BEFORE THE ARIZONA POWER PLANT

AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF ARIZONA PUBLIC SERVICE COMPANY IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES SECTION 40-360, ET SEQ., FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING THE NORTH VALLEY 230KV FACILITY PROJECT, CASE NO. 120 INCLUDING THE CONSTRUCTION OF APPROXIMATELY 31 MILES OF 230KV TRANSMISSION LINES, TWO 230KV SUBSTATIONS, AND THREE SUBSTATION INTERCONNECTIONS IN MARICOPA COUNTY, ARIZONA, ORIGINATING AT THE WESTWING SUBSTATION IN SECTION 12, TOWNSHIP 4 NORTH, RANGE 1 WEST, G&SRB&M AND INTERCONNECTING AT THE RACEWAY SUBSTATION IN SECTIONS 4 AND 5, TOWNSHIP 5 NORTH, RANGE 1 EAST, G&SRB&M, CONTINUING TO THE PROPOSED AVERY SUBSTATION IN SECTION 15, TOWNSHIP 5 NORTH, RANGE 2 EAST, G&SRB&M AND THE PROPOSED MISTY WILLOW SUBSTATION IN SECTION 8, TOWNSHIP 4 NORTH, RANGE 3 EAST, G&SRB&M, AND TERMINATING AT THE PINNACLE PEAK SUBSTATION IN SECTION 10, TOWNSHIP 4 NORTH, RANGE 4 EAST, G&SRB&M. _____ AND RELATED CAPTION.	) DOCKET NO. L-00000D-02-0120) DOCKET NO. L-00000D-06-0635-00131) APPLICATION TO AMEND DECISION NO. 65997 AND DECISION NO. 63943) VOLUME I Pages 1-131

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REPORTER'S TRANSCRIPT OF PROCEEDINGS

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BE IT REMEMBERED that the above-entitled and numbered matter came on regularly to be heard before the Arizona Power Plant and Transmission Line Siting Committee, at the Briarwood Country Club, 20800 North 135th Avenue, Sun City West, Arizona, commencing at 1:30 p.m. on the 26th of July, 2021.

BEFORE: THOMAS K. CHENAL, Chairman

ZACHARY BRANUM, Arizona Corporation Commission, via videoconference
LEONARD C. DRAGO, Department of Environmental Quality, via videoconference
JOHN R. RIGGINS, Arizona Department of Water Resources
RICK GRINNELL, Counties, via videoconference
MARY HAMWAY, Incorporated Cities and Towns
JIM PALMER, Agricultural Interests
PATRICIA NOLAND, General Public
JACK HAENICHEN, General Public
KARL GENTLES, General Public

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CHMN. CHENAL: All right. Good afternoon, everyone. This is the time set for the hearing on the Biscuit Flats 500/230kV line relocation project. My name is Tom Chenal. I am with the Attorney General's Office, Chairman of the Committee.

Let's begin with the roll call vote, starting with the people in the room, and then we will go to the people online.

Member Noland, if we could begin with you, please.

MEMBER NOLAND: Patricia Noland representing the public.

MEMBER HAENICHEN: Jack Haenichen representing the public.

MEMBER PALMER: Jim Palmer representing agricultural.

MEMBER RIGGINS: Jason Riggins representing the Arizona Department of Water Resources.

MEMBER HAMWAY: Mary Hamway representing cities and towns.

CHMN. CHENAL: And Mr. Grinnell, if we can go with you, and then Member Drago.

MEMBER GRINNELL: Member Grinnell representing counties.

MEMBER DRAGO: Len Drago representing the

Arizona Department of Environmental Quality.

MEMBER BRANUM: Zachary Branum representing the Arizona Corporation Commission.

CHMN. CHENAL: And I mentioned before we began Member Gentles is en route and will be here in a few minutes.

So with that, let's consider whether there is any procedural matters to discuss. I don't -- I am not aware of any motions to intervene in this case. I would like to confirm that with counsel.

MR. DERSTINE: That's right, Mr. Chairman. We are not aware of applications to intervene.

CHMN. CHENAL: All right. Let's have appearances then. And we will start with you, Mr. Derstine, and then Ms. Benally.

MR. DERSTINE: It is Matt Derstine with the law firm of Snell & Wilmer appearing on behalf of Arizona Public Service Company.

MS. BENALLY: Linda Benally, in-house counsel, representing Arizona Public Service Company.

CHMN. CHENAL: All right. Thank you very much.

I think this will be an interesting hearing. I have let certain members of the committee know that this could end up finishing up Wednesday. Certainly it shouldn't probably extend later than Thursday in the

morning.

And there won't be a tour this hearing. I think we are getting close to where we can begin the tours again, and I know we have a full schedule of hearings coming up, but this one we have been, it is a pretty short line, we have been promised a very comprehensive flyover, so I think that will suffice.

I don't expect there to be too much public input during the hearing. We will have our hearing this evening at 5:30 as we always do, take comment from the public. And we can take comments from the public if they show up at the appropriate time.

But with that, Mr. Derstine and Ms. Benally, if you would like to begin your presentation, we are all ears.

MR. DERSTINE: Thank you. Afternoon, Chairman, members of the Committee.

I have had the opportunity, the pleasure to be involved in several cases with this Committee over the past several years. As I was preparing for this case, it occurred to me that these cases are about more than just transmission lines and transmission infrastructure. In many ways these cases are about change, change that's occurring in the communities, the cities, and the towns where the infrastructure is being

sited, and oftentimes, more broadly, change that's occurring within the State of Arizona.

When my kids were in elementary school they learned about the five Cs that shaped Arizona's history and its economy: copper, cattle, cotton, citrus, and climate. Over time, the importance, or the relative importance, of the five Cs in Arizona's economy has changed, and for some of the Cs that has diminished significantly.

For example, as late as the 1980s, Arizona produced over 60 percent of the world's Pima cotton. Today it is somewhat less than 10 percent.

In the late 1800s, the first commercial citrus grove was planted at the base of Camelback Mountain, and by the 1940s there were over 20,000 acres of citrus in and around Phoenix and the east valley. Today those commercial citrus groves have largely been replaced by homes and urban development.

And the same is true to some extent for cattle; although, cattle and livestock are still raised in every county in the State of Arizona. In the 1900s livestock and cattle production represented over 50 percent of Arizona's economy. Today it is something less than 10 percent.

What has happened is that in many ways, the Cs

are being replaced by the Ts: technology, trade, tourism. In this case to some extent, as an example -- is a prime example of that change, that transition in Arizona's economy from the Cs to the Ts, in this case, technology, high tech industry.

In this care, Biscuit Flats illustrates that change. The project area referred to as Biscuit Flats was the southern end of the Black Canyon livestock driveway. The Black Canyon livestock driveway was the route that sheep herders and ranchers used to move cattle from northern pastures down to the south and to the Phoenix basin in the winter months. And the same route was taken to move their herds back to the north in the summer months. The Black Canyon livestock driveway was utilized extensively from the 1890s to the 1940s, and you will still see cattle trails and an old corral complex that are found in the Biscuit Flats area.

But today the remnants of the cattle grazing are being replaced by a semiconductor manufacturing plant. TSMC is the largest contract semiconductor manufacturer in the world. TSMC has announced and is in the process of building a $12 billion semiconductor plant in the Biscuit Flats area on over 100 acres of land. And this semiconductor plant is state of the art. The manufacturing facility will have a significant impact in

terms of jobs and growth in the economy, not only of the City of Phoenix and Maricopa County, but of the State of Arizona.

And so, as I mentioned, these, the cases before this Committee, are not just about conductors and poles and transmission lines; they are about change, and in this particular case, high tech industry that's moving to the State of Arizona, and in particular in this case the Biscuit Flats area of north Phoenix and the energy and infrastructure needs of this high tech industry.

In these cases before the Committee you are used to hearing about purpose and need, purpose and need for a particular project. In this case, the needs are twofold.

Number one, the TSMC plant is highly sensitive to electromagnetic interference from an existing 500/230kV line.

And maybe, Mr. Spitzkoff, you could use your laser pointer and show the Committee on the map on the right the existing transmission line shown in red.

And it cuts across the land that is being leveled for the TSMC plant that's shown in kind of the stippling or the dotted area. So that's the first driver for this project. We need to relocate the segment of this existing 500/230kV line to allow for the

TSMC manufacturing operations.

The second driver, the second need, this plant has a high energy demand, requires a significant amount of electrical power. I think you will hear more testimony from Mr. Brian Harrison, who will have a presentation for the Committee a bit later this afternoon. But at buildout of those first two phases, or fabs, it will require somewhere in the neighborhood of over 300 megawatts of power. The existing line that Mr. Spitzkoff identified with his laser pointer shown in red on the map on your right screen has sufficient capacity to serve the plant. So it certainly is a benefit that the plant is being constructed in close proximity to that existing line.

But in order to have the conductivity, in order to allow for the number of feeders that have to be connected to the plant and the manufacturing processes of the plant, we need to do two things, one, expand the existing substation known as the Avery substation shown in green on the map on your right from 10 to approximately 64 acres. And beyond that, we will need to construct and develop a new 500/230kV substation that will be placed somewhere in that pink area shown on the map.

So those are the needs.

There are some important things that are different about this case in the way it has come to the Committee. You don't have before you a new CEC application. We are not asking for a new CEC. What we are doing is requesting an amendment of two existing CECs, CEC 131 and CEC 120. CEC 131 governed the location of the Morgan to Pinnacle Peak 500/230kV line. So we need to amend the CEC to allow for the relocation of the segment of the line. CEC 131 also provided for and authorized construction of two substations. We now need to build a third in order to serve the TSMC plant.

Beyond CEC 131, we need to amend CEC 120 to expand the size of the Avery substation, as I mentioned. When Avery was sited in Case 120, the TSMC plant was not on anyone's horizon. And therefore that substation, that 230 substation was planned for approximately 10 acres. And now, as I mentioned, it needs to be expanded to 64 acres, or approximately 64 acres, in order to have a sufficient number of bays to allow for connection to the various manufacturing operations of the TSMC plant.

So that's what is different about the cases. But let me talk a bit about what is the same.

APS approached this case as if it was a new CEC request in terms of the planning for this project, albeit on an accelerated timeline in order to meet

TSMC's in-service date. But the approach to the case was as if it were seeking a new CEC. The level of environmental study work on the relocated line was the same; studied the environmental impacts of the new substation, the expanded TS-22 substation in the same manner as if we were coming before you and seeking a new CEC.

And APS utilized the same level of outreach and public engagement as we would have if we were bringing a new CEC application to this Committee. So in many ways what you will hear and what we, APS has done in terms of planning for this project as if we were seeking a new CEC, but again, we are seeking to amend two existing CECs, and that's the different posture.

So given the posture of the case, what is the Committee's role? Some of the members of this Committee were here or were part of the case that was held in Tucson at the end of last year that involved an amendment of the Southline CEC. And in that case, the Commission had sent, in that, the applicant's application to amend the Southline CEC back to this Committee for the Committee to take evidence concerning the proposed amendments, make findings of fact and conclusions of law, and issue a recommended opinion and order. And that's exactly the charge to this Committee

for this particular case.

What are the requested amendments?

As I mentioned, the initial and primary need is to relocate this existing three and a half mile segment of the Morgan to Pinnacle Peak line approximately half a mile to the north of its current location, utilizing in what we are representing and requesting that the Committee authorize is a 3,000 foot wide corridor to allow for the placement of that line. And I see Member Noland looking at me saying that is a wide corridor. And I understand that. I will spend a little bit more time talking about the corridor in the next slide;

Authorize the construction of the third substation. Again, CEC 131 authorized two substations. We now need to construct a third TS-22 substation;

And, as I mentioned, authorize expansion of the Avery substation.

CEC 120 doesn't specify the size of Avery, but there was a significant amount of testimony during that case and in the application in which it was anticipated that Avery would only be 10 acres. And therefore, again, we are seeking to expand that 10-acre footprint to approximately 64 acres. And that is the amendment that we will seek and need to obtain in order to serve the TSMC plant in connection with CEC 120.

So on the corridor size, the corridor request has evolved. You will see on the map on the right, and there is another map that more particularly defines or shows the corridor, that's different now than what we had. We had envisioned it and described it in the original supplement to the application to amend.

Now we are seeking simply a straight 3,000-foot corridor. That 3,000-foot corridor gives us the ability to connect the relocated line segment into the TS-22 substation. But, importantly, the TS-22 substation has not yet, or the final location is yet to be determined.

All of this land is owned by ASLD, State Land Department. This entire project area is on state land. And so part of the need for the 3,000-foot corridor is to give us the flexibility to route, place the relocated line segment within that corridor in the fashion in which it needs to drop into the TS-22 sub, with the understanding that the final engineering for the TS-22 sub has not yet been done, and the final location for the TS-22 substation has not yet been identified. Those negotiations and discussions are ongoing. But ultimately State Land will determine where and how that substation will be placed within the pink box. And that final location then will determine where we place the relocated line segment within the 3,000-foot corridor.

