characteristics and composition are because

that is going to inform, I guess, the input into that process. It will tell you what your -- your -- your ingredients starting point is; correct?

A. Yes.

Q. So as I understand, with diffusion, you can have either differing relative elemental compositions by percentage --

A. Mm-hmm.

Q. -- or relative by, let's just say, volume and thickness, more coating, less coating, and you will get different effects that will come out of the hot stamping heating process; correct? A different result?

A. Can you just say that one more time? I think -- in other words -- if you wouldn't mind just repeating it.

Q. Well, for example, the elemental compositions of the base steel and of the aluminum alloy coating are important because if those are changed, then you will end up with a slightly different result as you go through the hot stamping process; correct?

A. You could have a slightly different result. Meaning, for example, the -- the layer structure and the coating.

Q. Yes. Yes. So in other words --

A. Could you explain the differences?
Q. You need to be making what we call an apples-to-apples comparison.
If you're starting with the same base material and the same or similar coating --
A. Mm-hmm.
Q. -- and then you are subjecting them to the same processes --
A. Yeah.
Q. -- you can predict that the outcome will be the same; correct?
A. Yes.
Q. But you can't do that if you are potentially starting with a different elemental composition in the base coating or in the -- in the -- in the precoating of the aluminum alloy; correct?
A. I think it's a matter of degree. If there's, you know, significant differences in composition, yeah, you're going to -- you're going to see a different result. If the -- if the nominal values are very similar, you're likely to see a similar result.
Q. And so, for example, in dealing with the relative reference of iron in the diffusion process --
A. Mm-hmm.

Q. -- after hot stamping, some of that iron is going to be in the aluminum alloy coating layers; correct?

A. Yes.

Q. But the amount and location of that may change depending on the characteristics of the precoating, for example?

A. And you mean -- what do you mean by the "characteristics"?

Q. The composition and quantity?

A. The composition and quantity?

Q. Yep.

A. Yeah, I mean, the composition -- but it is a matter of degree, you know? In a small range, I don't have any reason to think that there would be big changes in the result.

If you have large changes in composition, that will have an impact on the result. Does that make sense? Relatively small deviations, I don't know if they would be material in terms of result.

Q. Yeah, I think that we understand each other. In other words, it is a matter of degree; correct?

A. Matter of degree, yeah.

Q. Okay. So then, moving on -- sorry, our

last layer, if we look again at Figure 1 of the Exhibit 1001, the '602 or the '227 patent, the same figure, we have there -- the last layer is called the superficial layer.

A. Yes.

Q. And the superficial layer is the top-most layer; correct?

A. Yeah.

Q. That would be -- the superficial layer would be the layer of the coating. The layer after it has been hot stamped would be exposed to the atmosphere; correct?

A. Mm-hmm.

Q. I'm sorry, I meant to get through that material before lunch, but we got a little bit bogged down. Let me change topics.

You understand that a professional examiner reviewed and allowed each of the asserted claims to issue; correct?

A. Yeah, that's the process.

Q. And the primary examiner on both of the patents at issue in the '602 and the '227 was Daniel Schleis; is that correct?

A. I don't know. I will take your word for it. I didn't look at it.

Q. If you look, for example, at the first page of either of the patents in the sort of one-third down on the right-hand side on the cover, it says who the examiner is.

A. Yes.

Q. And you don't have any reason to believe that the examiner is not well versed in the art of the '227 or the '602 patents; correct?

A. I don't have a reason to believe -- I don't know the individual. I don't know the process that he went through.

Q. You don't -- you, yourself, as more experienced in evaluating patentability in the field of the '602 and the '227 than the examiner; correct?

A. All I know is the process that I've gone through in evaluating the claims of the current patents against the prior art. I can't really weigh in on him versus me. He is a patent expert, but I can also follow instructions and make my own determinations.

Q. Right. I'm just saying you are not presenting yourself as more experienced than him in either evaluating patentability or in the underlying technology than he is because you don't know his qualifications; correct?

A. I don't know his qualifications, right.

Q. Now, if you go back to the -- the Exhibit 1003 in the -- the 370 -- that's your declaration, if it helps. We will keep going back to it a lot. So you may want to just have that up.

A. Okay.

Q. Let me see what I did with it here. And let's go to Paragraph 21.

In the second sentence of Paragraph 21 you say that the only reference applied in the rejection during prosecution of the '302 patent was Laurent.

Do you see that?

A. Yes.

Q. And I think you make a similar statement in your other declaration, but you note Laurent and Cornette.

Does that sound accurate?

A. I remember Laurent. Did I say Laurent in -- where did I say Laurent and Cornette?

Q. That, I think, would be in the other declaration, the Exhibit 1003 in the 371 in Paragraph 25. I can look for it here.

A. Okay.

Q. In Paragraph 25 of your declaration in the --

A. Okay.

Q. -- 371 matter you say, "To summarize, the only references applied in a rejection during the prosecution of the '227 Patent were Cornette and Laurent."

Do you see that?

A. Mm-hmm.

Q. Okay. And then we can close that. We are not going to spend too much time right now on the 371 declaration.

So here is my question: Is it your understanding that none of the other prior art references you cited for obviousness were addressed during prosecution that led to the '602 and '227 patent?

A. I don't know, but I wanted to look at what I said in that declaration, if you don't mind.

Q. We can pull it back up again.

A. Yeah.

Q. Or you can look at it in your binder.

A. Yeah, I'm trying to find it. So it was 20 -- let's see. Okay.

[Witness reading] To summarize, the only references applied in a rejection during prosecution of the '227 Patent were Cornette and Laurent. The allowance relied on Cornette's lack of disclosure of

the compositions of the four layers...By contrast, the two primary references that I reviewed for this Declaration...provide precise compositions. Okay.

I have got it.

Q. Yeah. I'm just summarizing the point that collectively, you have noted that Laurent and Cornette were variously applied in rejections in the '602 and '227 patent prosecutions; correct?

A. I think that -- [reading] The reliance relied on Cornette's lack of disclosure of the composition of the four layers.

So there was an allowance that didn't take into account Takagi and Suehiro who did provide those compositions.

Q. What I'm trying to do is look at the flip side of the question here.

A. Yeah.

Q. I'm trying to understand and enumerate every reference that you contend was addressed by the examiner during prosecution. And in this sentence, I see you state that Cornette and Laurent were addressed during the prosecution of the '227 patent.

Do you see that?

A. Yes.

Q. And during -- and in the other declaration

in Paragraph 21, you say, "The only reference applied in the prosecution of the '602 patent was Laurent."

A. Yes.

Q. Okay. And so my question is: Is it your understanding that none of the other prior art references that you've cited as a basis for obviousness were addressed during the prosecution that led to the '602 or the '227 patents?

A. I didn't -- I didn't really consider that.

Q. So just to clarify, is it your opinion that none of the other prior art references you cited were reviewed or considered by examiner -- by the examiner during prosecution of the '602 or '227 patent?

A. Well, if they are -- if they are on the list of things that were reviewed, then I assume that the examiner reviewed them.

Is that what you're asking?

Q. That would be part of it, yes. Okay.

A. But I didn't focus on that.

Q. Okay. Let's move on to a different point.

Let's look at paragraph -- and I'm back in Exhibit 1003 to the 370 IPR. This is the '602 patent. Let's go down to Paragraph 31.

Here, sort of second sentence of this paragraph you say, "I'm also informed that a parameter

is result effective when its variation or adjustment achieves a recognized result."

Do you see that?

A. Mm-hmm.

Q. Is it fair to say that it's your understanding that a result-effective parameter is a variable that can be changed that yields a measurable adjustment in the result?

A. So I'm -- I remember that phrase, but I don't think we are looking at it right here, are we?

Let's see. Where is the language that you just --

Q. I'm sorry. I'm looking at -- so we should be -- we might be in the wrong Exhibit 1003 in what they are showing you.

Like I said, you can follow along on the paper copy, too, if it helps.

A. On my paper copy, I'm there.

Q. Yeah. This is -- this is -- and we will stick almost predominantly with this Exhibit 1003 to the 370. Sorry for the confusion here.

If we look at Paragraph 31 --

A. Mm-hmm.

Q. -- you say --

A. Parameters.

Q. You describe result-effective parameters. So here is my question.

It's your understanding that a result effective parameter is a variable that can be changed that yields a measurable adjustment in the result when changed; correct?

A. Yes. And in this particular case, I was talking about how much the coating grows over the precoating thickness. And so Cornette --

Q. I understand. I don't want to cut you off. I want to try to go baby step by baby step.

A. Mm-hmm.

Q. Because we can get into that in a minute. I want to make sure that we are on the same page for a definition of a "result effective parameter." Let me ask my question again.

It's your understanding that a result effective parameter is a variable that can be changed that yields a measurable adjustment in the result when it is varied?

A. Well, that's -- I mean, I used the language [reading] I'm informed that a parameter is most effective when its variation or adjustment achieves a recognized result.

Are those the same things?

Q. I guess that's what I'm trying to understand is what it means by a "recognized result."

In other words, are you saying that a result effective parameter is a parameter that, when you vary it, achieves a measurable difference or variation in the result?

A. I guess those are the same things. Like I said, I -- this was part of the discussion of layer thickness -- coating thickness, I should say, based on the results of Cornette and Laurent.

Q. All right. And so what I want to understand about your understanding of result effective variable is that you do not limit identifying something as a result effective parameter to instances where the result of the change may be, for example, unpredictable or inconsistent; correct?

A. So that's -- that wasn't my thinking. My thinking was that I'm changing a parameter and the result is predictable.

Q. Okay. Okay. So you -- so your understanding of result effective parameter is that the change that one makes would have to yield a predictable result or consistent result; correct?

A. Yeah. I was thinking that when I'm varying the parameter that is result effective I have some way

of understanding that when I vary it, I'm going to move in the direction that I would like to move in terms of the result.

Q. Okay. So we --

A. And that was in the context of coating thickness, for example.

Q. So are we in agreement, then, that the result -- that a result effective parameter is not a parameter that when you change it, the result could be unpredictable or inconsistent?

A. I think it depends on how much you change it. But if you are changing it within a relatively small range, I think it's more -- more than likely that it's going to be predictable.

If you change it a lot, perhaps, it wouldn't be as predictable. So that would still be a result effective parameter. It's just that the way in which you decide to modify the parameter and the magnitude could give you a result that you're looking for, perhaps not.

Q. Okay. So in your view, a result effective parameter would include variables that, if changed, can yield unpredictable or consistent results; correct?

A. I don't know. Did we say the same thing there? I -- I said it depends on the magnitude of the

change.

So, you know, if you change something a lot, could there be an unpredictable, you know, result? There -- I think there could.

Q. Okay. Let me try it again just to make sure we are on the same page.

When you consider something to be a result effective parameter, you are recognizing that it is possible that that change, depending on the scope of the change, could result in measurable, but unpredictable or inconsistent results; correct?

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: So maybe I can help with my thinking a little bit more. I guess the reason I'm focused on, you know, relatively small changes, is, you know, in this case, I'm looking at the prior art. And I'm looking at the results when, for example, precoating thickness was changed.

And Laurent said, Okay, we gain 50 percent over the precoating thickness. Cornette said, you know, basically, 60 percent of the precoating thickness.

So, for me, that's a result effective parameter that I can -- a precoating thickness is

something I can change with the expectation that I have got predictable change in thickness of the coating after austenitizing and stamping and quenching.

Does that make sense?

BY MR. LAMAGNA:

Q. Respectfully, I'm not sure it does. I mean, I guess -- here is what I'm trying to understand, is that your sentence before in Paragraph 31 says [reading] When certain results are result effective, they would be obvious to vary.

Do you see that?

A. [Witness reading] -- that parameter.

Q. Okay. So what I'm trying to understand what -- how do you define what is or is not a result effective variable?

Do you understand that?

A. Yeah.

Q. So as I understood you to say, correct me if I'm wrong, that a result effective parameter in your understanding can include variables that, depending upon the magnitude of the change, can result in unpredictable or inconsistent results; correct?

MR. MONALDO: Objection.

THE WITNESS: I think that it is possible. I mean, I was sort of limiting myself in terms of the

person of skill looking at the prior art and asking, you know, can I change the precoating thickness and expect to achieve a certain coating thickness after heat treatment including the stamping and quenching process.

If I go beyond what I've seen in the evidence, could it be unpredictable? That is certainly possible.

BY MR. LAMAGNA:

Q. All right. Let's look at -- let's move down to Paragraph 33.

On the second page that Paragraph 33 spans, you say that -- there's a sentence that says, "For example" --

A. Yes.

Q. You say, "Takagi recognizes each of heating rate, heating temperature, rate of primary cooling, forming temperature and quenching rate as a result effective."

A. Yeah.

Q. Okay. And so your understanding that these parameters listed here are result-effective parameters is based on your view of what Takagi said; correct?

A. [Witness reading] -- as a result effective, yeah.

Q. But to be fair, let's -- all right. Let's -- let's pull up Exhibit 1016, which is Takagi.

A. Okay.

Q. And let's look at the first paragraph that you cite there in No. 19, I think it is.

A. No. 19?

Q. The bracketed numbered paragraphs. Like I said, you have this in your binder well.

A. Yeah.

Q. It is on page 8, I think, of the PDF.

A. Okay.

Q. So if we look at Paragraph 19 of Takagi, Takagi doesn't actually say that any characteristic or parameter is a result effective parameter or a result effective variable; correct? Takagi doesn't use those words?