Another driver of the corridor request is that the original corridor in CEC 131 was a 3,000-foot corridor. And so there is some symmetry and seemed to make sense to adopt and follow what was authorized in CEC 131 in terms of the initial corridor for the line prior to when it was constructed.

We will be seeking a 100-foot right-of-way from State Land in order to place the relocated line segment, again, within the 3,000-foot corridor.

So as I think I indicated, this project has been on an accelerated time line. There is engineering yet to be done. There are negotiations yet to be completed with State Land that will finalize the location of not only the relocated line segment but the new TS-22 substation. And so it is important to have the flexibility to allow us to continue that work and ultimately land on a final location for those improvements.

Let me touch on the key exhibits and the witnesses that we will use to present this case to you. I think the key exhibits are the supplement to the application to amend. That's APS Exhibit No. 2 found on your iPad. We also have paper exhibit binders if you prefer to work from paper.

The supplement to the application amendment

really serves as the CEC application for this case. It contains all the environmental study work. Its format follows what is prescribed in the siting statute and the rules for proceedings before the Siting Committee. So again, the supplement to the applications to amend is our CEC application if we were before you on a new CEC request.

I think another key document is the recommended opinion and order. We have a draft recommended opinion and order for you to consider. That's APS Exhibit 27. That ROO, or recommended opinion and order, sets forth the description of the 3,000-foot corridor. It also shows the additional changes to 131, and it clarifies the authorization request for the 64 acres needed to expand Avery.

And then the maps Figure 1A and Figure 3B, you will see those throughout our screen presentation. Those contain significant and important information for the Committee.

Oh, I am getting told that the exhibit changed. So 3B is APS-26, not APS-9.

So how will we present those exhibits and that information to you? As I mentioned, we have with us today Brian Harrison. He is a senior vice president of TSMC Arizona. And he has a video to share with the

Committee, together with testimony and remarks about the plant, and should be able to give you good information and understanding of TSMC and the plant and its needs for this infrastructure.

We will also present our case view through a witness panel that involves Mr. Jason Spitzkoff and Mr. Kevin Duncan of APS, and then Mr. Mark Turner who is here on behalf AECOM. AECOM was the environmental consultant that did the study work for this project that's contained in the supplement. Again, all the relevant exhibits, including the supplement, are included on your iPads. And the maps that I identified on the previous slide are shown on the placemat that should be before you on your table.

At the end of the case, after you have heard the testimony and the evidence, we will be asking that you approve a recommended opinion and order that authorizes the amendments that we are seeking to CEC 131 and 120. I think the testimony and the evidence that you will hear this afternoon and over the next couple days will establish that the CEC amendments are needed to serve the new TSMC semiconductor plant. Testimony and evidence will establish that relocation of the existing Morgan to Pinnacle Peak line. And the substation improvements are compatible with the total environment

of the existing and future land use plans, including the land for the TSMC plant.

And then at the end, approval of the requested amendments is in the public interest. It is in the public interest because it does what the statute directs this Committee and the Commission to focus upon, and that is does it balance the need for reliable, safe energy with the impacts of that new infrastructure on the ecology of the State of Arizona. And the testimony and evidence will show that it does.

So again, this case and many of the cases before this Committee are not just about wires and poles. They are about changes, changes that may be occurring on a local level, but may be more broadly in the state, changes that are shaping the economy of the State of Arizona that are important to the economy of the State of Arizona. And as more and more high tech industries are moving to Arizona, they have their own unique energy and infrastructure needs, and this case is about those needs and having them met so that APS can serve this new important customer.

So I appreciate your time for my opening. We look forward to presenting our case to you this afternoon.

CHMN. CHENAL: All right. Thank you very much.

Member Noland.

MEMBER NOLAND: Thank you, Mr. Chairman.

Mr. Derstine, you didn't mention how many acres the TS-22 is encompassing that you have shown in pink on the map. I thought that I saw that it was a total of 408 acres.

MR. DERSTINE: The site, I believe that's shown in pink. And I will have Mr. Spitzkoff, once he is sworn, answer your question. But the larger pink area is the substation siting area. I think ultimately what we are projecting if TS-22 is built as a traditional substation, it will be in the size of approximately 80 acres. And I am looking to Mr. Spitzkoff or Mr. Duncan if that's right, and I am getting the thumbs up that it is.

But I want you to know that, as I mentioned, engineering is still ongoing, and there is -- that size, the 80 acre size of the new TS-22 substation may change depending on whether it is developed as a G-I-S substation, a GIS substation, as opposed to the traditional substation which requires a much larger substation.

So Member Noland, a good question, and you will hear more specific testimony and the details of the TS-22 substation from Mr. Spitzkoff as we get into his

testimony.

MEMBER NOLAND: Well, and then I have just a couple other observations that you might discuss as you call those witnesses. My exhibits on both the iPad and the hard copy do not show that kind of arrow pointed area. They show a rectangle. Why has that changed, number one?

And then number two, my other question is why do you need to have -- and you knew this would come -- a 3,000-foot corridor that goes down onto the project property. You are obviously not going -- maybe that was part of the old corridor, but you are not going to put the line within the area, so why would you need to do that?

MR. DERSTINE: Yes, you are correct in your observation that the corridor does overlap with the TSMC property. And we will not be relocating the line onto TSMC's property. It has got to be to the north of the boundary line of their property.

However, as you will see on the right of Figure 1A, which is shown on the screen here in the hearing room, the corridor needs to extend to the south in order to get down to the Avery substation and to connect to the existing line there.

And so one of the drivers for the, I guess the

shape and the size of the 3,000-foot corridor is that that size need overlaps that section where we need to interconnect with the existing Morgan to Pinnacle Peak line at that point on that north-south run coming out of Avery. Then, when the line extends to the east-west run, it will absolutely be north of the TSMC property line. And so we certainly can and could pinch up the corridor at that juncture, but, again, our thinking was that it needs to be to cover the initial interconnection with the Morgan-Pinnacle Peak line on that north-south edge, and ultimately State Land is going to drive where we can place this line, and those negotiations are ongoing with State Land.

And then to get to your question about the change in the shape, that it didn't have that pointy, half of a pointer marker in pink, I think as I alluded to, this project is on a fast pace and it is evolving. And so that point, that triangle piece that comes out is a recent development where State Land has indicated they would prefer to have the TS-22 substation located in that pointy section. And again, Mr. Spitzkoff and/or Mr. Duncan can speak to exactly where State Land would like to see TS-22, but we have yet to work our way through the final engineering and analysis of that site. It is up against a wash, so there are some complications

with putting it where State Land would like it to be.

But again, at the end of the day, this is State Land's land. And the final placement of that substation will depend on our ability to reach agreement with State Land as to the site.

MEMBER NOLAND: Thank you, Mr. Derstine.

And just one last question at this point; I am not saying I won't have any others. But you currently have a 150-foot right-of-way for the current transmission lines. What happens to that? Do you give that back to State Land or to the project, or what happens when you move those lines, what happens to that right-of-way?

MR. DERSTINE: That's a very good question, and I don't know the answer to it. I am assuming that we would abandon it, or the lease for the existing right-of-way for the relocated line segment will essentially be terminated, and we will have to then secure and negotiate a new right-of-way in the new location for the relocated piece of the line of this project.

MEMBER NOLAND: Thank you.

MR. DERSTINE: But we will make sure we touch on that and cover that issue.

MEMBER NOLAND: Thank you.

CHMN. CHENAL: Member Haenichen has a question. But I am going to ask you, Mr. Derstine -- I am going to give you my pointer. I think what you discussed with Member Noland was very important, but it was hard to follow. Okay? I would like you to kind of repeat or summarize what you said with a pointer so we have the benefit of --

MR. DERSTINE: Well, maybe I can have -- because the angle here -- well, I can try it. Let's see if I can -- well, I can do it.

So when I mentioned in response to Member Noland's question about the need for the 3,000-foot corridor needing to cover the north-south run, you will see here that the existing line, which is shown in black on Figure 1A, which is the map on the right screen, comes out of Avery. This is where the line or where the -- this is the future site of the Avery substation. You will have a better sense of that when we show you our flyover simulation. But this is the future or the planned site for the Avery substation. The existing line passes through here, and it travels north where it turns right. The existing line here shown in red on this east-west run, we need to move that line segment at least a thousand feet north of TSMC's property boundary. And you will hear from Mr. Harrison of TSMC and you will

hear from Mr. Smith the reasons for that and the distance.

But somewhere north of that we will need to move the relocated line segment. And the relocated line segment is represented in black on Figure 1A. Again, the final location for Figure 1A is going to depend on where we drop in and tie into TS-22. And that will depend to a large degree where TS-22 is ultimately sited and placed within the pink box.

As Member Noland pointed out, our original depiction of the TS-22 substation site was more of a regular pink rectangle. That was shown in the supplement. Now we have it on our updated map, that's why it is called Figure 1A and not Figure 1, that shows this peak here. And this represents a parcel or a portion of a parcel in which State Land is suggesting that they would prefer that we site the TS-22 substation.

So those negotiations are ongoing. APS is considering whether the TS-22 500/230kV substation can be placed within this rectangular shaped area of the larger pink box or whether it needs -- it can be or needs to be placed further into the heart of the pink box here. And that may depend on the final engineering and design for TS-22 and the type of technology that's

used to construct that substation.

CHMN. CHENAL: So a quick question. I know Member Haenichen has a question, and maybe some others. But is there any issue if -- I mean I note that the pink area extends, is mostly within the requested corridor, but it also extends north of the corridor. Is there any issue with a potential placement of the substation in the pink area if it is outside of the corridor that's been described, and how would that work?

MR. DERSTINE: Again, a good question. My understanding -- and we are going to have to have the folks with real knowledge speak to this -- is that the peak that's above the corridor is, will likely be dedicated to a 69kV portion of the substation and that the lower portion is going to be the 500/230kV portion of this larger substation site.

And so the fact that the pink box to some extent extends out does not, to my understanding, create interconnection problems for future TS-22. But again, Mr. Spitzkoff can speak to that more directly.

CHMN. CHENAL: And I am looking at the legal issue of having, you know, the application seeking a particular corridor, but then, you know --

MR. DERSTINE: We are not --

CHMN. CHENAL: -- turned out the substation and

the lines would be north of that, of what is in the applications.

MR. DERSTINE: We have been consistent. Well, we initially in the supplement asked for a much -- a larger corridor. We brought that corridor size and width down, but all of this is within the original study area. You will hear testimony from Mr. Turner that all of this has been analyzed. It doesn't change our notification.

But this, as Member Noland points out, this irregular shape to the pink box which represented the TS-22 substation site is a new development -- that's why we are on Figure 1A and no longer on Figure 1 -- but, to my understanding, still allows for the interconnection of the relocated line segment with TS-22 wherever we end up placing it within the proposed pink box which represents the TS-22 site.

CHMN. CHENAL: Member Haenichen.

MEMBER HAENICHEN: Thank you, Mr. Chairman.

The essence of this project is really the level of electromagnetic fields surrounding a fully energized high voltage transmission line, and proximity thereof of that field to the TSMC equipment inside their plant.

I know that this is going to come up in detail later, but I just wanted to give everybody a heads-up

that I will be interested in the methodology that they used to determine what level of electromagnetic field is allowable for their process, how they did it, and how they arrived at the distances that they are specifying for the moved line.

Thank you.

MR. DERSTINE: I appreciate that, Member Haenichen. As I mentioned, Mr. Harrison is here on behalf of TSMC. I don't know that he has the level of technical knowledge to answer your question. It may be something that we can follow up and get for you. But I think he can give you some general understanding in terms of the parameters of the amount of what is allowable in terms of the milligauss that come from the line that is satisfactory or it does not interfere. But this is, their manufacturing, their state of the art nano manufacturing process is highly, highly sensitive to electromagnetic interference, and he will talk to about some of those values and what is important.

MEMBER HAENICHEN: Let me just express my concern and why I ask that question or made that presentation. And that is we want to be sure that there is enough safety margin in the completed project that it is going to work out appropriately and not require yet further distancing or other shielding or anything else.

So I just want to make sure we get it right the first time.

MR. DERSTINE: I appreciate it. And we agree, we want to get it right the first time. And I am sure TSMC wants us to get it right, too. So thank you for that.

MEMBER GRINNELL: Mr. Chairman.

CHMN. CHENAL: Yes, Member Grinnell.

MEMBER GRINNELL: I want to go back a little bit to Member Noland's comment on what would be the east side of this map. I see a couple residential areas and a lot of vacant land. Is that land that's going to be to the, looks like the northeast and due east of the proposed area, is that going to become residential down the road? Is that an industrial area specifically zoned and will any expansion of residential be moved within that, I guess, corridor?

MR. DERSTINE: Mr. Turner of AECOM will speak to existing and future land use plans of this area. But the residential areas you see are on the other side of I-17. These areas here -- I-17 runs north and south, so there is no residential development currently on the west side of I-17. I will let Mr. Turner speak to whether or not residential land use is possible within this area. Again, all of this area is owned by ASLD,

State Land Department. So he can speak to future land uses. But I appreciate the question, Member Grinnell, and we will address it.

MEMBER GRINNELL: Thank you.

MR. DERSTINE: Unless there are additional questions for me, I think Ms. Benally is ready to introduce our APS witness panel. And we will proceed with some testimony from Mr. Spitzkoff on the APS service territory and some of the existing transmission infrastructure in the area, and then we will move on and have the presentation from Mr. Brian Harrison of TSMC.

CHMN. CHENAL: Very good.

I did not mention, but as our standard practice, I will take breaks approximately 90 minutes after, you know, from when we started this afternoon.

But please proceed, Ms. Benally, with your panel.

MS. BENALLY: Good afternoon, Chairman Chenal, Committee members. Thank you for the Committee convening this afternoon and over the next couple of days to hear our case. We certainly do appreciate your time and attention.

Before I proceed, how is my sound? Am I coming through? Well, thank you very much.

It is indeed appreciated that I have the

opportunity to appear before this Committee again today. So I would just like to make that statement.

My plan this afternoon is to do an introduction of our witnesses. I will start with Mr. Spitzkoff, go to Mr. Duncan, and then end with Mr. Turner. And then I will come back and do a brief testimony presentation with Mr. Spitzkoff.

So starting with Mr. Spitzkoff, would you please state your full name and address for the record.

CHMN. CHENAL: I think we need to swear the witnesses in first.

MS. BENALLY: Pardon me.

CHMN. CHENAL: So -- that's all right.

Would you gentlemen prefer an oath or affirmation?

MR. DUNCAN: Oath.

MR. TURNER: Oath.

MR. SPITZKOFF: Oath is fine.

CHMN. CHENAL: Would you please all raise your right hands.

(Jason Spitzkoff, Kevin Duncan, and Mark Turner were duly sworn.)

CHMN. CHENAL: Thank you.

JASON SPITZKOFF, KEVIN DUNCAN, and MARK TURNER, called as witnesses, having been duly sworn by the Chairman to speak the truth and nothing but the truth, were examined and testified as follows:

DIRECT EXAMINATION

BY MS. BENALLY:

Q. Mr. Spitzkoff, let's start with your name and your business address, please.

A. (BY MR. SPITZKOFF) Yes. My name is Jason Spitzkoff. My business address is 2121 West Cheryl Drive, Phoenix, Arizona 85021.

Q. And you are the manager of transmission planning, transmission contracts and services, and facility siting at APS, correct?

A. (BY MR. SPITZKOFF) That is correct.

Q. And in these roles you have had a significant involvement with the Biscuit Flats 500/230kV relocation project, is that right?

A. (BY MR. SPITZKOFF) That is correct.

Q. Let's start by providing an overview of both your education and your work experience. And I believe you have some slides that you will be walking through?

A. (BY MR. SPITZKOFF) Yes.

Q. Thank you.

A. (BY MR. SPITZKOFF) So starting with my educational background, I have a bachelor of science in electrical engineering and a bachelor of arts in economics from Rutgers University, proud member of the Big 10.

CHMN. CHENAL: Sorry to hear that, Mr. Spitzkoff. We all know Rutgers does not belong in the Big 10. Please proceed.

MR. SPITZKOFF: Yes. My professional experience, I have been at APS for 20 years, 14 years as a transmission planning engineer, three years as supervisor of our transmission planning and engineering team. And my current role is manager of transmission planning, transmission contracts and services, and facility siting for about three years.

Continuing with my professional background, from a regional perspective, I was a member of NERC planning committee. NERC is the North American Electric Reliability Corporation. I have also been a member of various WECC committees. And WECC is the Western Electricity Coordinating Council. And regional experience, I have been on the WestConnect planning management committee. And then coming in more locally, I have been APS's subject matter expert for multiple biennial transmission assessments, and in relation to

line siting matters I have testified in three line siting cases.

BY MS. BENALLY:

Q. Okay. Thank you. So let's stop there for a moment.

Now, in preparation for this hearing, Mr. Spitzkoff, you prepared a summary testimony that was filed in ACC Docket Control on July 16, 2021, is that correct?

A. (BY MR. SPITZKOFF) That is correct.

Q. Okay. And is that in the supplemental binder, the exhibit binder marked as APS-3?

A. (BY MR. SPITZKOFF) Yes.

Q. And do you have any corrections to APS-3 today?

A. (BY MR. SPITZKOFF) No.

Q. Thank you.

Let's now move to the PowerPoint slides. You also prepared PowerPoint slides that you are going to use today, and perhaps tomorrow, to support your testimony before this Committee. That's marked as APS-4 in the exhibit binder, is that correct?

A. (BY MR. SPITZKOFF) Yes.

Q. And were those PowerPoint slides prepared by you or under your direction?

A. (BY MR. SPITZKOFF) Yes.

Q. Okay. And have you had a chance to review these slides before the start of this hearing today?

A. (BY MR. SPITZKOFF) Yes.

Q. Do you have any corrections to those slides?

A. (BY MR. SPITZKOFF) I do not.

Q. (BY MR. SPITZKOFF) And is APS-4 true and correct, to the best of your knowledge?

A. (BY MR. SPITZKOFF) Yes.

MS. BENALLY: Thank you.

Mr. Chairman, I would like to move APS Exhibit 3, which is the witness summary of Jason Spitzkoff, and I would also like to move APS -- I am sorry -- APS-3, which is the witness summary, and APS-4, which are the witness presentation slides that Mr. Spitzkoff will be using to support his testimony.

CHMN. CHENAL: Ms. Benally, let's do this. Let's do these at the end. It will save -- it will just be a lot, I think, more efficient to just do them all at the end. And we will make sure we do it.

MS. BENALLY: Okay, thank you.

CHMN. CHENAL: You bet.

BY MS. BENALLY:

Q. Okay. So now I would like to turn to Mr. Duncan.

Would you please state your full name and

business address for the record.

A. (BY MR. DUNCAN) Yes. My name is Kevin Duncan. My business address is 2121 West Cheryl Drive, Phoenix, Arizona 85021.

Q. And you are a senior siting consultant in APS's facility siting department, is that right?

A. (BY MR. DUNCAN) That is correct.

Q. And you are the project manager for the Biscuit Flats 500/230kV relocation project, is that right?

A. (BY MR. DUNCAN) Yes.

Q. Okay. So let's start -- I think you have got a few slides prepared. Would you share with the Committee an overview of both your education and professional background, please.

A. (BY MR. DUNCAN) Yes. So I earned my MBA from Benedictine University. Prior to that I earned my bachelor's of science in urban planning from the University of Utah.

I have 14 years of experience as an environmental planner and consultant, but in the last six years, have six years of experience at APS as a senior siting consultant, for a total of 20 years of combined experience. And I have testified in five previous CEC cases.

Q. Okay. So let's walk through a few more things

in your introduction. APS made two filings with ACC Docket Control to begin the amendment process that Mr. Derstine mentioned in his opening, is that correct?

A. (BY MR. DUNCAN) That is correct.

Q. Would you describe those two filings, please.

A. (BY MR. DUNCAN) Yes. So there was the -- excuse me. There was the application to amend which was filed in March, and then there was a supplemental application to amend which included many of the exhibits that are in a typical CEC application.

Q. And as the project manager, you supervised the preparation of the application to amend filed with Docket Control, is that correct?

A. (BY MR. DUNCAN) That is correct.

Q. And was the company's supplement to the application that was filed on June 10th, I believe, also prepared under your supervision?

A. (BY MR. DUNCAN) Yes, it was.

Q. Have you had a chance to review the supplement to the application to amend after it was filed?

A. (BY MR. DUNCAN) Yes, I did.

Q. And that is marked as APS-2 in the exhibit binder, is that correct?

A. (BY MR. DUNCAN) That is correct.

Q. Do you have any corrections that you want to

make at this point to APS-2?

A. (BY MR. DUNCAN) Yes. There are two corrections I would like to make. Figure 1 has been replaced by the new Figure 1A. And Figure 3 has been replaced by the new Figure 3B, as described by Mr. Derstine earlier.

Q. And just for purposes of noting exhibits, Figure 1A is APS-10, and it is described as the revised project vicinity map, is that correct?

A. (BY MR. DUNCAN) That is correct.

Q. Okay. And Figure 3, which are the requested amendments, is marked as APS-26?

A. (BY MR. DUNCAN) That is correct.

Q. Okay. Do you have any other corrections to the supplement to the application to amend at this point?

A. (BY MR. DUNCAN) No, I do not.

Q. Thank you.

Okay. So just a few more exhibits to cover. You have the exhibit binder in front of you in case you need to reference it, is that right?

A. (BY MR. DUNCAN) That is correct.

Q. So the Chairman's procedural order required that the parties file a summary of witness testimony. Did you prepare a summary?

A. (BY MR. DUNCAN) Yes, I did.

Q. Okay. And your testimony is marked as APS

Exhibit 5, is that right?

A. (BY MR. DUNCAN) That is correct.

Q. Okay. Do you have any changes or corrections that you would like to make to that testimony summary today?

A. (BY MR. DUNCAN) No.

Q. You also prepared PowerPoint slides that you will use as part of your testimony, is that correct?

A. (BY MR. DUNCAN) That is correct.

Q. And these slides are marked as APS-6 in the exhibit binder, right?

A. (BY MR. DUNCAN) That is correct.

Q. And was APS-6 prepared by you or under your direction?

A. (BY MR. DUNCAN) Yes, it was.

Q. And did you have an opportunity to review your presentation, APS-6, before this hearing?

A. (BY MR. DUNCAN) Yes, I did.

Q. And do you have any corrections you wish to make today?

A. (BY MR. DUNCAN) No, I do not.

Q. And is the information presented in your PowerPoint slides correct, to the best of your knowledge?

A. (BY MR. DUNCAN) Yes, it is.

Q. Thank you.

So now I will turn to Mr. Mark Turner. Will you please state your full name and business address for the record.

A. (BY MR. TURNER) Yes. My name is Mark Turner. My business address is 7720 North 16th Street, Suite 100, Phoenix, Arizona 85020.

Q. And you are a project manager and environmental planner for AECOM, is that right?

A. (BY MR. TURNER) Yes.

Q. Would you provide the Committee an overview of both your education and your professional background, and I believe you also have some slides presenting that information.

A. (BY MR. TURNER) Sure. I have a bachelor's degree in ecology from Prescott College here in Arizona, and a master's of science in biology from Marshall University.

I have been an environmental consultant for approximately 30 years. In that role, I have served as project manager, a biologist and environmental planner. 20 of those years I have been here in Arizona. I have managed more than 80 NEPA documents, National Environmental Policy Act documents, here in Arizona for civil infrastructure projects. I have provided

consulting to APS since 2000 for Palo Verde nuclear power plant, Childs-Irving hydroelectric plant, and dozens of others where I served as biological consultant during planning and during construction. Most recently I have been subject matter expert on Case 122 amendment, which was last year.

Q. Thank you for that introduction to your background.

Would you please provide an overview of AECOM, as Mr. Derstine mentioned, the environmental firm that was retained by APS to support these project changes.

A. (BY MR. TURNER) Sure. AECOM is an international engineering and environmental consulting firm. We are headquartered in the United States. We have two offices here in Arizona, Phoenix and Tucson. We plan, design, permit, and sometimes construct the civil project. This ranges from transportation, such as aviation, roadway, and rail projects, utility to power line water and gas, also water resource projects such as dams and mining, as well as commercial and urban development projects.

Q. What was AECOM's role with respect to this project, and then in particular the application to amend as well as the supplement to the application?

A. (BY MR. TURNER) Yes. Our role was to serve as

environmental consultant. We prepared environmental analysis associated with the potential impacts of the line relocation as well as the two substations. In addition to that analysis, we also were tasked with developing the public and agency involvement materials, including the development and operation of the virtual public open house.

Q. So I have a few exhibits I would like to walk through with you to wrap up your introduction. You filed -- prepared, pardon me, a witness summary of your testimony, is that correct?

A. (BY MR. TURNER) Yes.

Q. And that's marked as APS-7 in the exhibit binder?

A. (BY MR. TURNER) Yes.

Q. And do you have any corrections you would like to make today to APS-7?

A. (BY MR. TURNER) No.

Q. And you also prepared a PowerPoint presentation, which is marked as APS Exhibit 8. Was that exhibit prepared by you?

A. (BY MR. TURNER) Yes.

Q. Your PowerPoint presentation includes a number of maps, photos, and other information. Would you just take a moment to share what the source of that

information is.