A. Maybe not, but there is language about the effective temperature -- on the coating.

Q. Well, I'm -- again, I appreciate -- you answer my question and you do -- you go on and you try to -- comma -- like my kids, comma -- but and here is the excuse for this. We can leave the "comma but" part out and you can come back at a later time and we can address that or you can do it in redirect.

A. Okay.

Q. What I'm trying to get at it is Takagi does not label any parameters or variables as a result effective; correct?

A. I'm not sure that's true. I would like to go to my declaration and take a quick look.

Q. You have Exhibit 1003. And this is in Paragraph 33 in front of you.

And in Paragraph 33 of your declaration, you say, "Takagi recognize each of heating rate, temperature, rate of primary cooling, forming temperature and quenching rate as result effective." And then you cite Paragraph 19.

And my question is a simple question: Takagi does not actually identify or label any variable as a result effective; correct?

A. Let me just read this paragraph one more time because I think there is some other paragraphs where he does provide some guidance on variables that would be considered result effective.

Q. To clarify, my question is very narrow.

A. Okay.

Q. Takagi does not identify or label any variable as result effective; correct?

A. Perhaps they don't label it, but the discussion -- I have got to find it, but the

discussion -- there is some discussion in Takagi that provides guidance.

Q. That is my next question. We will go very slow today. Every time you answer my question and you provide a little speech. I'm not trying to be rude. You are stepping on my next question.

And no doubt, your own attorney will come in and have an opportunity to ask more questions.

A. Okay.

MR. MONALDO: Objection. Dr. Miles, you should feel confident to answer questions the way that you feel need to be answered. You don't have to change your practice based on Counsel.

THE WITNESS: I'm just trying -- yeah, I'm just trying to -- I know I have got some content in Takagi relating to my changing variables and some guidance. And I'm just trying to find it.

BY MR. LAMAGNA:

Q. I just -- I'm not trying to be rude. I just want to make sure we can all leave today. And I don't want to do a two-day deposition, you know? And so right now, we are looking at a two-day deposition. I'm trying to pick it up.

A. Okay.

Q. So going back to the -- let me do my

question.

Takagi does not, itself, characterize any variable as a result effective; correct?

A. In that language, perhaps, they do not.

Q. Okay. So when you say the characteristics or parameters in hot stamping aluminum alloy-coated steel are result-specific parameters, that is a characterization you are using based on your understanding of the technology; correct?

A. Well, based on my reading of Takagi.

Q. Okay. So we agree that in Paragraph 19, for example, the words "result effective" do not appear there; correct?

A. Correct.

Q. Let's look at --

A. Let me just make a comment, if we could look at that. If we look at Element No. 3, it says by controlling the raised temperature of the heating and holding time at the raised temperature, the diffusion quantity of iron is varied and the degree of transformation into a stable compound is varied.

That would be an example. We don't see result effective, but it would be some guidance on varying a parameter that might achieve a desired result.

Q. So what that says, in short, is that by raising the temperature, you can vary the degree of diffusion --

A. Yeah.

Q. -- correct?

Does that describe to you the predictability or the way in which it is varied? Is there an equation there that describes the diffusion kinetics that link temperature and diffusion?

A. No.

Q. Now, let's draw ourselves to the first sentence of Paragraph 19.

The first sentence says, quote, "The mechanism of formation of the layered structures is not fully evident"; correct?

A. Yes.

Q. So you are contending that temperature is a result effective variable based on what is written here in (3) plus your own experience in the field; correct?

A. Yes. I mean, they have some -- in (1) and (2), there is some information about elevated temperatures causing a diffusion of iron and producing a concentration gradient in iron and silicon in the coating layer.

Q. So --

A. So when they say urge to transform into a stable compound, I think they are talking about intermetallic compounds.

Q. Again, when I read Paragraph 19, it is fair to say that Paragraph 19 starts off by saying that the formation of the layered structures, which occurs through diffusion --

A. Mm-hmm.

Q. -- is not -- the mechanism of it is not fully evident; correct?

A. That's what they say.

Q. And they say you get diffusion at hotter temperatures; correct?

A. Yes.

Q. But they don't tell you any mathematical relationships in order to predict diffusion or not as to how predictable or unpredictable the impact of the temperature variable is on the diffusion kinetics; correct?

A. Correct.

Q. That's not in this paragraph?

A. It's not in this paragraph. They provide some guidance -- I guess you would call it guidance in the five experiments that they did.

Q. And so you would agree with me that if I

take iron at room temperature, or a take iron at a high temperature like 900°c, there will be more diffusion at the hotter temperature; correct?

A. Yes.

Q. That alone does not identify how predictable or not the diffusion kinetics are simply by saying that temperature can affect the result; correct?

A. Correct.

Q. But in your view, based on your understanding of the term "result effective parameter," temperature is, in your view, a result effective parameter in the diffusion process; correct?

A. Yes.

Q. Okay. Let's take a look at your declaration, Paragraph 79.

Let's just skip down a little bit. It's -- it's on page 57 of the PDF.

A. Yes.

Q. Let me look for the sentence I'm looking for. If you look at the sentence that is the crossover between -- of the page break there, it says, "Takagi also describes the physical mechanism behind layer formation and how the diffusion quantity of iron can vary, which would correspond to control of aluminum percentage, iron percentage and silicon percentage by

controlling the raised temperature of the heating and the holding time at the raised temperature."

Do you see that?

A. Mm-hmm.

Q. And you have, again, cited to Paragraph 19; correct?

A. Yes.

Q. Okay. And that's the same paragraph that we were looking at before; correct?

A. Yes.

Q. And that's the paragraph that states that the mechanism of formation of the layered structure, which is achieved through diffusion, is not fully evident; correct?

A. Yes. You're citing their sentence. And perhaps they didn't fully understand all of the mechanisms and the rates, but they know enough to understand that temperature has an impact, within a range.

Obviously, in the context of this, you know, you are going to austenitize above a certain temperature. And then, perhaps, there are certain temperatures that would be considered too high. So the range is really 50°c based on the prior art and based on Takagi and --

Q. Let's look at what Takagi actually discloses here. Paragraph 19, in sum, says that you get more diffusion at hotter temperatures; right?

A. Yeah.

Q. And is it your testimony that that disclosure would sufficiently guide someone with a four-year degree in -- you know, a relevant field to the '602 or '227 art to design or determine heating, holding or cooling parameters to obtain specific layer phase structures in aluminum alloy coatings for steel?

A. Not by itself.

Q. Okay.

A. But I think there's other guidance in Takagi that would be helpful. And the table, for example, the five cases.

Q. We will look at those shortly. You will agree that in Paragraph 19 of Takagi, there is no statement there that identifies how to design diffusion so as to achieve a particular layered structure; correct?

A. It's not that specific in this paragraph.

Q. Let's look at -- while we are up here on your declaration, let's look at Paragraph 72.

A. Okay.

Q. Let me see. Again, at the crossover

sentence you say, "Takagi explicitly recognizes this thickness as a result effective variable noting the thickness's relationship to crack prevention and corrosion resistance."

Do you see that?

A. Mm-hmm.

Q. And for that, you cite Paragraph 17 of Takagi; is that correct?

A. Yes.

Q. And in that context, what thickness are you referring to?

THE WITNESS: So, Jake, could you go down to 17? I want to read it real quick.

[Witness reading] This embodiment -- the thickness of the soft layer is made equal to or greater than 50% of the alloy. The thick soft layer extending from a layer at or near the boundary. That would be the so-called interdiffusion label.

BY MR. LAMAGNA:

Q. Okay.

A. So in the table of Takagi, it -- the interlayer and maybe also combining the interlayer and the intermediate -- or the -- what they called the inter 1 layer, which is, in some cases, a very thin layer between the interlayer and the inter 2.

Q. So you're not saying that Takagi suggests that overall aluminum alloy layering thickness is a result effective variable; correct?

A. So you're saying that I'm not saying it is a result effective variable?

Q. Correct. For the overall thickness of the precoating or post coating?

A. No. I -- it is result effective from Cornette in terms of balancing --

Q. And again, my question is about Takagi.

A. Takagi? Well, Takagi evaluates weldability in a table. So they found, you know, three solutions that meet all three criteria.

And so I -- I mean, I think -- I'm trying to remember. You were asking if Takagi is saying that the coating thickness after stamping is a result effective variable.

Q. I'm asking if you contend that Takagi treats coating thickness as a result effective variable.

A. Well, the coating thickness -- you know, you have got that layer. So that layer, you know, corresponds to a certain coating -- overall coating thickness.

I think Takagi shows a coating thickness of

just over 20 microns, something like that. I think they are opining -- they are showing, actually, that that first soft layer is important for protecting the underlying base material. So that thickness is important. That would imply that the overall thickness is important because I put forward the argument that there is at least some first order of effect on scaling.

If you go up in total coating thickness, you're going to scale perhaps at a first order level the other layers.

Q. Doesn't Takagi teach in Paragraph 17 that the thickness of the soft layer must be 50 percent or more of the total thickness of the alloy coating layer?

A. Yes.

Q. Are you aware of whether or not that teaching is consistent with the claims in the '602 or '227?

A. I would have to consult my declaration.

Q. So --

A. But the -- the '602 patent is saying that the coating thickness should be 30 microns or greater.

Q. The Takagi says that the diffusion layer part of the coating --

A. Yes.

Q. -- has to be 50 percent or more of the total thickness; correct?
A. Yes.
Q. Is that consistent or not with the patents at issue in this case?
A. I mean, Takagi over Cornette would teach that. I think I noted that in my report.
Q. Again, if we look at Figure 1 of the 227 or '602 patent --
A. Mm-hmm.
Q. -- is the interdiffusion layer more than half of the total aluminum alloy coating?
A. I'm looking at it quickly so I can grab it quickly. From Figure 1, I mean, going to the claims, it says it could be between 1 and 15 micros. So that would be half if it is at 15.
Q. If you look at Figure 1, is it half in Figure 1?
A. At a given location, it could be.
Q. Really?
A. Hold on a second. Sorry. Let me look at it a little more closely. In Figure 1, perhaps a little less than half.
Q. Okay. Is there any disclosure in the patents that -- in the '602 or '227 that as you go,

that the diffusion layer can be more than half of the total height of the -- the total thickness of the aluminum alloy layer?

A. I think in the '602, it actually gives a range for the interdiffusion layer. And it says that the coating thickness should be 30 microns or greater.

Q. Does it ever anticipate, in any of the '602 or '227 -- let me rephrase.

Neither the '602 or the '227 ever suggests that the diffusion layer would be more than 50 percent of the total thickness of the aluminum alloy coating; correct?

A. Right.

Q. And conversely, Takagi in Paragraph 17 says that the diffusion layer should be at least 50 percent, if not more, of the alloy coating; correct?

A. That's in this one embodiment --

Q. And --

A. -- one example.

Q. -- that is -- that is the -- the embodiment is -- you are relying upon, is it not, the Test 1 for your opinions?

A. I'm not sure.

Q. Well, let me ask it a different way.

A. If you can go to that in my declaration

because that would -- that would be in my declaration that that is what I said. I'm just trying to remember. Can you help me?

Q. You are relying on Takagi, and that is what Takagi says. That is what they say of the experiments right there in Paragraph 17; correct?

A. I'm relying on Takagi for layer compositions.

Q. Let me -- let me take a step back. You would agree with me that if the diffusion layer is more than -- is 50 percent or more in the aluminum alloy coating in Takagi, and not more than 50 percent or under 50 percent in the '602 and '227 patents, then there must be a difference in the starting base material or aluminum alloy material or heating that is applied to them; correct?

A. So you're taking one example. Do we have the layer of thicknesses for the five cases in the table?

Q. Let me ask it this way. To what extent did you consider that Takagi discloses a different strata of layers of different characteristics than in the '227 or '602 patent? Is that something you considered in your analysis, yes or no?

A. I considered the compositions.

Q. Did you consider that Takagi discloses a different compositional strata of layers than what is disclosed in the '602 or '227?

A. My opinion on that is in the -- in the declaration and I've made markings on the table from Takagi describing my answer to that question.

Q. Did you consider in Takagi the thickness of the diffusion layer is 50 percent or more of the total thickness of the alloy coating whereas in the '227 and '602 patents it is not? Did you consider --

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: I -- what I did was I considered that if I take Takagi -- if I take some of the compositions that appear to be successful as noted in the table. And then if I look at Cornette and I'm motivated by a combination of corrosion resistance and weldability for a 40-millimeter coating, I would be motivated to increase the precoating thickness with the Takagi compositions -- with the Takagi FeAlSi composition in order to achieve a thicker coating.

BY MR. LAMAGNA:

Q. Okay.

A. And if I'm using --

Q. Respectfully, I understand that you are not

answering my question. You are going to your safety answer which is restating your opinion without answering my question. My question is simple. Paragraph 17.

Here is my question: Did you consider that Takagi discloses an aluminum alloy coating where more than -- where the diffusion layer is more than or equal to 50 percent of the total coating thickness, whereas the '227 and the '602 do not? Did you consider that?