A. (BY MR. TURNER) Yes. There are lots of different sources. All are publicly available. We did receive CAD files from APS, obviously, for the design components, but publicly available material from Phoenix, State Land Department, Maricopa County, USGS, several mapping imagery platforms as well, Esri, Earthstar, Google Earth. The photographic simulation also used various softwares, Autodesk and InfraWorks.

Q. Great. Thank you.

In your presentation, the information you just referenced, the maps, photos, and information, they are included in APS's supplement to the application that was filed on June 9th, is that right?

A. (BY MR. TURNER) Yes, that's correct.

Q. So for the record, would you identify the environmental exhibits that were prepared under your direction that are included in APS Exhibit 3.

A. (BY MR. TURNER) Yes. Exhibit A, which is land use; Exhibit B, which is environmental studies; Exhibit C, which is areas of biological wealth; Exhibit D, which is biological resources; Exhibit E, which is scenic, historic, and archeological sites; Exhibit F, which is recreation; and Exhibit H, which is existing plans.

Q. Okay. Thank you for ticking down that list.

Did you review your PowerPoint presentation before the hearing today?

A. (BY MR. TURNER) Yes.

Q. And do you have any changes or corrections you would like to make to that exhibit?

A. (BY MR. TURNER) No.

Q. Okay. And the information that is presented in your PowerPoint presentation, is that information true and correct, to your knowledge?

A. (BY MR. TURNER) Yes.

MS. BENALLY: Thank you.

Mr. Chairman, that concludes my introduction of the witness panel.

CHMN. CHENAL: Okay. Very good.

MS. BENALLY: I am happy to move the exhibits at this point or a later time.

CHMN. CHENAL: I think we will do the exhibits right as the applicant closes its case, you know, Tuesday or Wednesday. We will do them all at once. We will do that in order at that time.

MS. BENALLY: Okay. Thank you very much.

Okay. So now we are going to transition to Mr. Spitzkoff, and we are going to do an introduction to a part of his testimony, and we will get through a

portion of that and then we will move to Mr. Brian Harrison as we conclude Mr. Spitzkoff's portion for this afternoon.

CHMN. CHENAL: Ms. Benally, what exhibit number, if we want to follow along on our iPads, what exhibit number will he be testifying about?

MS. BENALLY: Mr. Spitzkoff?

CHMN. CHENAL: Spitzkoff.

MS. BENALLY: Give me just a moment, Mr. Chairman.

What I would like to do is reference the exhibits at the time that we move into his portion of the presentation.

CHMN. CHENAL: Okay, that's fine. So he doesn't have an exhibit that includes all of his slides, is that correct?

MS. BENALLY: He does -- pardon me. He does have APS-4, which is the witness presentation slides.

CHMN. CHENAL: But you have already reviewed that. That's his educational and professional experience, correct?

MEMBER HAMWAY: Keep going, Mr. Chairman, keep going through that. It is part of A-4. It is on page 57 on my iPad.

CHMN. CHENAL: Okay.

MS. BENALLY: Thank you, Member Hamway.

Mr. Spitzkoff's slide deck includes his introduction as well as his substantive testimony on the subject matter.

CHMN. CHENAL: All right. Thank you.

MS. BENALLY: He will also be referring to a number of exhibits, and I will point those out when we introduce or get to that portion of the testimony.

CHMN. CHENAL: Thank you.

BY MS. BENALLY:

Q. So Mr. Spitzkoff, let's start with an overview of the APS service territory. And you have a map that is listed -- pardon me -- on the screen, and it is noted as Figure 1A, which is marked as APS Exhibit 10. And it is the revised project vicinity map that you will be working from, I believe. That's the first slide that's there.

So let's go to the next slide. And this is the first map depicting the APS service territory. So if you would, just describe the map and provide information about APS's service territory.

A. (BY MR. SPITZKOFF) Certainly.

So Arizona Public Service has been providing electrical service to Arizona for more than 125 years. That predates statehood for Arizona. We currently

provide service in 11 of Arizona's 15 counties. And the map on the right screen shows the blue shaded area is what our defined service territory is. And you could see it. It spans most of Arizona.

This service territory encompasses approximately 35,000 square miles. We have more than 34,000 miles of transmission lines. We serve over 1.2 million customers. As a point of reference, because you will hear the megawatt values being discussed in the testimony, the APS system peak demand was set last year, July 20th, 2020, and it was 7,861 megawatts.

Q. Now let's move to your next slide. And describe the north valley transmission system. That's the region where the project changes exist.

And just to orient the Committee, on the map that's on the right that's labeled the north Phoenix transmission system, start out by pointing out where the TSMC facility is and then continue with the discussion about that area.

A. (BY MR. SPITZKOFF) Certainly. So first just to orient the overall map, Interstate 17 runs north and south where I am highlighting here. The Happy Valley corridor is running east and west, closer to the bottom portion of the map. You can see in the middle east and west, this is Loop 303. That's here. And Carefree

Highway, or State Route 74, is east and west a little bit further north on the map. So I will start by -- oh, and then the TSMC project area is in this, this area over here that I am highlighting basically in the center region of this map.

And what I will do is start by highlighting the major infrastructure that you can see here. And the Westwing substation in the bottom corner is the predominant feature. It is a major 500/230/69kV substation depending on how you arrived at the facility. If you took the 303 to get here, you would have seen that, that substation, along with the 500kV lines that come north out of that substation. And these lines all go all the way north to the Navajo substation that was -- that's up in Page, Arizona, all the way at the northern border of the state.

And I forgot to point out all of the lines on this map are blue in color, but they do represent different voltages. There is 500kV, 230kV, and 69kV lines representing the APS owned and operated lines in this area. Normally you may be used to seeing lines color coded by voltage. However, in deference to publicly shared maps, we are trying to not differentiate facilities by voltage for critical infrastructure security. I just want to point that out.

So again, the 500 corridor runs along the west side here to the north-south. There is 500 and 230 lines over here along with 69. And then running east and west at the bottom is a 230kV corridor, and then generally everything else, all of these other lines are going to be 69kV lines.

MEMBER DRAGO: Mr. Chairman.

CHMN. CHENAL: Yes. I don't know who is asking a question.

MEMBER DRAGO: I think -- this is Member Drago. I was wondering, is there anyone in the room that can trace with a computer cursor so that we can see it here in this?

Okay. I didn't see that. Perfect. Thank you.

MR. SPITZKOFF: Okay. So the Westwing, as I mentioned, the Westwing substation is here on the bottom, the Raceway 230 --

CHMN. CHENAL: Let me stop you. Yeah, let's follow along. When people are using the pointer, laser pointer in this room, let's give the AV crew, or whoever is handling that, a chance to catch up with you and then let's trace it on the computer so people appearing by video can follow along with what you are saying, because they don't see the pointers, obviously, the laser pointer.

MEMBER DRAGO: I see that cursor now. I didn't see it earlier. But that's fine. That works.

MR. SPITZKOFF: So, again, the west, the Raceway substation over here, the Morgan substation over here. And Morgan was part of Case 131. It would have been referred to as TS-9 at the time.

And then I will point out the 500/230kV line in Case 131 comes down this corridor, across the area that we are showing here, dips down below Loop 303, and then follows Interstate 17 until it reaches Happy Valley and comes across. And the Scatter Wash substation that you will hear about a little bit later is located in this location. It is not labeled, but it is in this location here.

So some of the features to point out, as you can see, most of the transmission lines, the higher voltage lines are on the outskirts of this area. The 69kV lines that do come into the area will generally follow the existing development. So you can see all of the development that's happened more in the southern area. And then east of I-17 you see the development, and that's where the 69kV lines are. And then 69/12kV substations would also be located over there.

Back up into the main area that we will focus on for most of this, this case, this is largely undeveloped

area right now, and hence you only have the one line that comes through here along with this -- this line going north-south is a double circuit 69kV line. But there is no substations in this area and just these two facilities.

CHMN. CHENAL: All right. Let me just make a note here. Obviously it is hard for the AV folks to keep up with their cursor with the laser pointer, so I am just going to ask the laser pointer, just slow down and go a little slower and allow the cursor to keep up with you, because that was a little out of synch, from what I could see.

MR. SPITZKOFF: Chairman, I promise to do my best.

CHMN. CHENAL: We all are. I just want to make sure the folks appearing by video can get the full impact of your testimony. And when you talk about this area and that area and that area, it is hard. I just think we need to slow it down with the laser cursor so the cursor can keep up with you. That's all.

MS. BENALLY: Thank you for providing an overview of the existing facilitates within the general vicinity of the project.

At this point I believe we are ready to transition to Mr. Harrison, if there aren't any other

questions from the Committee in this regard, regarding the system. After Mr. Harrison, then Mr. Spitzkoff will be back on the stand to continue his testimony.

CHMN. CHENAL: Mr. Derstine.

MR. DERSTINE: Mr. Chairman, did you want to proceed with Mr. Harrison now? I don't know the length. He has some prepared comments and I think it is just a five-minute or so video.

CHMN. CHENAL: Let's do that. Mr. Harris or Harrison? I am sorry.

MR. HARRISON: Son.

CHMN. CHENAL: Would you prefer an oath or affirmation, sir?

MR. HARRISON: Oath, please.

CHMN. CHENAL: Please raise your right hand.

(Brian Harrison was duly sworn.)

MR. DERSTINE: We are going to take one second while we reposition Mr. Harrison on the other side. He didn't like the setup, just push the mike to talk. So it will take him just a second to relocate.

(Brief pause.)

MR. DERSTINE: Mr. Chairman, we have not -- we don't have a question-and-answer format set up with Mr. Harrison. Mr. Harrison has some prepared comments. He will introduce himself to the Committee, and then has

a number of comments and information he wants to share as well, I think I indicated the video. So I am just going to turn it over to Mr. Harrison to present his testimony.

CHMN. CHENAL: That's fine.

(Whereupon Brian Harrison was duly sworn by the Chairman.)

CHMN. CHENAL: Mr. Harrison, please proceed. Thank you.

BRIAN HARRISON,

called as a witness on behalf of the Applicant, having been duly sworn by the Chairman to speak the truth and nothing but the truth, was examined and testified as follows:

DIRECT TESTIMONY

MR. HARRISON: Thank you. Thank you, Mr. Chairman. And thank you to the Committee for the opportunity to get to present to you today.

My name is Brian Harrison. I am the senior vice president of TSMC Arizona. And I am the senior leader for TSMC on-site for this project.

Once again, I would like to thank you for this

opportunity to talk a little bit about what we think is a very exciting and important project for our company. We believe that this is also an important project for City of Phoenix, for the State of Arizona, and for the entire nation.

This project is well aligned with the presidential supply chain executive order, as well as the domestic supply chain initiatives underway presently. And I am sure it will be appreciated by anyone who has been impacted by the recent semiconductor shortages when looking to purchase a new car or even find a rental car these days. It has been quite difficult. If you tried to buy any home electronics or any kind of modern equipment, you feel the impact of that shortage. And this new capacity coming on line will help alleviate all of those issues.

First what I thought I would like to do is introduce the company with a short video that we presented, a colleague of mine, Mr. Dave Keller presented as a 2020 technology symposium where we share with our customers and our industry partners a little bit about what is going on in the industry and what is going on at TSMC.

So this is about seven and a half minutes. It gives you just a little bit of insight about what we are

doing at TSMC. So I would like to play that video for you now.

(A video was played.)

MR. HARRISON: Thank you. I hope you appreciated it. Dave is our North American president. And his primary focus and responsibility is in sales and marketing. And the vast majority, nearly 70 percent, of our customers or clients are based here in the U.S., and I will talk a little bit more about how we serve those clients in a minute.

But you see that many of the exciting things that are going on in the industry are really being enabled by TSMC's technology and by our manufacturing capability. And you see a little bit of that in that presentation there from Dave. And it talks about how TSMC is at the center of all of that.

I would like to talk a little bit about the Arizona project. So TSMC Arizona Corporation, or internally we call it Fab 21, is located in north Phoenix. And as you saw from some of the previous discussion here today, the factory is being built to produce five nanometer technologies. And as Dave said, the smaller the minimum feature size the more transistors and the more features we can fit in a given area and the more powerful we can make our devices and

the more power efficient they can become, extending battery life and reducing power consumption.

This five nanometer technology is the most advanced technology available today in the marketplace, and it will be the first facility to produce this technology in the United States. The factory will produce projects that our clients will use to serve a wide range of markets, from high performance computing, high speed communications networks, and all types of mobile computing and communication devices.

Now, we purchased 1,140 acres in the Biscuit Flats area in north Phoenix. And as you saw in some of the previous presentations, our property is located near the intersection of the 303 loop and the I-17. We are about one mile west of the I-17, bounded on the north by Dove Valley and on the south by the Loop 303.

We are currently constructing our fab, or fabrication facility. We are constructing two buildings simultaneously, as well as several other support buildings. We refer to those as Phase 1 and Phase 2. We have publicly announced Phase 1, and we have said that it is planned to be in production at the beginning of 2024. We will have about 1800 to 1900 direct full-time TSMC employees. We expect to have at least that many support partners, suppliers, and the like as

well.

During our construction phase, which is ramping up rapidly, we expect to have about 7,000 construction employees working on the project.

And while I am not here to make any announcements that TSMC has not already publicly announced, it has been widely reported that there are plans for six phases or six factories on this site. Each of those factories is about 550,000 square feet of clean room or manufacturing space in our industry. And that is approximately twice the size of the largest advanced technology wafer fabrication facility in the U.S. today.

Now, before I go into more details about the factory, I would like to quickly describe a little bit about what we do at TSMC. And you may have heard Dave talking to our customers and enabling our customers. So let me talk about what we do or what our business model is.

TSMC is a pure play foundry. We do not design or manufacture any products of our own. We will never compete with our customers. What we do is we provide a manufacturing service for our customers. They can design their products on our technology platform. We manufacture them and then they ultimately sell those.

And as I said, we never compete with our customers.

We provide that technology platform and leadership that provides them with an advantage when they take their products to the marketplace when designed on our leading and advanced technology.

The other thing we provide besides that technology platform is trusted manufacturing capacity. Many of these companies depend heavily on TSMC for their production and for their companies, and so we must develop a high level of trust in our ability to deliver and produce for them. So it is to provide this technology platform and provide trust to manufacturing capacity.

So what do we make then? You might hear people say we make wafers. The base material is a silicon substrate. It is a round, flat piece of silicon. Today's leading edge technologies are produced on 300 millimeter, or approximately 12 inch, wafers. They really look much more like a personal sized pizza than a wafer.

Way back in the early days of the industry, the original wafers were one inch and they actually did look like a wafer at that time. But the name has stuck. And you may have seen some pictures of that in the video, but the 12-inch silicon wafer.

We have been through a very complex process. We create integrated circuits on those 12-inch wafers. So ultimately we are making integrated circuits that are designed by others using our technology and design platforms. They put together a collection of resistors, transistors, capacitors, other electrical circuit elements. And then we implement them in silicon, creating this integrated circuit, or IC.

You can think of each of these ICs as a tiny little computing machine. They are at the center of virtually every electronic device that we see in our lives today. They are typically called chips or ICs. I will try to use chips today, but I may interchangeably use integrated circuits or some other name for chips.

Now, as you heard Dave describe in the video, these integrated circuits or chips are the foundation for everything in our modern electronic world. They are everywhere and they are driving virtually every technology breakthrough that we see in our lives today. High performance ICs like the ones that will be manufactured here in Arizona in Fab 21 enable this high performance computing artificial intelligence, machine learning types of breakthroughs that have taken place and require vast amounts of computing, raw computing power. And that's enabled by the most advanced

generations of technology.

They are enabling breakthroughs in science, medicine, industry, and all forms of research. These chips also enable the high speed wireless networks that we see today with the advent of 5G on the order of 10 times faster than 4G that enables vast amounts of data to be collected and transmitted over those networks, driving all kind of innovations, as Dave alluded to, from agriculture to daily life, enabling things like autonomous driving vehicles and all manner of connected devices. Each subsequent generation of the semiconductor process delivers ICs or chips with more computing power and reduced energy consumption.

Now, the chip making manufacturing process is extremely complex and challenging. The manufacturing process is extremely sensitive to essentially anything. The air inside of our factories is controlled to a cleanliness level that is greater than 10,000 times more clean than an operating room. The water we use has to have the ionic -- the presence of ions contained -- controlled to an extraordinarily tight level. We can't have any particles. Even the vibration on the floor makes our -- is very sensitive and must be controlled very carefully for our technology.

And one of those issues that needs to be

controlled is the reason we are here today and was alluded to earlier. It turns out that our manufacturing processes or, more specifically, our equipment is extremely sensitive to electromagnetic environments surrounding the facility as well.

Now, each one of these process tools are extraordinarily complex machines in and of themselves. The minimum cost of one of these is on the order of $20 million, and they can range up to $200 million per item for the capital cost for each of these pieces of equipment. And they are very sensitive to everything, including that EMI.

And as I have said before, our process here in Arizona will be five nanometer. It is not unreasonable to expect, as the technology treadmill moves forward, that we will not eventually run more advanced technologies than five nanometer, but we certainly announced a five nanometer process. And when we go to the three nanometer, the next one, the three nanometer line width -- or the minimum feature size is 1/10 millionth of a millimeter. The diameter of a silicon atom is 0.23 nanometer. So there is about 12 atoms wide are the minimum features that we are going to be defining at the next generation of technology. Today's technology generates feature sizes that are 20

atoms wide and oftentimes many less layers of atoms thick.

So these are the features that we are defining on our wafers. And as I said, due to those small feature sizes and the sensitivity of that, the electrical emissions or noise in the environment can cause problems for our equipment.

So the electromagnetic interference causes a wide range of potential issues, but they really come out in a couple of ways. It can cause damage or interfere with the operation of these very expensive and very sensitive pieces of equipment. It can -- we test the devices after we are finished making them, and it leads to, often can lead to false good test results or false bad test results when we are testing each device. And ultimately the yield, or the performance, the number of good devices we get on a given wafer is probably the most critical operational metric that determines the profitability or the success of the factory.

So this EMI impact is well known, as was mentioned earlier, to everybody in the industry. And it is well known and ensured that there is even an industry-wide standard that has been defined by the Semi Standards Group, it is called Semi Standards E-33, that sets the allowable level, or sets the standard by which

the equipment manufacturers must make their equipment to be able to tolerate for; therefore, that's the allowable level that we can have in our environment. And that's, as was mentioned earlier, around the one milligauss level.

This means that the separation -- we require some separation from the existing high voltage lines, as was discussed earlier and the reason we are here. And to its, its proposed moved location outside of our property, as was pointed out, will be around a thousand feet, and that will go acceptable.

So the last thing I wanted to mention is the timing, why do this now and why it is important. The construction of the factory has already begun. And if you drive, the best view is driving south on I-17, where you are not blocked by the median. Or driving westbound on the 303 you can really kind of get a sense for the activity that's going on in our location.

But the construction has begun. We have fully excavated the basement levels for both of Phase 1 and Phase 2. We have begun to pour the foundations in Phase 1, put all of the rebar in. We are on the order of a third of the way done with that base foundation. We are starting to put columns up to form the base for the first layer, the next floor up, if you will. We

will ultimately have five floors plus a mezzanine level. And we are several weeks away from getting the first steel delivery to begin to start building the super structure and going vertically.

We have several hundred, many hundred construction folks already on the site. We have hired about 400 engineers, many of which have gone on their training assignment in Taiwan already. And they will be returning. And the construction is progressing such that we will begin to take delivery and install the equipment that we use to manufacture our products at the end of 2023, I am sorry, 2022, so that we can start the production checkout at the end of 2023 and be in production in 2024.

So that concludes my remarks. I want to thank you again for your time, for the opportunity to meet with you, tell you a little bit about the TSMC Arizona project. And I would be happy to try and answer your questions, if there are any, at this time.

CHMN. CHENAL: Mr. Harrison, thank you very much. I found that to be very informative and very helpful to the Committee to kind of put this project in perspective.

I normally let the Committee members ask questions first, but if I don't get my questions out, I

am going to forget them. And I have a couple, three actually.

EXAMINATION

BY CHMN. CHENAL:

Q. First is I always thought of chips as being the small chips in the computers, and you were talking about these 12-inch wafers. So what will be produced at the facility, the wafers or the chips or both? And, maybe, if you could, just explain that.

A. Yes, that's a great question. And I probably wasn't clear, so I appreciate that.

So the substrate that we make each individual square or rectangular integrated circuit that you see has a chip and the little black packages that you see when you open up the back of a TV, or any kind of electronic device you may have, that is the chip. That is designed by your customers, or our clients. And they design that. And the substrate that holds them while we make them is this wafer.

So we use the wafer and we place hundreds of them on each of those round 12-inch pizza like wafers. And then when we are finished with it, we probe and test, or the customer may probe and test each one of them to figure out which ones are functional and which

ones are not functional. And the ones that are functional, they all get cut, scribed up into the little squares, encapsulated into the black package that you recognize. And that's the chip, so...

Q. All right. Thank you for that.

And customers, again, not to ask for any proprietary information, but are they companies that we are familiar with, like an Intel that actually designs its chips and uses your facilities and others like that?

A. So we are very sensitive not to talk too broadly about our customers, but I can share with you what is publicly available, you know, in our earnings reports, where we disclose our top 10 customers and that type of thing. So I can talk about those. And I won't say whether those are targeted for our Arizona facility or not, but you can get an idea.

So the biggest customers are kind of a who's who of semiconductor or electronic chips or manufacturers that you would know, Apple, companies like AMD, Nvidia, Qualcomm, NXP, and Intel. It was reported in our recent earnings report that Intel, I believe, has made it into the top five, if not top three, customers.

So in that case, because of the performance of our technologies, these customers will design on our standardized platform. We like to say we democratize

that technology, that anyone who wants to design on that platform, we will manufacture it for them, and then they can package it up and sell it into the marketplace.

So that's kind of the list of who our customers are.

Q. All right. Great. Thank you. That helps explain, to dumb it down for me.

The last question I have, I am sure the Committee will have some, but security, this sounds like something that has to have a lot of security. So generally, if you could, just address that?

A. So I would break security into two pieces. And there is probably many facets of it. But one that the company is very, very sensitive to is the intellectual property security. And so we go to great lengths to protect our intellectual property and our privacy. So that is something that we take very, very seriously, and then, as well, things like the physical safety and the physical security. And I can just, you know, give you an example of that.

We chose not to have a parking garage. And quite often the parking garage in Taiwan is built under the office building because of the scarcity of space. And we chose not to do that for security reasons. And so our parking lot will be kind of a traditional parking

lot away from the building with barriers to vehicles approaching the factory or approaching the office building. So the physical security is the second aspect that we take very seriously.

CHMN. CHENAL: Thank you very much.

Does the Committee have any questions of Mr. Harrison?

Member Haenichen.

MEMBER HAENICHEN: Thank you, Mr. Chairman.

EXAMINATION

BY MEMBER HAENICHEN:

What methodology did you use -- well, I am sorry. Let me start over. This Committee's involvement with this project is not on the technology of your company, but it has to do with a high energy electrical, existing electrical transmission line that has to be moved in order to reduce the electromagnetic fields in your -- near the vicinity of your factory.

I would like to know what methodology you used to determine a distance that was satisfactory and how confident you are that it is going to work.

A. Yeah, I understand your question. And I am not the expert to know how we determined that. I do know that we use as the basis that semi standard that I

talked about. And we believe that this thousand feet that we have discussed and agreed upon with APS gives us sufficient margin. Beyond that I am not expert in the calculations or the parameters used to determine that.

Q. Okay. As a follow-up question to that, is the amount of distance required, which ultimately determines the limit of the electromagnetic field, different for different nanometers? In other words, does it get -- do you need more, or lower and lower EMF for smaller and smaller spacings?

A. I can't comment in detail on that. But what I can tell you is that that semi standard has been developed to be industry wide for today's technologies and with some eye -- obviously with an aye towards the future. And so long as the equipment continues to be developed to be able to tolerate or operate efficiently with that level of EMI presence, then the actual feature size of the device is probably second, secondary or inconsequential relative to the equipment's performance.

Q. And who determined this information, what entity?

A. It is an industry standard that set the standards for everything in the industry. It is always the semi standards, and I can't tell you what the acronym stands for, but it is the semiconductor industry

association that sets, sets standards.

Q. And obviously they are a business and they have to make money. Are they paid for, is their work paid for by companies like TSMC in part?

A. You know, I am not aware of how they are funded. An industry association is probably not an unreasonable assumption, but I don't know.

MEMBER GRINNELL: Mr. Chairman.

CHMN. CHENAL: Member Grinnell.

EXAMINATION

BY MEMBER GRINNELL:

Q. I want to go back to a previous question I asked.

Would this thousand foot corridor that requires for you -- would that prevent any industrial or residential development inside that thousand foot?

A. I am not aware what the standards are for industrial or commercial, residential development, so I couldn't say.

Q. Well, I guess my question is: Would the presence of other industries or homes inside that thousand foot radius, would that inhibit your operation in any way, shape, or form?