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: I don't recall considering that specifically. I focused on the compositions and then combined with Cornette.

BY MR. LAMAGNA:

Q. Okay. Let's move on then to look at Paragraph 48 of your report.

In Paragraph 48, this is where you illustrate that you rely on these -- there's five different embodiments disclosed here; correct?

A. Mm-hmm.

Q. That are part of what I think they call collectively Test No. 1; correct?

A. Yes.

Q. And you are relying on, in this case, the

first, the fourth, and the fifth embodiment; correct?

A. Correct.

Q. And for each of these embodiments, you are relying on what we see here, which is taken from Figure 4 of Takagi coupled with Figure 2A, which is the SEM picture; correct?

A. I'm trying to find Figure 4 of Takagi. Okay, Figure 4 is the table. What else?

Q. You rely on -- for your embodiment of 1, 4 and 5, you rely on the combination of Figure 4 in Takagi and Figure 2A; correct?

A. Figure 2A isn't great, but it shows the sequence of layers.

Q. Okay. But my point is that it is the combination of Figure 4 and Figure 2A that you are relying on for your opinions regarding Embodiments 1, 4 and 5; correct?

A. I mean, I focused on Figure 4. Figure 2A, I can't see a layered structure in the micrograph that they have provided but --

Q. We will get to that in a second. But you --

A. That is the sequence, yeah, from the base material out to the so-called superficial layer or outer layer.

Q. You rely on Figure 2A to show the thickness of the resulting embodiments, the total thickness; correct?

A. Well, I think they -- that doesn't show a dimension on there. So I didn't rely on that for a dimension.

Q. I believe later -- all right, so you don't -- you are not -- let me just clarify, then. You are not relying on Figure 2A to show the overall thickness of the coated material, whatever it may be.

A. No, it doesn't have the coating thickness on there. There is no scale bar.

Q. Okay. And as you point out, the -- the Figure 2A, you cannot identify discernable layers in Figure 2A; correct?

A. Correct.

Q. You can't identify whether there is four layers or five layers or three layers. It is just not shown visually in Figure 2A; correct?

A. Correct.

Q. Now Figure 2A, for what it is worth, if we look at Paragraph 7 of Takagi, Figure 2A itself is only taken from Embodiment No. 1; correct? I'm sorry, Paragraph 8. My mistake.

A. Figure 2A is a view of photograph showing

the microstructure of a coating layer in a structural member in a practical example, No. 1, yeah.

Q. Okay. So this doesn't show whatever is the result of examples 4 or 5; correct?

A. Right.

Q. All right. Let's go back and look again at in Figure 4 in Takagi.

A. Okay.

Q. And we can look at that even if you like in your report. It's in -- reproduced in Paragraph 48; correct?

A. Correct.

Q. Okay. So we look at Paragraph 48 of your report, where does the -- I see some numbers here that you have boxed in colors.

Do you see that?

A. Yeah.

Q. And what are those numbers?

A. So what I'm doing is making a correspondence between this and the four-layer structure in Cornette or, you know -- Cornette has a four- or potentially a five-layer structure, depending on how you look at the interdiffusion layer.

Q. What I mean is, what are the numbers showing us? Are these elemental compositions? What is

the thing -- what is the value reflecting?

A. Those are mean iron compositions. Let's see. Those are mean compositions of the different elements. So, you know, percent, weight percent.

Q. Okay. So you understand those to be weight percent. Now how -- where did this data come from? How is it derived?

A. I don't know other than they most likely would have done some kind of a line scan or a characterization in order to determine those numbers.

Q. Okay. Do you know -- do you know how -- where the line scan was taken? Even, for example, for Embodiment No. 1, where we have Figure 2A.

Do you know where on Figure 2A that line scan was taken?

A. No.

Q. And we don't have SEMs to know where a potential line scan was taken for Figures -- I mean, for Embodiment 4 or 5; correct?

A. Correct.

Q. And in fact, you're not even sure if it was a line scan that was taken; correct?

A. I'm not sure. That's a common way.

Q. Okay. But it doesn't -- it doesn't say that here in the figure?

A. It doesn't say it.
Q. Now, the relative thicknesses, either the individual or the collective thicknesses of these layers is not shown; correct?
A. Correct.
Q. So we don't know where these add up to 20 microns, 30 microns, whether one of them is 5 microns or 10 microns, we just don't know that; correct?
A. We don't. Takagi mentions 20 microns as a coating thickness. We don't know specifically how thick these coatings are.
Q. Okay.
MR. LAMAGNA: Why don't we do this? Have we been going about an hour since we had lunch?
MR. MONALDO: We are.
MR. LAMAGNA: We are not quite out of Takagi, but I don't want to belabor everybody's bathroom break. Why don't we go off the record.
(Recess was taken.)
BY MR. LAMAGNA:
Q. Dr. Miles, thank you again for your patience?
A. Sure.
Q. Just to close the line that we were talking

about a second ago, I want to look quickly at Exhibit 1017, which I believe is the original Japanese application for Takagi. And just going -- I think the figures are at the end of it.

A. Okay.

Q. If we put it up on the screen -- this one, Dr. Miles, I don't know is included in your binder.

A. Okay.

Q. It was not intentionally. It was --

A. Yeah.

Q. -- unintentional.

If we go to the end, Figure 2A; right?

A. Mm-hmm.

Q. And then zoom in on that so we can see the figure there. On Exhibit 1017, this is the Japanese application version of Takagi; is that fair to say?

A. Yep.

Q. And you agree here that in the Japanese version as well, the layers, to the extent they are present, are not discernable in Figure 2A; correct?

A. Not in the figure. We have got labels that point to layers, but it's hard to see them in the figure.

Q. In other words, the resolution here regarding potential layers in Figure 2A is no -- not.

Materially better in the Japanese version than in the U.S. patent that we were looking at earlier, Exhibit 2016; correct?

A. Correct.

Q. Okay. All right. We can put 2017 away.

I didn't want you to say I showed you 2016 and I didn't show you 2017.

A. Okay.

Q. Full disclosure. So moving on, let's go back to your report, looking again at Table 4 from Takagi, which is the -- reflected in Paragraph 48 of Exhibit 1003 to the 370 IPR which is your report.

So there at the top for Embodiment No. 1 --

A. Mm-hmm.

Q. You have identified the first layer -- what's called inner, as the diffusion layer; correct?

A. Yes.

Q. And then you skipped the second interlayer, and you have identified the third layer as the intermediate layer; correct?

A. Yes.

Q. It is inter 2, but it is the third layer?

A. Yep.

Q. And you identify the fourth layer here in your opinion, which is called inter 3, as the

intermetallic layer; correct?

A. Yes.

Q. And you identify the fifth layer as the outer layer; correct?

A. Correct.

Q. Okay. Now, you essentially do -- I think it's the same thing for Embodiment No. 4; is that correct?

A. Yes.

Q. But you do something different on Embodiment No. 5?

A. Right.

Q. And so what was referred to previously as the intermediate layer in Embodiments 1 and 4 is now referred to as the intermetallic layer in Embodiment 5; correct?

A. Yes.

Q. And Takagi does not distinguish any of these layers as being an intermetallic layer in contrast to the other layers; correct?

A. Well, in terms of the layered structure -- so that's -- I don't remember whether Takagi actually uses the term "intermetallic layer," but you can see the correspondence between the layers in the table and -- and the '602 patent layers or the -- sorry. I

had the table and now I have lost it. Hold on a second.

Q. Let's just take this in pieces. Like I said, you tend to answer -- try to answer my question and then defend a different --

A. I don't know.

Q. -- I'm just trying to streamline it.

A. Okay.

Q. Takagi does not identify any layer as an intermetallic layer; correct?

A. Not here.

Q. Takagi does --

A. Although, you could -- you could argue that they are saying these are intermetallic layers, inter 1, 2, 3, they are sort of acknowledging, but they are just calling all of them that. There is not a specific one, if we compare the '602 patent to this, but we -- we do have a correspondence in terms of compositions. So, sorry, go ahead.

Q. Okay. So -- but my point is that Takagi doesn't expressly identify any layer as an intermetallic layer, per se?

A. In the same way as done in the '602 patent, they don't.

Q. Okay. What Takagi does purport to do is

include some compositional information from -- for each of the layers that they identify; correct?

A. Mm-hmm. Yeah.

Q. And we do not know how relatively large or small or thin or thick those layers are; correct?

A. Correct.

Q. And we are not to the extent a line scan was used, we are not given that line scan data here; correct?

A. Correct. What we may be given is understood composition from a line scan, if that's what they did.

Q. Right. And just to clarify your testimony, you said what we may be given is average compositional data; correct? We don't know for sure what it is; right?

A. Right.

Q. And we -- what I guess I'm struggling with here is -- well, do you -- is there a distinction here to be made in the data between what is being identified as an intermetallic layer for the purposes of the invalidity analysis and what is being identified as an intermediary layer?

A. So in -- in Cornette we have --

Q. Again, I want to focus on the figure in

front of us, in the data that is in -- specifically in Takagi. We will get to Cornette.

A. Yeah.

Q. Maybe. In the data that is specifically here with respect to Takagi --

A. Right.

Q. -- what distinction is there between the intermediary and the intermetallic layers as you've identified them?

A. So if we take Specimen No. 1, the interlayer is the interdiffusion layer. Two is the intermediate 3. The inter 3 would be the intermetallic layer and outer would be the superficial layer in -- and that's the same correspondence as in No. 4.

And then they didn't have a five-layer structure in their fifth example. So it maps a little more cleanly as the interlayer as the interdiffusion layer. The intermediate layer is inter 1. The intermetallic layer is inter 2. And the superficial layer is outer.

Q. For Embodiments 1 and 4, for example, how are you determining that you have identified here as C, the inter 3 layer, is the intermetallic layer and B, inter 2, is the intermediate layer?

Why not the reverse?

A. Because that's the sequence in the layered structure when you use an aluminum silicon coating on a boron steel, and it goes through the thermal history. That's what we would expect looking at the other prior art that had similar thermal histories and similar compositions.

Q. Okay. Just to drill down, if I'm asking the question here is how did you determine that the inter 3 layer in Embodiment 1 is an intermetallic layer, your first answer is because that is the sequence that such a layer would fall into based on your review of other examples such as the '602 or '227 patents; correct?

A. Such as Cornette.

Q. Such as Cornette.

A. Okay.

Q. So in other words, to make it easiest, in the Cornette -- well, in the '602 and in the '227, the intermetallic layer falls underneath the top-most layer, correct, underneath the superficial layer?

A. Yes.

Q. And underneath the superficial layer here is a layer called inter 3; correct?

A. Yeah.

Q. Because that is positionally in the

position where the '602 or the '227 patent have an intermetallic layer, you have determined that that would be inter 3 in Takagi would be an intermetallic; correct?

A. So there is a correspondence there. I'm relying on Cornette for the sequence that I'm looking at here.

Q. We will get to Cornette.

A. And there are similarities, obviously, between the Cornette sequence and the '602 and the '227 sequences.

Q. Okay. So what you're saying is in the '227 and '602 and in Cornette, the intermetallic layer is located directly underneath the outer or superficial layer; correct?

A. Yes.

Q. So therefore when you see the layer, inter 3, here that is underneath or directly below the outer layer, that must be the intermetallic layer because that is where it shows in Cornette and '602 and '227 patent; correct?

A. Yeah.

Q. Okay. And in --

A. I mean, I'm using the Cornette to make that correlation and I compare the '602 and the '227 to

Takagi and Cornette.

Q. Okay. So it's based on the -- in sum, your determination that inter 3 is an intermetallic layer meeting the claims of the '602 and the'227 '227 patent is based off of its positioning relative to the other layers as that also is evidenced in, for example, Cornette?

A. Yes. And the composition is obviously something that is characteristic of the intermetallic layer.

Q. Well, if we look here at Example No. 1 and we have a second layer there, the one that you have not labeled, inter 1 and inter 3, those compositions are pretty similar, aren't they, for aluminum, silicon and iron?

A. In Example No. 1, they are pretty similar. There is a -- you know, the interdiffusion layer in several of the prior art examples has that character where most of it has a certain composition and then there is a slight change in composition as it moves into the intermediate layer.

That is what we are reflecting here. You could potentially average an inter 1, which you need to know the weighting to get the average, the proper average composition. That is what we are essentially

saying. It could be that thin band of material.

Q. But we don't have the weighting here?

A. No, we don't.

Q. But my point is if you look at the second and the fourth layer here, inter 1 and inter 3, there is no measurement in the Takagi that distinguishes those two layers; correct?

A. They have similar compositions but the hardness is quite different. You know, the interdiffusion layer is a softer layer. It is consistent with the 310 and the 360 versus the 700 and the intermetallic layer which is typically harder.

Q. Okay. If we look at the -- the compositions between inter 2 and inter 3 and the outer layer, we don't have any -- all three of which have relatively high hardness values.

A. Yeah.

Q. There is nothing that Takagi discloses here that distinguishes one over the other as an intermetallic layer other than potentially the -- the position of the layer as we previously discussed; correct?