A. So the line is being moved to that thousand

foot, which is kind of beyond the edge of our property. So there would be no other commercial or residential presence on our property. So it is kind of a --

Q. Okay.

A. You know.

MEMBER GRINNELL: I am just trying to clarify that. But I am looking at the map. I wasn't quite sure where you were inside that, that particular thousand feet. But thank you.

MEMBER HAMWAY: Mr. Chairman.

CHMN. CHENAL: Member Hamway.

EXAMINATION

BY MEMBER HAMWAY:

Q. I just had a quick question. The six phases you are talking about, are those all going to be in the 1,140 acres that you have allocated?

A. So I don't mean to seem evasive, but I am not here today to announce we are making six phases. It has been widely reported in the press.

Q. Okay. I don't want to put you on the spot. I was just --

A. And that would be within our --

Q. Okay.

A. -- current layout.

Q. The other question, I am kind of fascinated by the fact that this technology is so sensitive to the EMI, you know, the EMF. I am surprised you can't create your building with some kind of material that would shield the equipment inside of it. And I just find a thousand feet so far away. We site these all the time. And often we put a line 200 feet, 100 feet from a person's home. And yet we have this technology and you are asking for a thousand feet.

So I guess I am -- A, why can't you shield your own building, and B, I am just kind of stunned because we see these, we see these charts all the time that a baby monitor is this and a garage opener is this and this and this and this. And yet -- I wish I had that chart in front of me. I would love to see which ones of those are at 33E.

Is that -- do you understand what I am asking?

A. I do. And I don't have the --

MEMBER HAMWAY: Anyway, yeah, I don't mean to put you on the spot. I am just stunned that you can't shield your own building and that it has to be a thousand feet. I am just surprised by that.

CHMN. CHENAL: So --

MEMBER DRAGO: Mr. Chairman.

CHMN. CHENAL: Yes, Member Drago.

MEMBER DRAGO: Yeah, hey. Thank you, Mr. Chairman.

EXAMINATION

BY MEMBER DRAGO:

Q. Mr. Harrison, it is good to see you again. My time at Intel I remember well.

I think my understanding when I was at Intel, the thousand foot setback also provides a buffer for off-site consequence analysis, or accidental release. So, in addition to having that thousand foot setback, it is my assumption in this discussion that it is going to help with the EMF impacts as well.

Mr. Harrison, is that sort of what I am understanding?

A. I am not familiar with either one of those acronyms that you use. So I am sorry, I can't comment on that.

MEMBER DRAGO: Okay. But that's not -- it is not unlike another large semiconductor company to have a thousand foot setback. I will just make that for the record, Mr. Chairman.

CHMN. CHENAL: Thank you.

FURTHER EXAMINATION

BY CHMN. CHENAL:

Q. Mr. Harrison, it has been reported that there will be six phases?

A. Yes, it has.

Q. You mentioned in your testimony that there are two phases that are under construction right now. And what is the size of each of those phases again?

A. So for the clean room or the actual manufacturing space that we use to manufacture, so that's the relevant figure for us because that is the productive piece that pays the bills, is what is productive, and that's 550,000 square feet in each of those two phases.

And we build the two buildings in pairs like that because it is just a lot more efficient way for us to manufacture. We dig substantial basements, and if we put one phase in and then we had to dig right next door for the second phase, I talked about vibration and disruption to the facility, it would be quite disruptive. So we dig them and build them in pairs. And our plan is to fit up the first phase, equip it with this capital equipment, ramp it to full production, and that's what we have announced.

Q. So thank you.

The last question I have, I promise. And then we will see if someone else as a question. Or maybe we have to take a break here pretty soon.

But I don't know how one measures the amount of wafers or chips that are produced in the United States, for example. But when Phases 1 and 2 are constructed and in full production, can you give the Committee just a general idea of how much of an increase that will add to the current production of chips and wafers in the United States, or wafers in the United States?

MR. HARRISON: That's a very interesting question, and I don't know. It would be in double digit percentages for sure. I just don't know.

CHMN. CHENAL: Okay, thank you. Thank you.

Member Gentles.

MEMBER GENTLES: Mr. Chairman.

EXAMINATION

BY MEMBER GENTLES:

Q. So just for context in terms of size of this project, so I think I read it is 1100 acres. Did I read that correctly?

A. 1,140 acres, yes.

Q. Okay. And so how many acres of that entire land are going to be actually developed?

A. I don't have the --
Q. Projected.
A. I don't have the answer to that. But it is, the rumored buildout would have it full, effectively full.
Q. And how does that compare with a campus like Intel in the east valley?
A. I probably would rather not do that comparison, but from other publicly available information, you could probably determine that it will be larger. But --
Q. Okay.
A. -- I don't -- care not to comment on that.
Q. Okay. That's good context.
A. Our competitors, yeah.
MEMBER GENTLES: Thank you.
CHMN. CHENAL: Any further questions from the Committee in person or appearing virtually?
(No response.)
CHMN. CHENAL: Mr. Harrison, thank you. That was very informative, we really appreciate you providing that testimony, give us the background and the context.
MR. HARRISON: Thank you. I appreciate your time and your consideration.
CHMN. CHENAL: With that, let's take a 15-minute break and then we will resume.
(A recess ensued from 3:21 p.m. to 3:48 p.m.)

CHMN. CHENAL: All right. Let's resume the afternoon portion of the hearing.

Any questions from the Committee or any procedural matters before we begin?

If not, Ms. Benally, I believe you have questions of your witnesses.

MS. BENALLY: I do.

CHMN. CHENAL: So please proceed.

MS. BENALLY: Thank you, Chairman Chenal.

And just to orient the Committee, we are still going to be working from the Exhibit APS-4, which is Mr. Spitzkoff's testimony slides, and we are at page 65. They appear both on your iPad as well as in your exhibit binders.

JASON SPITZKOFF, KEVIN DUNCAN, and MARK TURNER, called as witnesses on behalf of the applicant, having been previously duly sworn by the Chairman to speak the truth and nothing but the truth, were further examined and testified as follows:

DIRECT EXAMINATION CONTINUED

BY MS. BENALLY:

Q. And before we proceed, Mr. Spitzkoff, I would just like to remind you to try to move slowly as you are

working through the maps. I did talk with our AV folks and I think they found a way to coordinate the movement so that we are better able to demonstrate where for the Committee members who are appearing virtually. We will do our best.

So let's start with the first question, which is related to the case before the Committee. It involves two prior line siting cases, is that right?

A. (BY MR. SPITZKOFF) That's correct.

Q. Thank you.

And so to start with you, can you describe the exhibit that's marked as APS-1 in the exhibit binder.

A. (BY MR. SPITZKOFF) APS-1 is an application to amend CEC 120 and CEC 131. It is a request to amend the decisions, Decision No. 65997 for Case 120, and Decision No. 69343 for Case 131 authorizing transmission facilities. Transmission facility changes will allow APS to serve the development of TSMC while maintaining system reliability. And this, APS filed this on March 10th, 2021.

Q. Okay. Thank you.

You have a map up on the right screen. What is the source of that map?

A. (BY MR. SPITZKOFF) The diagram on the right shows the authorized route and corridors for CEC 131.

This was part of APS-1. It is Exhibit B of Decision No. 69343.

Q. And this Exhibit B is included in the Decision No. 69343, which was attached as an exhibit to APS-1, is that correct?

A. (BY MR. SPITZKOFF) Yes.

CHMN. CHENAL: Excuse me. This was issued when, approximately?

BY MS. BENALLY:

Q. Do you have the date, Mr. Spitzkoff? If not, I can get it very quickly.

A. (BY MR. SPITZKOFF) Not in front of me. But the map does say December 11th, 2006.

CHMN. CHENAL: Okay, all right. That's good enough. Yeah. Great.

MS. BENALLY: The CEC decision was issued by the Committee on February 20, 2007.

CHMN. CHENAL: All right. Thank you.

BY MS. BENALLY:

Q. So let's start with a description of what Case 120 authorized using the map.

A. (BY MR. SPITZKOFF) Certainly. So as was mentioned, the map on the right screen is from CEC 131. However, I will use it to start off talking about CEC 120.

What 120 -- or, sorry, what Case 120 authorized was a double circuit 230kV line and two substations. And I will use the laser pointer to point out the features.

Just off of the map to the west side would be the Westwing substation. And the double circuit line started there and would have come up a corridor to the Raceway substation. And then, from that point, it would have generally followed the corridor that you see on the map here coming around all the way to Pinnacle Peak.

What it also authorized were two substations. The one substation would have been Misty Willow, which I am highlighting here. Misty Willow later became Scatter Wash substation, and that was energized last summer.

It also authorized the Avery substation, which is located in this area. And the status of the Avery substation construction has just begun. Site preparations to the larger 64 acre parcel have begun, which includes grading and vegetation clearance. And the electrical infrastructure construction right now is going to be started very shortly and will be contained within the original 10-acre substation size that was discussed in CEC 120.

Q. Mr. Spitzkoff, for the benefit of the Committee members who are appearing virtually, would you please

point out the Avery substation area again. What I saw on the screen in front of me that our AV tech was pointing out was a slightly different location.

A. (BY MR. SPITZKOFF) Certainly. The Avery substation is in the corner, up in this location.

Q. Yes, thank you. That is the area.

Okay. So now let's have you describe what Case 131 authorized.

A. (BY MR. SPITZKOFF) Case 131 took the lines that were authorized in CEC 120 and basically transformed them. Again, Case 120 authorized two, or a double circuit 230kV. 131 changed those to a 500kV/230kV configuration, so basically one of the 230 lines and the 500kV line. And it doesn't -- it did not start at Westwing anymore. It started up at the TS-9 substation in the top left corner here.

And I will wait for the AV to point out TS-9 up here.

TS-9 has become the Morgan substation. And it was constructed following the corridor that you see on the map. The other parts of CEC 131, it authorized two substations. One is the Morgan, or TS-9, substation I just described. The other is the expansion of the Pinnacle Peak substation, which is in the eastern terminus of the project over here, of a 500kV yard, and

expansion of the existing 230kV yard was added to Pinnacle Peak.

Q. Okay. Thank you. Let's move to the next slide.

Okay. So in preparing for this hearing did the company prepare a map that shows the proposed changes?

A. (BY MR. SPITZKOFF) Yes.

Q. Okay. And that map is marked as APS Exhibit 26, is that correct?

A. (BY MR. SPITZKOFF) Yes.

Q. Okay. And I believe it is also Figure 3B, that's how the -- and requested amendments. That is the name of the exhibit. So using Figure 3B that is appearing on the right screen, describe to the Committee the proposed changes that are the subject of this hearing and how those changes impact each CEC, because there are two, 120 and 131. And start with CEC 120, please.

A. (BY MR. SPITZKOFF) Yes. So starting with CEC 120, we need to amend CEC 120 to account for the expanded size that the Avery substation will need to be. It was mentioned earlier, there was testimony and discussion about the size of Avery as being 10 acres. However, with the increased needs to serve the TSMC facility and the feeders that will come from Avery to go over to TSMC, it increases the number of 230kV

terminations, the size of the Avery substation will need to be significantly expanded. And there will be some graphical illustrations of the additional lines that are coming out of Avery in a few slides.

So the expansion will push the size of the Avery substation to approximately 64 acres. And on the map on the right screen, that's depicted in the green box. This is the 64-acre footprint. And the orange hashed section that this green box is within was the original Avery substation siting area that was authorized in CEC 120. So even though the size of Avery is expanded, it is still within the original siting area for Avery.

CHMN. CHENAL: Member Noland.

MEMBER NOLAND: Thank you.

Mr. Spitzkoff, I am trying to wrap my head around something. And I want to be sure I understand this. CEC 120, is that the one you said that was done in 2006, or was it 131?

MR. SPITZKOFF: Member Noland, CEC 131 was the one from 2006. CEC 120 would have been around 2002-ish time frame.

MEMBER NOLAND: So it has been 19 years, and you just energized Misty Willow and you haven't -- you just started the site prep for Avery, is that correct?

MR. SPITZKOFF: That is correct.

MEMBER NOLAND: What was the number of years that you were given on the CEC to complete construction?

MR. SPITZKOFF: Member Noland, I cannot remember the original number of years from 120. I do know, when 130 -- when we did Case 131, that term was likely extended as part of that case. And I cannot recall whether we since that time had gone in for a CEC term extension or not.

MEMBER NOLAND: I would like to know, please. This comes up, you know, in various cases about how long a period of time we are going to give someone for a CEC. So if you could, please answer those questions, maybe tomorrow, do a little research and let me know.

MR. SPITZKOFF: Certainly can. And just for added context, the 500/230 line itself was completed probably just a few years after the CEC 131 case. So the line all the way through was done, just the additions of the substations -- which are more predicated upon the development and buildout of the areas -- were not done until Scatter Wash more recently and Avery now.