A. I'm relying -- correct. I'm relying primarily on the position of the layer and the idea that similar compositions and thermal histories should

yield similar results and correspondence with Cornette, for example.

Q. Do you know what role intermetallics play in the claimed coatings in order to promote weldability?

A. You know, I think that -- I would have to go back and look at the claims, but they have a certain amount of strength that is helpful when the electrodes are pressing against the material.

Q. What do you mean by that? Like, can you explain "a certain amount of strength"? I'm sorry, I just don't know the terminology.

A. I mean, in the patent, they mislabel, they say "intermediate layer" when they mean "intermetallic layer." But in terms of the prior art, the thing that I rely on is the layered structure in Cornette that provides good weldability.

Q. Okay. I don't know the answer myself. I'm just saying, do you know -- let me rephrase it.

Do you have an understanding as to what contribution specifically the intermetallic layer as claimed in the '227 and '602 patents play in promoting weldability?

A. Off the top of my head, I don't remember.

Q. Okay. That's --

A. Go ahead. Yeah, I'm not going to opine, but I could look for it, and I could kind of tell you what I think I remember. I will just say that I don't remember.

Q. Okay. Let's go to Paragraph 22. Why don't you --

A. Paragraph 22 in my declaration?

Q. Yeah, in your declaration, Exhibit 1003.

A. Mm-hmm.

Q. And let's take a look at that. You're referring to Takagi here, and why don't you just read the paragraph to yourself real quick just to refresh your recollection.

A. Okay, I have read it.

Q. And it says that in Takagi, the forming operation occurs at 700°c to 800°c; correct?

A. Yeah.

Q. By "forming operation," they mean the hot stamp pressing; correct?

A. Yep.

Q. And after the forming operation, the shaped sheet is cooled rapidly, correct, in Takagi?

A. Yes.

Q. So in Takagi, the forming operation occurs in heated conditions. And then after forming, the

product is cooled; correct?

A. Correct.

Q. Okay. Let's set aside for a little bit Takagi. I hate to let people's hopes down. Why don't we move on for a little bit to Cornette. I know that everybody is wanting to get on to Cornette and all of what Cornette shows.

A. Okay.

Q. I guess one last question. I'm sorry, I apologize for this. I don't remember if I asked this or not before we completely leave the concept of Takagi.

Takagi was considered by the examiner and provided to the examiner and listed on the face of the '602 and '227 patents; correct?

A. I -- I would have to look at the front of the patents. If you're telling me that, that's true.

Q. But that wasn't --

A. Yes.

Q. -- a consideration you evaluated: Correct?

A. No. The fact that it was provided to the examiner.

Q. Okay.

A. It was.

Q. And likewise, Cornette was provided to the

examiner, considered by the examiner, and listed on the face of the challenged patents; correct?

A. Yes.

Q. Okay. Are you aware that Posco cited Cornette to the patent office in challenging ArcelorMittal patents previously?

A. So I'm looking for Cornette in the references cited. I see Takagi. I see Laurent.

Q. Well, hold on. In the '602 patent, I believe it is on page 3 in --

A. Page 3?

Q. Yeah. At the beginning under, "Other Publications" maybe a quarter down the page on the left column?

A. Okay, I see it.

Q. It's in the right column, I think, on the '227 patent.

A. Okay.

Q. For reasons I don't know.

A. Okay.

Q. Okay. So you're aware, aren't you, of course, that Posco had cited to Cornette to the patent office by challenging ArcelorMittal patents in the past; correct?

A. So this was the action that I was involved

in the last time around; is that correct?

Q. Yes, I believe so.

A. Yeah, I remember Cornette in the last action.

Q. And you are aware that the results of that action were then provided to the examiner for the present patents; correct?

A. So I'm not aware of that, but if you're telling me that that's what happened, I will take your word for it.

Q. Hold on. Okay, sorry about that. Let's look at Figure 21 in Cornette.

A. Okay.

Q. So this is the figure that you rely on in Cornette to some degree, correct, on page 9?

A. I did rely on it, yep.

Q. And you agree that -- well, let's look at Paragraph 28 of your report. Let me -- let me go down to Paragraph 28. I'm trying to see, apologies, where you cited this paragraph. And I might just have the page wrong.

A. Page 23 of the PDF.

Q. Yeah, I'm on page 23 of the PDF. And I thought -- I was just trying to draw your attention to where you rely on that. But let me -- regardless, if

we look at Figure 21, Figure 21 does not offer a specific disclosure of the processing conditions; correct?

A. It doesn't offer what?

Q. It doesn't disclose the specific processing conditions that are being used; correct? It is sort of a generic or a high-level figure?

A. But it discloses the essential elements of the prequoted boron steel, the heating process with the alloy reaction, and then the hot forming and quenching and the cooling. Those are the essential elements of the process. It doesn't disclose transfer time, but it pretty much discloses the other elements.

Q. All right. So it gives a 60k range for heating; correct?

A. Yeah, 60 or 70.

Q. Oh, sorry, 70. And it provides -- it says heating from somewhere between 5 and 10 minutes. That is 100 percent range from 5 to 10; right?

A. Yeah.

Q. It provides -- you know, what does Figure 1 disclose as to the holding time?

A. Figure 1?

Q. Yeah.

A. Figure --

Q. I'm sorry, Figure 21, what does it disclosure as the holding time?

A. Well, it doesn't break up the heating time and the holding time. So I think it's probably lumping those together.

Q. So the heating could occur at 100°c per second for 10 seconds. And it could be held for 9 minutes and 50 seconds at 900°c?

A. I think the way -- we don't know for sure, but I think the way we would read that is that the lower temperature would be a longer time, and the shorter time would be the higher temperature.

Q. It doesn't say that, does it?

A. It doesn't, but that would be my opinion based on my experience.

Q. And there is --

A. Yeah.

Q. Let me ask --

A. The -- the -- you know, the instruction under, "Mechanical characteristics" on the next page is 900°c for five minutes would be a typical time. And they -- and they provide mechanical properties.

So I would put some weight into that particular -- for the thickness that is given. In fact, if you have got a bigger thickness, you are

probably going to have to spend a longer time in there maybe at a slightly lower temperature.

Q. So is it -- what is the relationship between Figure 21 and Figure 22?

A. Figure 22, [witness reading] So the figure on top, Figure 22, is a cross section of the hot formed and quenched product.

Q. Okay. And what is Figure 21?

A. Figure 21 is a high-level process diagram with a few specific pieces of data in terms of heating and hollowing reaction.

Q. Okay. And the heating rate is not disclosed here; correct?

A. Not in this diagram.

Q. Okay.

A. No.

Q. And the contact or pressing time is not disclosed; correct?

A. Correct.

Q. And the quenching or cooling times or rates are not disclosed; correct?

A. In the diagram.

Q. Or are they disclosed elsewhere? I guess there is -- no, I don't see them?

A. Not in this diagram.

Q. Okay. In terms of the heating, we don't know whether that heating is linear or curved; correct?
A. Correct.
Q. It could be -- heating could be done in stages, correct? You could have a rate for a certain period of time and then a different rate for a different period of time, couldn't you?
A. I mean, that could happen.
Q. The furnaces could have different sections, couldn't they?
A. It could.
Q. None of that is disclosed here; correct?
A. No.
Q. So let's take a look at, again, Paragraph 28 of what -- of your disclosure. I know Cornette is very important to your analysis; is that correct?
A. It is important.
Q. And Cornette is -- you've testified earlier, Cornette is the -- the basis on which you are using in order to determine whether a metallic layer is present in other prior art; correct?
A. So it is -- it is a basis for determining that.
Q. Okay.

A. But --
Q. So let's start by looking at Paragraph 28 of your report, Exhibit 1003.
A. Mm-hmm.
Q. You write that Cornette discloses a post hot stamping coating thickness of about 40 microns corresponding to a precoating thickness of 25 microns, an increase of 60 percent; correct?
A. Correct.
Q. Now, is that what you are saying that Cornette is describing about Figure 22?
A. So in the paragraph prior to that, it does say the average layer of thickness after hot dipping, 25 microns.
Then heating the steel generally 900°c for five minutes creates an alloy reaction which leads to a hard multiphase layer, typically 40 microns at the surface. The following shows a section view.
So yeah, that -- that's what they are referring to is that photograph at the top of page 10.
Q. Let's start with the post coating thickness of 40 microns; right?
A. Yeah.
Q. Cornette says that the iron aluminum silicon layer is typically about 40 millimeters at the

steel surface; correct?

A. Forty microns, yep.

Q. I'm sorry, you're right. Forty microns at the steel surface; correct?

A. Yep.

Q. That's not purporting to measure Figure 22; correct?

A. I don't know if they took a measurement from Figure 22, but they talk about it right before they show Figure 22. So I'm assuming that they are making that connection.

Q. Well, you took a measurement to figure -- of that figure; correct?

A. Yeah.

Q. And you did not get 40 microns; correct?

A. Not in all locations.

Q. Well, in the location that you show in your report, I believe --

A. Let's go to that location so I can just kind of take a look at it. Are you talking about --

Q. Let's look at --

A. -- page 48?

Q. Yeah. The end of Paragraph 61.

A. Yeah.

Q. You show and report one measurement here of

32.3 microns, purportedly; correct?
A. Yes.
Q. And that is the only measurement that you take and report with respect to Cornette; correct?
A. There are some other measurements --
Q. Let me strike that. Let me restart. This measurement in Paragraph 61 of 32.3 microns is the only measurement of the entire aluminum alloy coating that you take and report on in your report; correct?
A. In this report that's possible. In the report on the '227 patent, there are additional measurements on Cornette.
Q. For the entire --
A. Layer, yes.
Q. For the entire layer?
A. Yeah.
Q. All right. We will look at that later. All right, let's go back up to Paragraph 28 and your discussion of Cornette.
All right, you say that -- my point being that when you measured this micrograph, you purport to have identified a 32.3-micron thickness for the aluminum alloy coating; correct?
A. Yes.
Q. Okay. And so it is not necessarily the

case that the preceding sentence is referring -- the sentence that says that the coating is, quote, "Typically about 40 microns at the steel surface."

That doesn't necessarily refer specifically to the figure that is Figure 22 in Cornette; correct?

A. It looks that way when I read Cornette. Our measurement was at a location. We measured a thickness. There are other locations where we could have measured a greater thickness if we look to the right.

Q. Again, what I'm trying to understand here is Cornette doesn't expressly say that the statement that these layers are, quote, "Typically about 40 microns," it doesn't necessarily link that to Figure 22; correct? Not necessarily?

A. Not necessarily, but that's how I read it because --

Q. I understand.

A. -- it comes right before the figure.

Q. I -- I understand.

A. Yeah. Yeah. No, you're saying not necessarily.

Q. Right.

A. But that's how I would read it.

Q. And when you measured Figure 22, you only

got 32.3; correct?

A. At a thickness, that's what we got.

Q. Okay. Now let's look at what you say about the precoating.

In your Paragraph 28, you say that the 40 micron post hot stamping coating is, quote, "Corresponding to a precoating thickness of 25 microns."

Do you see that?

A. Mm-hmm.

Q. Now, if we go back to -- to page 9 of Cornette, the sentence there on page 9 says, "The average layer thickness showing the best compromise between corrosion production and weldability is 25 microns."

Do you see that?

A. Yeah.

Q. That --

A. I take that as the precoating thickness.

Q. But, again, I understand you're making some inferences here and some conclusions. But I want to distinguish between what you are inferring that is not written here and what is written here.

And it is accurate to say that it is not written here that the experiments that we see

reproduced in Figure 22 and discussed necessarily started with a precoating thickness of 25; correct?

A. It doesn't say that, but the way they have structured the paragraph, if we read through the paragraph, the average layer of thickness is cited right after the coating, which is applied with a hot dip process. So --

Q. Again, I -- my question is simply whether it says it. I understand you desperately want to take a ball and grab that ball and run for the end zone.

A. I --

Q. I understand that you have a flag to plant here.

A. I don't think it's a stretch to say that that's what they -- that's what they are implying here with their paragraph. You're saying that it doesn't say which layer of thickness. Is it the precoating layer of thickness, or is it the coating thickness after hot forming and quenching.

But the position in the paragraph leads me to believe that naturally they are talking about the precoating thickness and that the FaAlSi layer, which is after alloying, that implies the alloying that is happening is 40 microns. And then they show the photograph right after that. That's my interpretation

of that paragraph.

Q. You recognize that Cornette is not a scientific paper that is reporting on a specific -- specific test result as an academic paper; correct?

A. It looks like a -- so SAE technical paper series is a conference paper, but it's a decent conference paper. And it's a -- it's a good venue for reporting results. It's not --

Q. I'm not trying to impugn it. What I'm saying is that the nature of the paper is it is an overview of different products that are being offered and their relative properties; correct?

A. Yeah.

Q. It is a summary. I forget what they call a paper that is like a -- a summary paper, not -- it is covering more than one thing here; correct?

A. Yeah, I mean, their theme is, "High strength steel parts." And they have different types of these high strength steel parts.

Q. And they say that the average layer of thickness showing the best compromise between corrosion protection. Weldability is 25 microns; right?

A. Yes.

Q. That -- that implies, doesn't it, that they must have run more than one test using different

thicknesses; correct?