MEMBER NOLAND: Okay. Mr. Chairman, I don't know if you know this, but does the CEC cover everything within it, being the transmission lines and the substation authorizations?

CHMN. CHENAL: Good question, Member Noland. I don't -- I mean I think the CEC has to be extended if it is going -- if later the substation is going to be energized or built.

MEMBER NOLAND: Thank you. Thank you. Please get back to me on that.

MR. SPITZKOFF: We will.

MEMBER NOLAND: Thank you.

BY MS. BENALLY:

Q. Do you have any other items you would like to cover on Case 120?

A. (BY MR. SPITZKOFF) That is it for Case 120.

Q. Okay. So then let's move to Case 131. And again, using the same map, if you would, describe the amendments needed.

A. (BY MR. SPITZKOFF) Yes. So the needed amendments for Case 1 -- I am sorry, CEC 131 is to relocate approximately three and a half miles of the existing Morgan to Pinnacle Peak line from its approved corridor to accommodate the TSMC facility.

On the map on the right, I will point out the relevant areas. The red line that cuts across in an east to west direction is the original line. And this section that's shown in the black and red dashed section between the two points, the two end points, are the part

of the line that we are seeking to move to a route, a new route that is shown in the black line.

Yes, there you go. So that's the reroute of the existing line.

Also with CEC 131, that original CEC included authorization for two substations. And we are seeking to authorize a third substation, which is the TS-22 substation. And the siting area for TS-22 is what you see in the pink box here. This is an area that is approximately 475 acres, of which TS-22 will be around 80 to 100 acres within that area.

Q. Mr. Spitzkoff, a few points to cover on CEC 131. What does APS intend for the existing 500/230kV lines once the new lines are relocated?

A. (BY MR. SPITZKOFF) The existing lines, so after if we receive authorization of the -- of this amendment, we will commence construction of the new line. The existing line will remain as the part that's in service. Once the new line is complete, then we will tie it in at the endpoints, the western endpoint in this location, the eastern endpoint in this location, and remove the tie-in for the existing section. This will establish a new end to end route.

Then at that point, the existing line will be demolished, the poles will be removed, the wires will be

removed, and you will only be left with the -- wrong button. You will be only left with the corridor that comes along the red line, transitions to the black route, and then comes back down back until it meets the original red line again. This black and red section would end up being removed.

Q. Okay. Thank you.

So earlier during the opening statement, Member Noland asked about the existing right-of-way that APS currently holds for where the existing line runs. Do you have a response to what APS would do with that existing right-of-way after the relocation if the amendments are approved?

A. (BY MR. SPITZKOFF) Yes. So the -- my assumption, and I am not our right-of-way guru for APS, but at this point it is my assumption that right-of-way will be relinquished, as it is currently with Arizona State Land Department, and we will be establishing a new right-of-way for the new route, and we would no longer have any use for the right-of-way where that existing line is.

Q. Thank you for that information.

So talking about Arizona State Land Department, let's discuss that a little bit more. Would you describe the discussions that APS has had with ASLD

relative to the TS-22 siting which was described this morning.

Member Noland indicated that originally APS had a rectangular shape siting area and then through development we got moved into an area. If you would show on the map with your pointer, Mr. Spitzkoff, the extension up to the triangular portion heading to the north and then a little bit coming all the way down, that section that corners there at the western end is what was added on. Can you explain to the Committee how APS got to adding that particular segment?

A. (BY MR. SPITZKOFF) Yes. So APS has been working closely with Arizona State Land Department since the outset of this project. And even in the time when TSMC was still looking at this land prior to making a commitment, we have been working with them.

We have also been working closely with the City of Phoenix. And initially the initial focus was on nailing down a location for the Avery substation, as that will be the site for the initial service to TSMC's phases, initial phases.

But then we move to discussing the TS-22 location. Typically APS likes to build a substation in a rectangular format. And, you know, so our original siting area is seen in the pink box, that you follow the

top edge up until, up until it meets the angled pink edge and then come down, come straight down to the bottom pink and then back. That was basically the original substation siting area that we were looking at.

Through our continued discussions with State Land Department, they ended up identifying a parcel that they wanted us to consider. And you can see that parcel in the blue outline that's within the pink. That's in the northern part of that arrow shaped area there. We are in the process of looking at that location.

Again, you know, it is not our preferred shape. So first thing we have to figure out, if we could fit all the equipment in the configuration, and then also do field engineering analyses to make sure from a civil engineering perspective that this area is constructible, you know, we are comfortable with the ground, the western boundary there.

The reason why it is sort of cut on an angle like that is that is the Deadman Wash. So, you know, there is concerns on making sure that the soil conditions are in good enough condition and we could handle any drainage concerns with that area.

And initially we didn't think it was a very viable location, but as we have continued to do our diligence on that site, we do think it is a good

potential, that we can utilize that site and, hence, we thought it is definitely worthy of amending what the shape of the pink box is to make sure we include the area. Because the northern area up here would have extended beyond the pink, and then the southwestern area would have extended beyond the pink area a little bit.

So we extended our substation siting area to make sure that was all included within that area, as State Land Department is the only landowner in this area and, you know, their preference on location of the substation, you know, is a major factor.

CHMN. CHENAL: Member Noland.

MEMBER NOLAND: Thank you.

Mr. Spitzkoff, does that give you the 80 acres that you need for that substation?

MR. SPITZKOFF: Yes, I believe that parcel is 80 acres. However, not all 80 acres are created the same, you know. A rectangular 80 acres and a triangular 80 acres are different. However, from an equipment layout perspective, we have determined that even with that shape and that size, we can fit all of the equipment that we will need into that parcel.

MEMBER NOLAND: Thank you.

CHMN. CHENAL: Mr. Spitzkoff, show again where the TSMC property is.

MR. SPITZKOFF: Certainly. So the TSMC property is basically, you know, all of this area above the 303. And my guess is it probably borders the hatched area and extends just above the existing line, so basically this, in this area.

CHMN. CHENAL: Thank you.

BY MS. BENALLY:

Q. And Mr. Spitzkoff, would you -- it appears on another map, but for illustration here, the study area, would you identify that, please, for the group, for the Committee.

A. (BY MR. SPITZKOFF) The study area, it would extend -- it extended above Carefree Highway. And if you come to the west, and it circles around this, the study area is beyond what I can really point out on this particular map.

Q. Okay. Thank you, Mr. Spitzkoff.

Essentially the TS-22 siting areas, even the expanded portions, are within the study area, is that correct?

A. (BY MR. SPITZKOFF) Yes. And if, you know, without changing the map, on the placemats that everyone has in front of them, Exhibit Figure 1A, you could see the study area there. And it has the pink TS-22 outline shown within there. And you can see the relation of

TS-22 to the study area, which is shown in the black dotted line.

Q. Thank you for the reference to the placemat to illustrate the study area.

Mr. Spitzkoff, how would you characterize the discussions with ASLD relative to the actual siting, actual location where the substation would be built? Is that still in discussion and no particular location specifically identified?

A. (BY MR. SPITZKOFF) Yes, that's still in discussion. As I have mentioned, they indicated this parcel to us as a site that they wanted us to explore. However, without us finalizing our engineering and survey studies, we can't lock that area in. And hence that's why, if that area does not prove to be constructible for whatever reason, we still have the rest of the pink area where we would move into and locate the substation.

Q. So is your testimony that the siting area, the 475 acres that you had noted, is what APS needs the flexibility to build an 80 acre substation within that site?

A. (BY MR. SPITZKOFF) That's correct. And that flexibility is needed because 80 acres is a large piece of land, and the State Land Department and City of

Phoenix, in working with us and each other, you know, want to maintain the flexibility on the optimal location to locate that substation that would have the least long-term impact on their development plans for this overall Biscuit Flats area.

Q. Okay. Thank you.

Let me take you just for a moment back to Case 120. You indicated that the green area on the map is about a 64, approximate 64 acre site where the Avery substation expansion will occur, is that correct?

A. (BY MR. SPITZKOFF) Yes.

Q. And it is within the previously authorized substation siting area that was authorized in Case 120?

A. (BY MR. SPITZKOFF) Correct.

Q. Okay. And the purpose of bringing this forward is certainly to request an amendment. But you are augmenting the evidence in this case for the expansion because the decision itself, there is not express language in CEC 120 authorizing 120, is that correct?

A. (BY MR. SPITZKOFF) That's correct.

Q. I am sorry, authorizing 10 acres for Avery substation?

A. (BY MR. SPITZKOFF) That's correct.

Q. Okay. Do you have anything further to cover on 131?

A. (BY MR. SPITZKOFF) No, that's it.

Q. Okay. All right. So now let's move to the next segment of your testimony. Let's -- you talk about TS-22 quite a bit up to this point. But let's explain to the Committee the need for TS-22 and how it fits into the future plans of the plant. We heard a little bit from Mr. Harrison earlier today; although, he expressed it as, you know, two fab units being currently planned and then potentially a full buildout at six, based on what is publicly available information.

But what's the impact of TS-22 to those plans as well as the surrounding area?

A. (BY MR. SPITZKOFF) Certainly. TS-22 is being planned to accommodate the future development, not only of the later phases of the TSMC project, but also any future development of other facilities within the larger Biscuit Flats area, which, if I will point out on the map on the right, the blue color represents all of -- is all State Land Department. And Mr. Turner will get into more of this in his testimony, but all of that area or large parts of that area have the potential to develop into various uses in the future. So TS-22 will be available as needed for the future phases of TSMC and/or future development beyond TSMC.

Q. Okay. Thank you.

So talking about TSMC, let's move on to your next slide. Let's talk a little bit about the semiconductor plant. Why don't you cover some key features for this project, and then we will move from there after that description.

A. (BY MR. SPITZKOFF) Certainly. So some of this is going to be a little redundant to Mr. Harrison's testimony. I am not sure if it was stated yet, but TSMC stands for Taiwan Semiconductor Manufacturing Company. Again, they are one of the world's largest semiconductor manufacturers. They plan to build a new state of the art semiconductor facility in this area. It will be a facility capable of producing five-nanometer chips.

And Mr. Harrison stated that it has publicly been stated the full site is capable of six fab units, and I use fab as a shortened version, six fabrication units or manufacturing facilities, as he described. There will also be air products plants that are on-site.

And I will reference the map on the right to talk about what I mean on-site. The area that's outlined in the black line and is the dotted, the dotted area, this is the TSMC facility. And the air products plants will be more to the western area of the development. And those air products plants are a supplier. It is an on-site supplier for TSMC and their

manufacturing process, supplying things like gas and air products that they use in their manufacturing.

The proposed site at total buildout, if you believe the rumors of six total fabs, and the air products plants to support them, will be approximately 1200 megawatts. And it was also stated the operations for Fab Unit 1 and 2 will be starting up. They are looking for power in April of 2022, ramping up to producing chips and sending them out by 2024.

Q. Okay. Thank you for that.

So with that information, would you please share with the Committee what the purpose is of the project changes.

A. (BY MR. SPITZKOFF) So the purpose is to relocate a section of the existing double circuit transmission line, to add one substation, and to expand the Avery substation size. All of this will supply adequate power to the semiconductor plant and allow APS to maintain reliability for the plant and the overall system.

Q. And what would you describe as the need for the project changes?

A. (BY MR. SPITZKOFF) So the need, as Mr. Harrison described, is -- there are a couple of drivers for that need. One, as Mr. Harrison described, is the

sensitivity of the manufacturing process to electromagnetic fields. So, you know, the one need is to relocate the line a thousand feet from the property.

In addition to relocating the line, in order to serve what would be approximately 1200 megawatts at full buildout, we need to, one, add the TS-22 substation to accommodate the 230 feeds that will be needed and expand the Avery substation also to accommodate the feeds that will be needed for the TSMC project.

And then, finally, in addition to that, the 500kV infrastructure that we will put in place at TS-22 will support all of that load coming off of the 230 system with a new 500kV source. And that will help maintain the reliability of the overall system.

CHMN. CHENAL: Member Haenichen.

MEMBER HAENICHEN: I am a little confused here. We are talking about a rumored six fab configuration, which may or may not happen. And we are talking about a transmission line that exists that's going to be -- have a bump put in it to accommodate the electromagnetic field problem. So are we saying that APS is believing the rumor and they are going to put in 1200 megawatts of capability, or is it already there?

MR. SPITZKOFF: So the capability of the lines are already there. We just have to connect them into

the substations. And we know the first two fabs are definitely under construction right now. And that service will come out of the Avery substation.

The future phases will come out of the TS-22 substation. And APS won't just initially construct TS-22 right off the bat. We will wait for a signal from TSMC, or, as I said earlier, if there is any other large development in this area, we will build TS-22 as needed for the development at that time.