A. Yes.

Q. Okay. So sometimes the layer of thickness might have been less than 25 microns and sometimes it might have been more?

A. Yeah, that's what it implies.

Q. Okay. And we see here it doesn't actually tell you the value here for the specific precoating or for the specific post coating that is used -- that is shown in Figure 22; correct?

A. It doesn't, but I gave my argument before on why I think 25 would be naturally read as the precoating and 40 as the coating after hot forming and quenching.

Q. And I understand that you believe that you're reading is reasonable. And I'm not trying to argue with you on that.

What I'm saying is that it is not necessarily the case that what we see in Figure 22 began with the 25-millimeter -- I'm sorry, a 25-nanometer precoating and ended up with a 40-micron coating.

A. Right. That's my interpretation of this paragraph.

Did they explicitly say that 25 millimeters

was the precoating? No. But I -- again, I won't keep repeating myself.

That's how I read it naturally based on this paragraph and that's why I think 40 microns would be the post forming coating thickness. I understand your point as well.

Q. But your own measurements of Figure 22 came up with a 32.3-micron measurement; correct?

A. Yeah. In this -- in this report. And I think we did another measurement where we moved over to the right and measured it at about 40.

Q. Okay. So what you're saying is that you could pick and choose places on Figure 22 where you would get tall -- thicker or thinner --

A. If you're -- yeah, the thought process if you're comparing the claim to the thickness, it says a thickness. You could choose a thickness here. You could choose a thickness in a different location.

Q. Okay. So you're construing the claims as having a thickness somewhere --

A. Yeah.

Q. -- that is 30 -- more than 30 microns; correct?

A. Yeah. Yep.

Q. You are not in the way you are construing

the claims, requiring that there be any consistency or averaging or otherwise as to the thickness measurement?

A. Correct.

Q. Okay. Now, you note that the difference between 25 microns as a precoating and 40 microns as a post hot stamping coating thickness is a 50 percent increase; correct?

A. I think we said about 60 percent and Laurent was about 50 percent.

Q. Okay. A 50 to 60 percent increase?

A. Yep.

Q. Is it your testimony that the relationship between precoating thickness and post coating thickness is a constant?

A. I don't know that it's a constant but within these ranges of precoating thickness, it looks like that's a reasonably good assumption to make.

In other words, if I started with a precoating thickness of 25, similar alloy and substrate and same thermal history, I should expect something like 40 microns after hot forming and quenching. That would be the thought process on that.

Q. But you would agree, that, in fact, the relationship between precoating thickness and post coating thickness is not a constant; correct?

A. I can't say that it is a constant. I don't know that it's -- it's not likely a constant, but it may -- you know, what is the sensitivity of that factor as you sort of move up and down in the precoating thickness? All that I have is data that I have seen in Laurent and Cornette.

Q. So you --

A. Some indication.

Q. So would it be fair to say that you don't know the degree to which other factors like time, temperature or composition affect the relationship between the precoating thickness and the post hot stamping coating thickness?

A. So those things should have an impact. And you know, we've got some thermal history where we see what the factor is. Could there be --

Q. So --

A. Yeah, could those things have an affect? Sure. But the -- the data points that we do have are -- look fairly, fairly reliable because we see a similar pattern between two independent papers, Laurent and -- you know, Laurent was, you know, was a paper and Cornette.

I'm not saying -- you are saying time and temperature and so forth, would that have an effect to

alloy changes? Yes, it could have an effect.
Q. So just to clarify, would you agree with me if I were to tell you that categorically the relationship between a precoating thickness and the post hot stamping coating thickness is not a constant?
A. Well --
Q. Just yes or no. Is --
A. I would say that it's unlikely to be a constant.
Q. Well, but you couldn't go farther and say --
A. I haven't done the -- done the experiments. I have notions based on what I know about diffusion and time and temperature. But I haven't done the experiment. So I can say that it's unlikely to be a constant.
Q. Okay. But you're not entirely sure that it is not a constant is my point?
A. I think it is unlikely.
Q. Okay.
A. But in a small range, we can depend on the data that we have.
Q. Do you know whether the -- do you know the impact that time or temperature have on the relationship between the precoating and post hot

stamping thickness?

A. Time and temperature is going to have a tendency to increase thickness.

Q. But do you know how much? Do you know what -- what relative, you know, time and material or not?

A. I don't have specific numbers. I'm just relying on a few examples from the prior art, but I don't have the things that you're asking for. I know tendencies and trends.

Q. Okay. So you know that time or temperature might affect the relationship between the precoating thickness and the post hot stamping thickness, but you're not sure to what degree; fair to say?

A. I can't tell you the numbers for that. I just know what the tendencies would be, correct.

Q. Okay. Let's -- now let's look again at Figure 22 on page 10 in Cornette.

A. Okay.

Q. Sorry, I have to pull up the right picture here. We see some layers here in the picture, what appear to be some layers in the upper part of Figure 22; correct?

A. Yep.

Q. Where does Cornette disclose the elemental

composition for those layers?

A. Well, I don't think they are disclosing the elemental composition.

Q. So what is -- you -- it's fair to say that we don't know the mean iron compositions for any of these layers; correct?

A. Other than, you know, in our analysis, as you know, we are -- we are taking the compositions from Takagi.

Q. And again, I -- I --

A. Yeah.

Q. I'm not trying to -- I'm asking you --

A. And this --

Q. I'm asking you about Cornette and you are going to continue back and not answer my question. It is just delaying us. You know I am dogged.

I will go back and continue to ask my question and we will just be slower.

A. I answered the question that it's not in there. It's not in Cornette.

Q. Okay. And so we also do not know in -- for these various layers what the relative aluminum or silicon layer -- percentages are; correct?

A. Not disclosed in Cornette.

Q. Okay. So which layer here in Cornette is

the intermetallic layer?

A. I believe it's the third layer, the layer just underneath the outer-most layer.

Q. Is that the slightly lighter-colored layer or the slightly darker-colored layer?

A. The slightly lighter-colored layer.

Q. So it is sort of the layer that is roughly the same color as the diffusion layer?

A. Mm-hmm.

Q. And -- and how do you know that that qualifies here in Cornette as an intermetallic layer?

A. Well, you know, if I compare the '602 patent to this, and it's labeling of that third layer as an intermetallic layer, the '602 patent has a similar substrate composition, a similar aluminum silicon composition, a similar thermal history.

Q. When you say "similar thermal history," what do you mean by that? How is the '602 thermal history similar to Cornette?

A. Well, it is within the ranges -- I mean, Cornette is within -- if we look at the '602 patent, you know, it overlaps Cornette in terms of thermal history. Five minutes at 900°c, which likely includes a little bit of heating time and then time at inet [phonetic] temperature, which is the austenitization

period before transfer and quenching. So that's what I would say.

Q. So because the heating time that is described here on page 10 -- let me start this over.

You're saying that because the heating time here is 900°c for five minutes and starting with similar precoated boron steel, that because the '602 patent obtained something it called an intermetallic layer, the thing we see here in the same position in the micrograph that is in Figure 22 must also be an intermetallic layer? Is that your logic?

A. I think that's likely to be the case.

Q. Okay. But you recognize that Cornette does not disclose any compositional data for that layer from which one could draw the conclusion as to what the composition is in the Cornette disclosure itself; correct?

A. We know it's aluminum silicon alloy that was being used at the time with a well-known boron steel. We don't -- it's not disclosed. The composition of the steel is disclosed.

Q. All right. So the -- the composition of the resulting layers here is not disclosed. And the inference that you were drawing is relying on having the '227 or '602 patent in hand. And armed with that

patent in hand, you go back and you look at Cornette. And that is how you infer that that lighter-colored layer is an intermetallic layer; correct?

A. No, I mean, there are other prior art disclosures like Suehiro.

Q. We will get to that in a second, perhaps. My point is what you just described to me is referring to the disclosures in the '602 and the '227 patent. And so --

A. I'm saying if you look at the layered structure in the '602 patent and, you know, they have obtained certain things. You are not relying on that for this. It is a correspondence that could be made.

This really is -- the purpose of Cornette that we understand the increase of layer thickness from the precoating to the final coating thickness. And we were using Takagi which does disclose all of the compositions and performance data.

So Takagi over Cornette is what I would look at, and then I would compare '602 and '227 to Takagi over Cornette.

Q. All right. In very simple terms, you state that -- that Cornette here has in it an intermetallic layer. True or false: To reach that conclusion, you are taking in hand the '602 and '227 patent and trying

to see if the thing here that we see in Cornette looks similar to and has the same heating time as in the '602 or '227 patent; correct?

A. Well, the '602 and '227 patents disclose a layered structure like Cornette, right?

Q. But that doesn't answer the question as to how we know that the lighter-colored material is specifically an intermetallic layer when we have no compositional data for that layer?

A. I don't know that from Cornette.

Q. Okay. So within the four corners of Cornette, we cannot determine, it's fair to say, that the lighter-colored material is an intermetallic layer?

A. Not -- not from Cornette alone we don't have that disclosure.

Q. Okay. Let's move --

MR. LAMAGNA: Let's take a break. Have we been going about an hour?

MR. MONALDO: Yes.

(Recess was taken.)

BY MR. LAMAGNA:

Q. Let's look at Paragraph 30 of your declaration.

In Paragraph 30 you refer to a Japanese patent publication called Maki?

A. Yeah.

Q. And it says that Maki notes "a thickness of 20 microns or more is preferred because a thicker layer responsible for corrosion resistance results in a greater overall corrosion resistance and a longer material life."

Do you see that?

A. Yeah.

Q. Now, Maki says that only 20 microns is preferred; correct? Twenty is acceptable?

A. At least -- it says preferably at least 20.

Q. At least 20. But 20 to 30 microns fall fully within what Maki identifies as preferred; correct?

A. They don't put an upper limit on it. They just say at least 20.

Q. Twenty to 30 microns falls within what Maki identifies as preferred; correct?

A. It falls within, but he doesn't put a limit on it other than no more than 60.

Q. I understand. But --

A. Okay.

Q. Twenty to 30 microns falls within what Maki identifies as preferred; correct?

A. I -- I did answer that question. I said

yes. And then I said there's no upper limit. So...

Q. I understand that. But the latter part is called nonresponsive. The latter part is an extra little gem that you are throwing in that is not responsive to my questions. It is chewing through our time. I have said that repeatedly.

I am just putting everybody on notice. If we don't finish my questions today, we will have a second day of deposition, which I do not want to do.

A. I don't know that I can do another day.

Q. I don't know that I can either.

A. It is just a scheduling thing for me. So let's try to get through.

Q. All right. Let's go to Paragraph 32.

In Paragraph 32, of your declaration, you note that the difference between 25-micron precoating thickness that you attribute to Cornette and a 20-micron thickness that you attribute to Takagi is a relatively small change; correct?

A. Correct.

Q. Now, you would agree that it would not be a relatively small change to add, say, 25 percent more carbon, would it?

A. Twenty-five percent more carbon maybe within the range if you're -- I'm not sure about that.

Q. Would it be a relatively small change to add 25 percent higher heating temperature or a 25 percent longer holding time?

A. So 25 percent higher heating temperature would be -- would not be a small change, but we are talking about --

Q. Now, so here we have a sentence from you that says that it would be a relatively small change and there is no citation. What is your basis for assuming that a 25 percent change in the thickness of the precoating would be a, quote, "relatively small change"?

A. I guess just my judgment of what I think might happen in terms of 5 microns' difference. So just my judgment, I guess.

Q. Okay. And that's your judgment based on your experience; correct?

A. Based on my experience.

Q. Okay. And do you know what the melting point is for aluminum?

A. It's around 660°c for pure aluminum, something like that.

Q. And do you know what the melting point is for the base steel?

A. It's around 1500°c, something like that.

Q. So in welding operations, does that differential have an impact?

A. Are you talking about a coated material or --

Q. Of coated material, welding, hot stamped aluminum alloy-coated material.

A. You are going to melt both.

Q. They would melt at different times, wouldn't they?

A. If you are passing -- so the steel would have a higher resistance than the aluminum-based coatings I believe.

So really it's a very quick -- the cycle time is so quick, you're talking about fractions of a second. So -- yeah, if -- the aluminum melts a little bit before it happens in -- in fractions of a second.

Q. So having a thicker coating because of that small difference in time you're describing, having a 25 percent thicker coating wouldn't have a downside in your view?

A. I don't think so. That's my judgment. That's my -- I haven't done the experiment.

Q. Let's go to Paragraph 61 of your Exhibit 1003, your declaration for 370 patent.

A. Okay.

Q. And specifically, I guess, let's look at the image we looked at before that comes at the -- that comes right after that, do you see that image there, taken from Cornette?

A. Yep.

Q. Now here, you took one measurement of the thickness of the aluminum alloy coating after hot stamping; correct?

A. Yes.

Q. Why did you pick that particular spot shown by the red line?

A. I don't know. I chose a spot.

Q. If you selected a different spot, the coating measurement would be under 30 microns; correct?

A. Yes.

Q. Let's go to Paragraph 69 of your report and the page that sort of follows it. We see a similar measurement taken, this time of only the diffusion layer and the aluminum alloy coating; correct?

A. Correct.

Q. And again, you have measured one spot here; correct?

A. Correct.

Q. Why did you select the spot you measured here?

A. I'm choosing a thickness location. And we have got a -- interdiffusion layer of just over 10 microns and the '602 has a 10-micron interdiffusion layer thickness in the claim. And my reasoning was that based on the idea of a location, this would show that they are essentially the same. This is slightly more, but 0.7 microns wouldn't be material in my judgment.

Q. You would agree that 10.7 does not meet the claim limitation of less than 10 micrometers; correct?

A. Correct.

Q. And you would also agree that there are places you could measure here where the diffusion layer is even thicker than where you have measured; correct?

A. Correct.

Q. Let's go -- let's change gears and go to Suehiro, which is Exhibit 1055.

A. Okay.

Q. I'm going to close my version of Cornette for a second. That will make everybody happy. And Suehiro was provided to the examiner, considered by the examiner as listed on the face of the '602 and '227 patents; correct?

A. I'm going to rely on you for that.

Q. Okay.

A. I believe it was. We can go look for it.
Q. Okay. It wasn't -- making that determination was not part of your analysis; correct?
A. It wasn't.
Q. Okay. Let's go to Paragraph 132 of your declaration, Exhibit 1003, in the 370 IPR. It's a little bit of -- a little ways down.
A. 132?
Q. Yes. And again, the image that follows it.
A. Okay.
Q. You have reproduced Figure 1 from Suehiro; correct?
A. Correct.
Q. And you say that this outlines the hot forming method in use at the time; correct?
A. Correct.
Q. But, again, what we see here in Figure 1 is very high level. Is that fair to say?
A. High level.
Q. In other words, Figure 1 does not disclose heating process parameters except for -- or I guess, Suehiro does not disclose heating process parameters except for the target that is 850°c; correct?
A. Yes. Which is in the diagram heating above the A3 temperature.

Q. Okay. So we don't have the heating rate; correct?
A. I think you're correct. We have cooling rates.
Q. And we don't know whether that heating rate is a curve or linear; correct?
A. Correct.
Q. We don't -- or I guess I should say stair stepped, it is stages; correct?
A. Correct.
Q. And we don't know the holding time, do we?
A. No.
Q. And I don't believe we know the time in press, the hardening time in the -- in the press itself; correct?
A. We don't know the holding time in press, that's correct.
Q. Would you call that the contact time?
A. Yeah. Well, you know you got the forming and then at the end of forming the quenching happens.
Q. Okay. Let's go down to Paragraph 148. So in 148, let's find the analog here.
In 148, you refer to Figures 12 and 13 from Suehiro to supposedly show the layering required in the '602 and the '227 patents; correct?

A. Correct.
Q. All right. And the data that is shown in Figure 13, what is that?
A. That is the iron, aluminum and silicon concentrations through the thickness of the coating.
Q. And that was obtained using an SES line scan; correct?
A. I believe it was.
Q. And where was that line scan taken on Figure 12?
A. I don't know.
Q. Suehiro does not disclose where that line scan is taken on Figure 12; correct?
A. That's correct.
Q. And we only have data from one line scan reported here; correct?
A. Correct.
Q. So we don't have data for any -- for multiple locations along the -- the width of the layer; correct?
A. Correct.
Q. And when you are doing a line scan like that, how narrow is the beam reporting elemental composition?
A. Well, the resolution of a line scan is

limited to 1 micron of thickness or greater.

Q. So basically the elemental composition that we are seeing here in Figure 12 is a 1-micron slice down the -- I'm sorry, in Figure 13, is a 1-micron slice of whatever was the experimental result here; correct?

A. Yes. And a sequence of slices.

Q. Hold on. Give me one second. Sorry, I'm back.

Okay. So now let's look at the layers here that we see in Figure 12 and in Figure 13. I want to try to understand the correlation between what we see in Figure 12 as visually, you know, grayscale shading?

A. Yes.

Q. And Figure 13?

A. Okay.

Q. I -- I do see some sort of dotted lines, vertical dotted lines in Figure 13.

Is that where the -- you understand the layers to be delineated using those dotted lines?

A. The -- the individual dots?

Q. Yeah.

A. Yeah. Well -- oh, the vertical lines, yes, correct.

Q. The vertical lines. For example layer 5,

there are two vertical lines that extend down to the demarcation for aluminum.

A. Yes.

Q. And to the left and right of the word aluminum, that would be what you considered to be the diffusion layer?

A. Yes. Or if you refer to Figure 12, you start to get a little bit of a change in shading at the top of that interdiffusion layer. And so it could be the combination of 5 plus 4 as the interdiffusion layer or -- in prior -- you know, angles and I think we could argue, Cornette, we see that little bit of shading in between the interdiffusion layer and the intermediate layer. And so we are leaving open the possibility that we could add those together.

Q. But you do not determine the layer boundary with reference to where the iron and aluminum lines intersect in the SEM data; correct?

A. So can you -- can you explain that a little bit more where they intersect?

Q. Well --

A. Are you talking about in the middle there in --

Q. Correct. So if we look at the boundary, for example, between what is labeled as layer 2 and

layer 3 in Figure 13, that boundary appears to intersect the most distant points in that section between the aluminum and iron values, whereas there is an intersection between the aluminum and iron, but that is to the left and the right of that layer intersection.

Do you see that distinction?

A. I see the intersection on the left closer to the surface. And I see the intersection between 3 and 2.

Q. So my question is: The layer boundary is not defined based on where the aluminum and iron values intersect, correct, in your view?

A. Well, I'm not sure because they -- they define these boundaries. I'm not sure exactly how they did it other than I'm assuming there is a correspondence with Figure 12.

Q. Okay. But -- fair enough. So you're not sure exactly how they drew or why they drew the specific lines that they did in Figure 13 except you believe it may be informed by Figure 12; is that correct?

A. Correct.

Q. Okay. But it is not informed by the intersection of the values of aluminum and iron?

A. I don't know.
Q. Okay.
A. I would have a tendency to say that it is informed by the Figure 12, but I don't know.
Q. And let's look again at Paragraph 149 here of your report and sort of the image that that is above it. It is a reproduction of Figure 13 from Suehiro.
Do you see that?
A. Yes.
Q. And in Figure [sic] 149, you combine the two layers closest to the base steel to constitute together the diffusion layer; correct?
A. Yes.
Q. The diffusion layer as it is claimed in the '227 and '602 patents; correct?
A. Correct. I mean, I said layer 5, or layer 4 plus 5.
Q. In Takagi, there were also two layers proximate to the base steel and only the closest of them, the most proximate, were the ones that you identified as the diffusion layer; correct?
A. Yes. We were trying to make a correspondence with a four-layer case. And, again, it is a little bit ambiguous sometimes when you look at the layers in will or Cornette or -- where you have

that little band where the composition is changing a bit, but we -- that is why we said 5 or 4 plus 5. And we provided the mean composition in both cases.

Q. I'm saying that in -- in Takagi in Test 1, Embodiment 1 and Embodiment 4, you identify the first layer most proximate to the base steel as the diffusion layer and you sort of drop or skip over the second layer; correct?

A. Yes.

Q. And in Suehiro here, you are at least, in part, taking the first and second layer and combining them together to constitute the diffusion layer; correct?

A. Yes. You could say either/or.

Q. Okay. But you are doing something different in Suehiro than you were doing with Takagi; correct? Because you are allocating for the first and second layer to be part of the diffusion layer as claimed in the '602 and '227 patent; correct?

A. Yes.

Q. So in your view, if a person of skill in the art were looking at Suehiro and trying to determine where the diffusion layer is and where the intermediate layer starts, would they be considering layer 5 to be the diffusion layer or layer 4 and 5 to be the

diffusion layer?

A. I think 4 and 5.

Q. Okay.

A. Because the intermediate layer, even in the other cases, we sort of assume that layer, which in this case is layer 4, is a layer that -- you know, you are looking at the layered structure.

If you say there are five layers, then you count that layer. If you don't count it, then you found it into the interdiffusion layer and so 3 would be the intermediate layer.

Q. Okay. And then, if we look at the Suehiro -- I guess you could look at your Paragraph 148 above. If you look at Figure 12?

A. Yeah.

Q. And you see the layer 1 is kind of a darker gray layer, is that fair to say, middle, gray layer?

A. Yeah.

Q. Okay. And above that there is an additional layer of lighter material; correct?

A. Correct.

Q. And that layer is not numbered or identified in your annotations here to Suehiro Figure 12; correct?

A. Correct.

Q. Let's go back down to 151 and 152. You refer here to composition data points.

Do you see that?

A. Yep.

Q. What do you mean exactly by composition data points here, 51 percent?

A. That would be the average. So if we are talking about iron, it would be the average of the data points that fall in that No. 3 band.

Q. So we are talking about the mean iron composition?

A. Yeah, of -- let me see -- 1, 2, 3, essentially 3 data points.

Q. Okay. And then we have also here, again, the requirement for an intermetallic layer.

Do you see that in your --

A. Yes.

Q. I guess it's covered in Paragraph 152; correct?

A. Yes.

Q. Now, once again, Suehiro doesn't refer to any of the layers as being intermetallic layers; correct?

A. I think you're correct.

Q. And if we look at Figure 13, we can see

that silicon and aluminum -- I'm sorry, that iron and aluminum are present in similar quantities in layer 1, layer 2, a little bit in layer 3, layer 4, they are a little bit more divergent in layer 5, but there are -- multiple layers have both iron and silicon in the similar ratios; correct?

A. I don't know if they are similar ratios, but you have all three components in 1, 2, 3, 4 and then it tapers off in -- in 5.

Q. Right, if we look at the line that is separating the layer -- what is numbered here as layer 1 and layer 2 --

A. Yeah.

Q. -- and the line that is separating what is numbered here as layer 3 and layer 4, at the intersection points of those lines, the relative iron and aluminum contents are, you know, pretty similar; correct? The values for iron and aluminum respectively?

A. In layer 2, we have got around 60 percent iron and about 30, 35 percent aluminum.

Q. And did you say layer 4?

A. Yeah, the difference, the line that is intersecting the -- delineating the difference between layer 3 and layer 4 and between layer 1 and layer 2.

Q. Okay.
A. But I see between layer 2 and layer 3, they are fairly close.
Q. Yeah, that's true. What I mean to say -- allow me to rephrase this.
A. Okay.
Q. In -- at the intersection point between layer 1 and 2, and between 3 and 4, both of those have, for example, 60 percent iron; correct?
A. Correct.
Q. All right. And both of them have, give or take, 30 percent aluminum; correct?
A. Yep. Yep.
Q. So there isn't really -- at least at that point, there isn't a significant elemental distinction that we are seeing in the line graph; correct?
A. I mean, the silicon is a bit different, but the iron and the aluminum compositions are similar.
Q. So how do you come to the conclusion that layer 2, for example, is identified as an intermetallic layer but not, say, layer 4 or even layer 3?
A. So -- I mean, based on this, what I've -- what I've sort of observed is you typically are -- have a similar composition in the intermediate layer, layer 3, and the superficial layer, layer 1, and, you know,

they have kind of similar shading. So that would sort of bear that out.

The shading, you know, between the layer No. 2, and let's see -- you were comparing layer 2 with layer 4?

Q. For example. My point is, what defines one layer as an intermetallic layer and the other layer as not an intermetallic layer? What is the distinction that defines layer 2 as an intermetallic layer?

A. I think we are doing a correspondence looking at the layer structure in the patent and superimposing that on this.

It's not that we have to know that that is an intermetallic layer per se. We know that there is intermetallics in all of these layers.

Q. I see. And so in the patent, and we saw this in Figure 1 of the patent, it describes proximate to the base steel an interdiffusion layer and above that an intermediate layer and above that an intermetallic layer and above that a superficial layer; correct?

A. Correct.

Q. And what you're saying is that what you're doing is --

A. I'm superimposing that structure on this --

you know, this layers that I see in Fig 12 and that corresponds to the compositions in Figure 13.

Q. Okay. And so because we don't -- other than this very single line scan here, we don't have any more detailed reporting in Suehiro on the composition or the phase structure of these layers; correct?

A. Correct.

Q. Okay. Let's go -- let's close this one and go to another one, which is Exhibit 1026, the GMW14400 specification.

Now, you don't dispute that GMW14400 was also provided to the examiner and considered by the examiner and listed on the challenged patents; correct?

A. I will take your word for it.

Q. This is a GM specification for certain materials that GM would use for manufacturing cars; right?

A. Yes.

Q. So GM would use this specification to confirm the materials acquired from suppliers met GM's requirements; correct?

A. Yes.

Q. And outside of GM, the audience for this type of specification would be engineers at GM, GM's suppliers, who are tasked with designing, manufacturing

parameters sold to GM under this specification; correct?

A. Yes. I think it goes with the people doing research like myself.

Q. So you think that that was the audience that GM anticipated when it released it?

A. Well, not necessarily, but I think it's something that -- you know, if you are doing research at a university, you can get access to these standards and I've gotten access to GM's standards when I have done projects with them, particularly on their welding requirements.

Q. I think --

A. So I think you could ask for it, you could use it in the context of trying to meet a need. We did the same thing with Honda. They gave us their specifications on the project that we were working on with them. So the universities would be another venue where these specifications could be -- could be found.

Q. Fair enough. So if -- for example, if a researcher at a university is working on, you know, research or a joint project or something funded by GM, this could be something that they might use?

A. Yes.

Q. And now we look at page 7 of this, it

identifies some thickness requirements with respect to the coating; correct?

A. Yes.

Q. Now, this coating does not require -- I'm sorry, strike that.

This specification does not require a four phase or a four structural layer like that claimed in the '227 and '603 [sic] patents; correct?

A. Correct.

Q. I'm sorry. '602 patent, my mistake.

In other words, while this describes what -- how much coating there should be, it does not purport to describe any specific microstructural layering or required microstructural features in that coating; correct?

A. Correct. But I would say that the GM specification gives us that precoating thickness to final coating thickness relationship. And it's aluminum silicon, so it has the development of these alloys and coatings as happening.

You would have to assume that GM would be using something that works, now that we know that the layered structure works.

Q. So the layered structure is the only structure that works? Is that your testimony?

A. Well, we know it works from Takagi because they indicate a layered structure with compositions and then they test it for three criteria. And three of their coatings passed the tests and two of them didn't.

Q. Okay, we are --

A. But we would be on firmer footing if we are relying on the layered structure disclosed in Takagi and Cornette.

Q. Okay. Again, I want to avoid just speculating. I'm trying to get us back so we can get out of this deposition today.

So, again, GMW14400 does not articulate any requirements for the microstructural or layering --

A. Yes.

Q. -- correct?

A. Not disclosed in this document.

Q. Okay. So a researcher or a commercial partner that is making parts with GM, if motivated to comply with this specification, would not necessarily need to incorporate the four-layer structure that is claimed in the asserted patents -- I mean the challenged patents?

A. Not necessarily.

Q. Okay. And it's a -- a researcher or a commercial partner that is working with GM to make

parts in accordance with this specification would not need to -- in order to satisfy that commercial relationship with a specification, they would not need to use the structures disclosed in Takagi or Suehiro in terms of layering; correct?

A. The -- I guess they wouldn't need to, but they would be motivated to provide something that works.

Q. So --

A. And those were shown to work.

Q. Okay. So again, is it your sworn testimony here that the four-layer structure as claimed in the ArcelorMittal patents are the only commercial embodiments that have been shown to work for the purposes of aluminum coating for hot stamped parts?

A. Those layered structures and small variations in the layered structures are the ones that I'm aware of that meet specifications and standards for corrosion resistance and formability and, you know, could crack if not done properly, and weldability. That is what I'm aware of.

Q. Right.

A. There could be others that I'm not aware of.

Q. Based on your awareness, if Posco is

manufacturing steel that its downchain hot stampers are stamping successfully into weldable parts, your testimony is that they must be practicing and infringing the patents?

Is that the testimony I'm hearing from you? It is the only way in which one, to your knowledge, can create a workable hot stamp part; correct?

MR. MONALDO: Objection. Scope.

MR. LAMAGNA: If he wants to testify that the only road to a commercially successful product is through the asserted patents, and it's not in his report, and he wants to go there, he is your expert. I'm just saying he is -- he is out of left field trying to carry water for you. And I can use this quote in an infringement complaint. I just want to be clear.

THE WITNESS: So I'm doing my best here.

BY MR. LAMAGNA:

Q. I understand. Here is what I'm concerned about. I want to make sure that I understand what your testimony is, that you are testifying not just -- in order to satisfy the GMW14400 specifications, a commercial partner would be or researcher would be motivated to use a four-layer structure because that is the only structure you're aware of that works for weldability. Is that your testimony?

A. Based on my review of the prior art -- based on my review of the prior art, that's my testimony. I'm not saying that there couldn't be other structures that work.

Q. So your review of the prior art in this field -- presumably, you were given certain pieces of prior art by counsel; correct?

A. Yes.

Q. What other prior art did you review in this case independently that shows -- that would reveal a microstructure for hot stamped aluminum-coated steel?

A. I did my own Google searches last year on the topic. I'm pretty good at searching for stuff. And I didn't find anything that was -- was more relevant than what was provided. That's my recollection.

Q. Okay. So in your opinion, then, the four-layer structure that is claimed in the '602 and the '227 patents is the best way that you know of to achieve a weldable hot stamping aluminum part; correct?

A. Yes. As embodied in the prior art showing that coating structure in which some cases it's considered to be a five-layer structure, but essentially a four- to five-layer structure has been shown in the prior art to be successful because

Cornette -- you could argue that it is a five-layer structure, you know. Takagi has some five-layer structures.

So four or five layers where the interdiffusion layer is the only thing that appears to be a little bit different with a sub -- with a possible sublayer.

Q. Okay.

A. And again, is it possible that there are other structures that work? It is possible. I don't know.

Q. But the best structure that you know of, the one that works the best is the one that is claimed in the '227 and '602 patents; correct?

MR. MONALDO: Objection.

(Clarification by the reporter.)

MR. MONALDO: I logged an objection on the scope of the question.

THE WITNESS: Do I respond?

BY MR. LAMAGNA:

Q. You still answer.

A. Okay. Yes, and, you know, small variations on that structure that we have seen in the prior art.

Q. Okay. So you agree that the need -- there is a need in the industry for good weldability of hot

stamped parts; correct?

A. Yes.

Q. Aluminum-coated hot stamped parts; correct?

A. Yes.

Q. So from the beginning of whenever there was aluminum-coated hot stamped parts, there has been a need to weld them together; right?

A. Yeah, they go into the body structure.

Q. And so there is -- for that period -- the history of aluminum-coated hot stamped parts, there has been a need to have the most weldable, you know, microstructure in order to make the most weldable finished part; correct?

A. The -- so the weldability -- you're talking about the microstructure of the coating, right?

Q. Right.

A. Yes.

Q. And that's -- what you're describing there is a -- a need that is felt commercially in order to make sure that the parts that are being manufactured according to this process can be put into service in a vehicle, for example?

A. So at the time of the priority date, I was working in the lightweighting field, but primarily light metals and some of the steels we've talked about,

dual-phase, for example. I didn't have as great an awareness of -- of the hot stamped boron steel. I read in some of the documents that it was something that was under development for lightweighting. Weldability needs to be good in order to go into production.

So in terms of the -- the answer to your question, I'm not sure, but my sense is that any application that is going to be successful has to have weldability.

Q. And specifically the best -- you know, improved weldability; correct? In other words, you need to have a weld that is going to hold where corrosion resistance is not going to suffer, et cetera; correct?

A. Well, the corrosion resistance after the welding, that is held by the coatings that go on afterward. But the corrosion resistance is primarily during the processing of the part. But the strength of the joint is important.

The size of the weld nugget and there's other issues in these types of steels where welding development has to ensure that there's not microcracks in the weld. That's done by process development, but the -- the steel has to be weldable for sure to go into production.

Q. Okay.

MR. LAMAGNA: How long have we been on the record?

COURT REPORTER: We went back on at 4:29.

MR. LAMAGNA: Let's just keep plowing a little bit. I will just try to keep going through.

BY MR. LAMAGNA:

Q. So let's look at Paragraph 36 of your report.

A. Okay.

Q. Takes me a second to get there.

A. Okay, I'm there.

Q. All right. Just take a quick look at that paragraph that's on -- at least a portion of the paragraph that is on page 29.

A. Okay.

Q. You agree that the combinations that you've identified here with Cornette, Takagi -- and I suppose, Suehiro and Cornette would require some degree of trial and error; correct?

A. Correct. I think there would be motivation to try to achieve a coating that has good weldability and good resistance.

Q. Most of my questions will be yes or no type questions.

A. Okay.
Q. So you state here that that experimentation in trial and error would be within a finite number of possible experimental values.
Do you see that?
A. Yes.
Q. You don't identify what that number would be or even what order of magnitude it would be, do you?
A. No.
Q. You recognize that there are multiple values for both heating rates and heating times and target temperatures; correct?
A. Correct.
Q. And there are multiple ways that can be achieved through a curve or through stages in a furnace, correct, or linearly?
A. Potentially.
Q. And there are different hold times; correct?
A. There could be, yes.
Q. And -- and press times and values for cooling and quenching; correct?
A. Yes.
Q. And you have not considered in this case and quantified the different potential options and

multiplied them against each other in order to calculate what this finite number is; correct? You haven't done that?

A. I haven't done that.

Q. Okay. So while it is arguably a finite number, it is possible that that number could be very large; correct?

A. Theoretically, it could be large.

Q. You go on to say here in this paragraph, towards the end of the page, "Modification of one parameter, e.g., to obtain a thicker coating, might affect another parameter, e.g., layer composition"; correct?

A. Sorry, I'm just looking. Yep.

Q. And so you recognize that modification of one parameter may have impacts on other parameters; correct? This is a multidimensional problem that is being solved; correct?

A. Yes.

Q. And you go on to say that this would have been within the ability of a person of skill in the art to obtain by routine experimentation; correct?

A. Correct.

Q. And that is your view of the capabilities of somebody with a bachelor's degree in a related

field; correct?

A. Correct.

Q. Okay. So in your view, your opinion is based on the premise that someone that has that bachelor's degree, based on their learning in college, would be able to navigate this multidimensional interrelated set of parameters with a potentially large number of experimental values in order to determine how to create the heating, holding and cooling parameters necessary to obtain specific layered structures at certain thicknesses that meet the claim limitations of the '602 and '227 patent; correct?

A. Yes.

Q. Let's go down to page -- I'm sorry, not page. Paragraph 40. I'm sorry to be jumping around.

A. Okay.

Q. And you go on to say that- -- here on page 40 that certainly layer thickness morphology and composition may be associated with one another; correct?

A. Yes.

Q. That is another way of saying that layer thickness morphology and composition are interdependent; correct?

A. Yes.

Q. And by morphology, you mean the internal layered microstructures?

A. Morphology to refer to kind of, like, the thickness of the layers, the shape of the layers.

Q. Okay. And you agree that you say here, "a POSITA would expect that a given change to austenization [sic] temperature might affect both coating and/or layer thickness and composition of one or more of the layers"; correct?

A. Correct.

Q. And you don't identify whether that change in temperature is -- would provide a linear or predictable outcome on that effect; correct?

A. The temperature effect on -- effect coating or layer thickness in the composition, I haven't opined on that.

Q. Well, let me ask a different question. Yes, to clarify, yes, you have not opined on that issue.

Diffusion coefficients are not constant; correct?

A. They are not necessarily constant. Sometimes we approximate them as constants, but they are not necessarily constant.

Q. Okay. In fact, compositional differences,

differences in time, temperature and microstructure can all affect diffusion kinetics in nonlinear ways?

A. It's possible.

Q. In -- in some, diffusion kinetics can be unpredictable; isn't that correct?

A. Well, I think that, as I stated earlier, in a small range of change around a composition, I believe it's predictable. As the magnitude increases, the chance for something that is less predictable increases.

Q. Is 25 percent a small change?

A. In the -- well, that's related to the layer thickness, precoating thickness.

In my judgment in that particular instance, I consider it not to be a large change because we've seen examples of -- of both levels of precoating thickness. If you're seeing 25 percent in some other areas, it could be a large change. It depends on the situation.

Q. The fact --

A. And the --

Q. -- the only example where we actually see the thicker coating with a layered structure is purportedly Cornette; correct?

A. Cornette. And we -- we could postulate

that the GM specification is asking for that. We don't know for sure.

Q. And I don't want to revisit this, but GMW, as's established, GMW14400 which for the record is Exhibit 1026, does not have any internal microstructural requirements; correct?

A. Correct.

Q. And GM Exhibit 1026 does not disclose use of a multilayered internal microstructure in the coating; correct?

A. Correct.

Q. So the only art reference that you cited that shows, purportedly, according to you, a multilayer coating that is over 30 microns, again, in your view, is Cornette; correct?

A. I think Suehiro has a 20-micron precoating. If we assume that there's a 50 percent increase, then it would at least be 30 microns in the final coating.

Q. All right. Let's look again at Suehiro, Exhibit 1055. Specifically Figure 13.

A. Let's see 1055. That was either Suehiro or Takagi. Takagi I think is the one that cites it 20 micron precoating and therefore, using the Laurent 50 percent increase or the Cornette 60 percent increase, would have a final coating thickness of at

least 30 microns.

Q. Okay. So just looking right now at Suehiro, it appears on its face in Figure 13 to disclose a total coating thickness of just a smidge over 20; correct?

A. Yeah. So I could have been -- I could have been wrong on that. I think it may be Takagi that discloses a 20-micron precoating thickness.

Q. Okay. Let's look at Takagi. Takagi does not --

A. Takagi, sorry.

Q. Takagi does not identify or disclose expressly any coating measured at 30 microns or more, any final coating; correct?

A. It doesn't. We are postulating based on the increase in coating thickness from Cornette and Laurent.

Q. But, I guess, to break that down, Takagi does not expressly disclose a 30-micron or more coating layer; correct?

A. Correct.

Q. And the values and the experiments reported in Takagi do not -- strike that.

The values and experiments reported and disclosed in Takagi do not necessarily result in a

30-micron coating; correct?

A. I -- my argument was based on a 20-micron precoating. Takagi does not talk about a 30-micron final coating thickness.

Q. But Takagi does not disclose experiments or testing or any results that necessarily yield a 30-micron or more coating thickness; correct?

A. I don't know because they haven't measured the coating thickness.

Q. Right. So I think we are in agreement, but listen to my question.

Takagi does not disclose experiments or testing or any results that necessarily yield a 30-micron or more coating thickness after hot stamping; correct?

A. Correct.

MR. MONALDO: Objection. Asked and answered.

BY MR. LAMAGNA:

Q. Okay. So going back to Cornette, which you measured at 32.3 microns; correct?

A. Yep.

Q. Cornette is the only reference that you have cited that in your view purports to disclose both a four-layer structure and a 30 or more micron aluminum

alloy coating after hot stamping; correct?

A. Correct.

Q. And again, as we said, the only heating, holding and stamping data that we have for the parameters that were used is that the 900°c during five minutes that is on page 10; correct?

A. That's the specific one. I think they had a range, but then that was a specific example.

Q. Okay. And you would agree with me that those two data points alone are not all of the parameters that one would need in order to effectuate hot stamping of a part; correct?

A. Correct. You would need some others.

Q. So let me go back to the points that we were talking about for diffusion kinetics. Diffusion kinetics and intrinsic diffusion coefficients vary throughout material undergoing diffusion as the composition and temperature of the material changes; correct?

A. I think that's correct.

Q. Okay. And --

A. That's why I suggested first order approximation and not something that is exact.

Q. And within that, even, diffusion kinetics can be unpredictable; is that correct?

A. Well, I don't know how unpredictable they are. It would really depend on specific circumstances.

Q. But during diffusion and phase transformations, the material at issue is literally changing composition and phases dynamically in time such that the material is not the same from one moment to the next; correct?

A. Correct.

Q. Thus, during a process like heating and hot stamping, the diffusion coefficients are literally changing and varying from moment to moment; correct?

A. They could vary. How fast they vary, I'm not sure, but the composition is changing as the diffusion process proceeds.

Q. So we have a problem here that is multidimensional in the terms that we have multiple variables that we need to control; correct?

A. Yes.

Q. And those variables are interdependent with each other; correct?

A. Yes.

Q. And those interdependencies are not necessarily linear; correct?

A. Not necessarily linear.

Q. And those interdependencies also change

over time; correct?

A. I think they can change over time.

Q. So if we were doing this as an equation, we would have to consider the multiple different variables, but then we would also have to multiply by "T" for time; correct?

A. Well, time -- those variables are a function of time, yeah.

Q. Correct. But what is happening inside of the steel, the diffusion -- if we are trying to understand and control and regulate the diffusion kinetics in the steel, that is a problem that doesn't just exist at one point in time.

But what is happening inside the steel is changing constantly over time during the hot stamping process; correct?

A. Yeah, I think it's happening primarily in the oven, but it's also going to happen during the stamping and quenching process.

Q. All right. And so you also have factors like -- for example, you are familiar with Kirkendall porosity?

A. Yeah.

Q. And so in Kirkendall porosity, you get -- for lack of a better term, you get, let's just say,

bubbles or different --

A. Vacancies.

Q. Vacancies. And those vacancies can extend in irregular ways in three dimensions in the aluminum alloy coating; correct?

A. Well, the vacancies would typically migrate in the opposite direction of the fastest diffusing component.

Q. Right, they would present themselves in the aluminum alloy coating?

A. I mean, it could. I -- I'm not exactly sure about the kinetics of each element.

And so the directionality makes a difference, but there could be the phenomena of Kirkendall porosity. We don't -- you know, we see some porosity in these coatings.

Q. Well, to be clear, when you say "we see," exactly how many SEMs are you referring to?

A. I'm looking at Figure 12 of Suehiro, for example, where I see some. I don't see as many in the Cornette micrograph. I'm not sure. Is it -- is Kirkendall porosity a big deal in this application? I don't know.

MR. MONALDO: I think that we have been going a little over an hour.

MR. LAMAGNA: I guess does -- does Dr. Miles want to be done at 6:00 his time?

THE WITNESS: That would be great. We have 20 more minutes.

MR. LAMAGNA: You might want me to power forward a little bit.

THE WITNESS: I'm okay with that.

MR. LAMAGNA: I don't know how we are doing in the seven hours.

THE WITNESS: I think that we have 20 minutes based on my count.

BY MR. LAMAGNA:

Q. All right. So back to -- you agree that -- strike that.

Is it fair to say that Kirkendall porosity is not a linear function of composition, temperature, time and microstructure?

A. As a function of time?

Q. Well, it's not a linear function of any of those variables, is it?

A. I'm not sure. I think, as time goes on, radiance tends to normalize and things tend to slow down. So there is variable with time at temperature.

Q. Do you know -- or isn't it true that the Kirkendall porosity is unpredictable?

A. I don't know if it is unpredictable.
Q. You would agree that Kirkendall porosity is something that has to be managed and controlled in the development of hot stamped aluminum-coated steel?
A. I understand what you say when you say "Kirkendall porosity," I can understand the phenomena that might be happening. I didn't consider that in my declaration.
Q. Okay. So you didn't consider in your declaration -- well, strike that.
If we look back at Paragraph 40, you note that a person of skill in the art would have to have exercised care when performing experimentation; correct?
A. Yes.
Q. And as we have discussed, that is because the problem that we are facing, like I said, is multidimensional with interdependent variables that change over time as the composition and phase structure and microstructure of the steel and its coating change; correct?
A. Yes.
Q. And they also have to take into account other potential defects or problems like, for example, Kirkendall porosity and managing that; correct?

A. Possibly, yeah.
Q. Have you ever modelled the -- those variables to determine how those variables would be navigated to obtain a specific multilayered structure in aluminum alloy-coated steel?
A. No. I'm not aware of other models, but there could be some that have been attempted.
Q. But that's not something that you've ever attempted to do?
A. I haven't attempted it.
Q. Okay. And, in fact, like we determined before, you, yourself, have not attempted to design or determine heating, holding or cooling parameters that would attain specific layered microstructures in aluminum alloy coatings for steel; correct?
A. Correct.
Q. So if we look at Cornette again as the only piece of art that has the more than 30-micron coating, allegedly, and four-layer structure, you would agree that Cornette does not really give direction as to how to navigate all of these variables; correct?
A. Correct.
Q. There's many possible combination choices and Cornette doesn't give an indication as to how to navigate those choices; correct?

A. Correct, but I think Takagi over Cornette would provide a good starting point for someone of ordinary skill.

Q. Right. I'm just saying what -- what Cornette offers. What Cornette tells you in your view is that the layers should be thicker; correct?

MR. MONALDO: Objection. Asked and answered.

THE WITNESS: It says that the layer thickness obtained provides a good combination of weldability and corrosion resistance.

BY MR. LAMAGNA:

Q. So what you've identified here as a motivation to combine Cornette with the other references is the general guidance that a thicker coating has some advantages; correct?

A. Correct.

Q. But none of these pieces of prior art actually identify the ways in which one would navigate all of the issues that we have discussed in order to achieve the multilayered structure in the thicker, more than 30-micron ultimate layer; correct?

A. The first part of that was with respect to Cornette?

Q. No, I think for all of the prior pieces of

art including Takagi.

A. Well, Takagi --

Q. Takagi does not tell you how to obtain the results in Takagi but in a thicker material. It only discloses what it discloses.

A. Yes, and I guess, my opinion would be that a person of ordinary skill would try a slightly thicker precoating layer in order to achieve a final coating thickness as discussed in Cornette.

Q. So as I understand what you're saying is that in your view, it would be obvious to -- to follow Cornette because -- to use a thicker coating because Cornette provide the general approach that suggests that a thicker coating is promising and gives some general guidance that a thicker coating has advantages; correct?

A. Correct.

Q. So with that in mind, a person of skill in art would, in your view, see that as sort of an invitation to experiment in which they would be ultimately able to achieve, in your view, the -- the '602 and '227 patent claims; correct?

A. That's correct.

MR. LAMAGNA: Why don't we do this. I don't want to hold the people over too long. Let's try

to take a short break. And then come back for -- I know, we will get the reporter to tell us how much time we have left for today.

THE WITNESS: Okay.

(Recess was taken.)

MR. LAMAGNA: Let's go back on the record.

BY MR. LAMAGNA:

Q. Let's go very quickly. I have two questions basically for you.

At Paragraph 28 of your report, you refer to Laurent and you say that, "Laurent describes that the alloying of precoating generally responds to a 50% increase in thickness for the resulting coating."

Do you see that?

A. Mm-hmm.

Q. And you cite Exhibit 1025 at page 5, line 17 to 20. So if we can go quickly to Exhibit 1025 on page 5, just to clarify, this is the page number at the top. There are page numbers top and bottom to make it extra confusing.

A. Yeah.

Q. And Laurent says there at line 17 to 20, "The alloy, through interdiffusion, leads to an increased thickness of the layer which for the treatment specified above generally corresponds to a

50% increase."

Do you see that?

A. Yes.

Q. Do you see that the statement that the increase between the precoating and the post hot stamping thickness is 50 percent is caveated in Laurent as limited to the treatment specified above; correct?

A. Yes.

Q. Laurent does not purport to make a universal statement that there is a 50 percent increase that occurs in hot stamping between the precoating thickness of aluminum alloy and the post hot stamping thickness; correct?

A. Correct.

Q. Now --

A. Now the treatment that we are talking about includes those ranges.

Q. It's whatever is above.

A. Okay.

Q. I'm -- I'm just saying, again --

A. Yeah.

Q. -- that Laurent does not make a universal statement about -- that a 50 percent increase is categorically what is seen between the precoating thickness and the post hot stamping thickness; correct?

A. Correct. It says for the treatment specified above.

Q. Okay. Now, you've worked for Posco on exactly how many IPRs now?

A. Well, this is the second one, I think.

Q. Or -- or other post grant, you know, challenges. I guess I should say how many total. Because you have two now?

A. I haven't worked for -- I haven't worked for Posco in other projects.

Q. I guess I should say, how many post grant reviews have you been involved with against ArcelorMittal?

A. I think two.

Q. And --

A. And one --

Q. Sorry, go ahead.

A. Go ahead. This is the second one.

Q. You also were involved -- wasn't there also one in 2024?

A. Well, isn't that -- isn't that what this is?

Q. This is actually -- well, it depends on how you count it. There are two sets of them.

A. Okay.

Q. They came close in time with each other.
A. Okay.
Q. There are four IPRs that were at issue recently. So you had four different declarations within the last year, let's just say.
A. Okay.
Q. And then you had one before; correct?
A. I had one before.
Q. Do you, in any of your research or academic work, receive any funding from Posco?
A. No, I haven't received any funding.
Q. Do you receive any -- well, let me leave it there.
MR. LAMAGNA: I think I'm -- Jeremy will correct me if I'm wrong, but I think I've run my minutes allocation, based on my little clock.
MR. MONALDO: I think that's correct.
MR. LAMAGNA: I know that we will disagree and that's fine. We will, you know, hold the deposition open. And Dr. Miles, I have to thank you for, being out of time now, your patience in this long, arduous set of boring questions. Thank you for being a good sport about that.
THE WITNESS: No problem.
MR. LAMAGNA: Anything from you, Jeremy?

MR. MONALDO: No, I have no questions.

COURT REPORTER: Could I get your orders?

MR. LAMAGNA: Let's let Dr. Miles to go. You can sign-off.

On orders for now, I think -- I think we had suggested that we would take, like, a one-week expedite. And we don't need a rough, but maybe if you shoot me an email, I can confirm if that's the case. And we don't need an index.

MR. MONALDO: Yeah. I mean, if you can just give us a copy at the same time, you know, that would be great.

MR. LAMAGNA: I can let you know, Jeremy, or --

MR. MONALDO: Right, if you just send us the copy once you get it.

MR. LAMAGNA: If we change the order up, we will let you know. Do you know what I'm saying?

At present, I'm thinking that we are all pretty tired. I don't need it, like, tomorrow. Then it makes Abby have to turn it around overnight or whatever. So a week is probably fine for us. I don't think I need a rough.

(Concluded at 6:04 p.m.)

-o0o-

REPORTER'S CERTIFICATE

STATE OF UTAH)
)
COUNTY OF SALT LAKE)

I, ABIGAIL D.W. JOHNSON, a Certified Shorthand Reporter and Registered Professional Reporter, hereby certify:

THAT the foregoing proceedings were taken before me at the time and place therein set forth, at which time the witness was placed under oath to tell the truth, the whole truth, and nothing but the truth; that the proceedings were taken down by me in shorthand and thereafter my notes were transcribed through computer-aided transcription; and the foregoing transcript constitutes a full, true, and accurate record of such testimony adduced and oral proceedings had, and of the whole thereof.

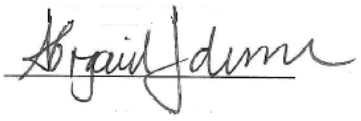
I FURTHER CERTIFY that I am not a relative or employee of any attorney of the parties, nor do I have a financial interest in the action.

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(X) Review and signature was not requested.

I have subscribed my name on this 30th day of October, 2025.



ABIGAIL D.W. JOHNSON, RPR, CRR, CRC

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