However, the speed at which development in this area and even specifically what we have seen with the first fabs for TSMC, the turnaround on that would be impossible to, to meet if we don't site the location for the TS-22 site right now. And then also, once the initial two fabs are connected and served out of Avery, and just general growth in the overall system in Phoenix, moving the line to getting the outages for the line, to move it and relocate it will become increasingly difficult.

MEMBER HAENICHEN: Okay. Let's go back to the way the line is now and there are no semiconductor plants involved. Is 1200 megawatts flowing over that line right now?

MR. SPITZKOFF: What is actually flowing over that line is -- I don't know the exact answer. I would

have to look at our --

MEMBER HAENICHEN: Roughly.

MR. SPITZKOFF: But it was likely 1200 megawatts or more on the 500kV line. The 230 line probably does not have 1200 megawatts flowing on it right now. But the thermal rating of those lines, so they are both 3,000 amps. And at 230kV, that equates to, oh, testing my memory, I think that's approximately 1200 megawatts. And at 500kV would be approximately 2500 megawatts.

MEMBER HAENICHEN: So the 500kV existing line, and even if you move it, is capable of much more than is needed now. That was just built for possible future load or --

MR. SPITZKOFF: In a sense, yes. So APS's standard for 500kV lines over the last decade may be a little bit more, and even for 230kV lines, is to build them with conductors and termination equipment that's rated at 3,000 amps. And, you know, you know, that equates to the numbers I just --

MEMBER HAENICHEN: I understand, yeah.

MR. SPITZKOFF: -- discussed, and that's not always used immediately. Transmission additions are what they call, they come in chunks. You build it. You might not be using the full capability of the lines, you know, but they are there just inherently in the

standards.

MEMBER HAENICHEN: Okay. So right now as things stand, the 500kV line has plenty of extra capacity over what is being used at the moment. What about the 250 -- or 230?

MR. SPITZKOFF: Yes. So the 230 has capacity right now to handle the first two fabrication units, which is going to be approximately 380 megawatts. And then in order to handle if a third and fourth fabrication unit are constructed, that's when we need to cut in the 500kV source that will allow the 230 capability to expand even greater. Because the way we plan is, if all lines are in service, it would have no issue, the 230 line, but we plan the system so that we can withstand any single contingency. So we can lose any one element and still serve all our load.

MEMBER HAENICHEN: Okay. So the excess capacities we have just uncovered is for possible contingencies then?

MR. SPITZKOFF: Yes. That's how transmission, when you build transmission and network configuration, you know, that's what you are looking for.

MEMBER HAENICHEN: I understand. But now let's add TSMC to this. Now you have lost that cushion for the contingencies.

MR. SPITZKOFF: That's if we did not build the 500kV source at TS-22. Plugging that source in at TS-22 builds that contingency back in. And we ran all of these studies with the load buildout at TSMC. That's part of what we have to do to ensure we can reliably serve not only this load but also continue to reliably serve all of the other loads.

MEMBER HAENICHEN: Okay. So talking about the 500 with all its tremendous capacity, would that involve an addition to the moved line, which really is only just changing geometry? Will it be other 230 lines that feed off of that 500 extra capacity?

MR. SPITZKOFF: So if I can point out on the map what is depicted here, if we stick with the existing line in red --

MEMBER HAENICHEN: Right.

MR. SPITZKOFF: -- that's actually two circuits there right now, one 500, one 230.

MEMBER HAENICHEN: I understand.

MR. SPITZKOFF: When we build the Avery substation in the green, that will only connect to the 230 line.

MEMBER HAENICHEN: Right.

MR. SPITZKOFF: Then when we build TS-22 and it cuts in, it cuts into the line in the new route, we will

cut both the 230 into that and the 500 into that.

So then the 500kV source will be supporting the 230, which this goes all the way back to, one of our earlier maps, it goes to the Raceway and Morgan substations, and Morgan is another 500kV source, and then in the other direction goes to the Pinnacle Peak substation, which is another source for the valley.

So the 500kV will support the 230, which pushes back onto all of those other sources also and bolsters the reliability of the system.

MEMBER HAENICHEN: Okay. But in addition to the 230 that exists there now -- and presumably it is serving some loads, right?

MR. SPITZKOFF: So --

MEMBER HAENICHEN: Right now today, before TSMC.

MR. SPITZKOFF: Right. Its initial use was, when it was going from Raceway or Morgan to Pinnacle Peak, was connecting those two sources. And it wasn't directly serving a load substation. We recently built Scatter Wash and energized Scatter Wash. Once that was done this past summer, or summer of 2020, now that 230 line is serving the load that's fed out of Scatter Wash.

MEMBER HAENICHEN: Okay. But on the mythical six fab situation, would that moved-upward 230 line have enough capacity to serve six fabs.

MR. SPITZKOFF: Yes, it will.

MEMBER HAENICHEN: Thank you.

CHMN. CHENAL: Follow-up question, Mr. Spitzkoff. I think I understand what you have been testifying to. And with the TS-22 -- is that the name of the substation?

MR. SPITZKOFF: Yes.

CHMN. CHENAL: You talk about another 500kV line interconnecting with that substation to provide this excess capacity power that Member Haenichen was asking about. What is the source, what will be the source of that 500kV line?

MEMBER HAENICHEN: The generation you are talking about?

CHMN. CHENAL: Well, the generation, yes, the generation I am talking about.

MR. SPITZKOFF: Sure. The line itself is the line that's already there. So I just want to make sure; we are not going to build another 500kV line. It will cut into the line that's there. And that line spans right now two of the major sources of power for the greater Phoenix valley, Pinnacle Peak substation on the east and the Morgan and -- well, the Morgan substation on the west.

Morgan substation is a 500kV substation that's,

itself, connected to what we call the Navajo South 500kV lines. And that's 500kV lines that come down from northern Arizona. The Navajo power plant, when it was operational, was connected into there. But there is a number of other 500kV substations that are between Navajo and by the time it gets to Morgan and then it continues on to Westwing. Westwing is another hub where it has 500kV lines that come from the Palo Verde area also. So that 500kV system is fed by a number of different generation hubs, you know, up in the north and then also the Palo Verde hub.

On the other side, Pinnacle Peak has a number of 230 lines and 345 lines connected there. The 345kV lines come from northern Arizona also. The APS lines come from the Four Corners area down to Cholla and then into Pinnacle Peak. So there is a coal plant at Four Corners, there is a coal plant at Cholla, along with other imports that are coming into Arizona that also come down that line. And then Western Area Power Administration has 345 lines that come down from Glen Canyon also.

So this 500kV line, that's, I guess that was a long explanation to say it is in between in connecting two strong sources. So connecting a 500kV substation into this line is connecting into a strong system.

CHMN. CHENAL: So maybe it is the vocabulary. But, so the 500kV line will now connect into TS-22. And when you said that that will be -- there will be another 500kV source for that substation, it is not a separate line; it is that there will be, what, the ability to connect with other 500kV lines that could provide the power to that substation from different sources?

MR. SPITZKOFF: Okay. So what will happen, what happens is we will cut the 500kV line, bring it into a switchyard, or a 500kV bus within the substation. Then there will be transformers that transform from the 500kV bus down to the 230kV bus that's at TS-22. So the power, the support of the 500kV line and the greater 500kV system is now supporting the 230kV system in this area --

CHMN. CHENAL: Right.

MR. SPITZKOFF: -- in addition.

CHMN. CHENAL: But I am confused, I guess. And I am sorry, but I just -- you said something about the TS-22 will be sourced, you used the word sourced, and you used the word 500kV. And I am trying to understand what you meant by that. That wasn't the complete sentence, but those were the words I remember hearing. Maybe you don't. Maybe I misunderstood.

MR. SPITZKOFF: I am sure I used those two

words.

BY MS. BENALLY:

Q. Mr. Spitzkoff, it might be helpful to use Slide 58. That is the APS service territory. And earlier in your testimony you covered the transmission system, and that might help illustrate the connection of the transmission lines to the affected line that we are discussing.

If that isn't the appropriate map, the other map that you could consider using to answer some of the questions is Slide 60, which is the northern Phoenix transmission system.

I believe, and I don't mean to speak for Chairman Chenal, but I think he is asking about the generation source, if you will, for the TS-22 substation that will then, that will connect to the 500kV transmission line.

MEMBER HAENICHEN: Can I jump in here?

CHMN. CHENAL: Yes, Member Haenichen. I have some follow-up questions.

MEMBER HAENICHEN: Okay. Let's talk generation now. The Navajo plant is shut down, is that right, completely shut down?

MR. SPITZKOFF: That's correct.

MEMBER HAENICHEN: And what was the capacity of

that at full output?

MR. SPITZKOFF: It was about 2,200 megawatts.

MEMBER HAENICHEN: Okay. Where is that coming from now?

MR. SPITZKOFF: It is coming from a number of sources. So with the transmission system being interconnected, the power could be coming from southern Nevada, it could be coming from California, it could be coming from New Mexico. It comes from a number of different places.

MEMBER HAENICHEN: Well, I am sure the participants in this -- I am talking generation now -- didn't just say, oh, we are going to take -- shut down the 2,000 megawatt plant and not worry about it. Is there that much excess capacity above and beyond safety margins and all that?

MR. SPITZKOFF: Okay.

MEMBER HAENICHEN: That's what I am worried about. I have also worried about this for some time unrelated to this case.

MR. SPITZKOFF: Certainly. So if I may rephrase your question, and let me know if it is correct. Not where is the generation on the line specifically coming from, but where is the generation that the participants use to get from that plant, where are they getting it

from?

MEMBER HAENICHEN: Right.

MR. SPITZKOFF: Okay. There were a number of participants in that plant, and I certainly can't speak for all of them. When it comes to resource planning I can barely speak for APS. But, you know, the announcement of the retirement of that plant, you know, happened a number of years ahead of its actual retirement. So in that time replacement sources were found through power purchase agreements with various entities; added a number of different renewable project also in that time frame.

So while I can't tell you exactly X and Y where it came from, just that in the interim between the announcement of the retirement and it actually going away, all of the entities would have been required to, you know, figure out, you know, where to get replacement power for that.

MEMBER HAENICHEN: Okay. But would it be fair to say then that at that time, just they made that decision to shut down Navajo, that there was 2,000 megawatts of excess energy generation available in the system?

MR. SPITZKOFF: Yes, because each utility is required to carry reserve margins.

MEMBER HAENICHEN: I know that.

MR. SPITZKOFF: And, you know, collectively all of those reserve margins would definitely be over 2,000 megawatts.

MEMBER HAENICHEN: Yeah, but they were there for a reason, not for shutting down a plant. They were for contingencies that happen.

MR. SPITZKOFF: Yes.

MEMBER HAENICHEN: So is it not safe for those contingencies?

MR. SPITZKOFF: No, Member Haenichen. I don't mean to allude that, just to point, more directly answer your question of, you know, was there 2200 megawatts in the system. And the answer, you know, is yes. And then again, the generation in the system was added to. And it is continuously added to over time.

It is also recently we have seen some generation be decommissioned and retired. And we will continue to see that as more coal plants are retired. But that generation is made up for in new construction, and then also plants that were already constructed and, frankly, not used a whole lot, you know, that are out there for merchant purchases.

And as a point of reference, you know, the APS interconnection queue, that is the generation

interconnection queue, right now, last time I looked, had over 50 gigawatts of generation requesting to be interconnected just to the APS controlled system. So those resources are not yet on line, but there is continuous -- I point that out because there is continuous plans of adding generation and building new generation in not only APS's system, but all of the systems in the west for sure.

MEMBER HAENICHEN: Okay. But now I am talking about an administrative issue. When you as an owner of a 2,000 megawatt generating facility, that's operational at the moment and still has life left in it, you plan to shut it down for whatever reason, is there some procedure that you have to see, that the system has to see that it can support that activity?

MR. SPITZKOFF: Absolutely. There is a reliability analysis that's done. There is also standards from procurement requirements that have to be met. And also, you know, because there are multiple owners, for instance, the APS share is not 2,000 megawatts.

MEMBER HAENICHEN: No, I understand that.

MR. SPITZKOFF: It was on the order of 500 megawatts or so, which is a lot different than trying to find replacement power for 2200 megawatts. And it would

be similar for all of the other participants. It is a smaller share of that overall value.

MEMBER HAENICHEN: The only thing that strikes me is that, not this project, but the load that mythical six fabs are going to show is a huge load that's not there now.

MR. SPITZKOFF: Correct.

MEMBER HAENICHEN: So do you think there is generation, additional generation being planned to cover that?

MR. SPITZKOFF: Yes, there are.

MEMBER HAENICHEN: I know there are a lot of large solar facilities, which have their own problems of storage and so on.

MR. SPITZKOFF: We have a number of solar projects in our interconnection queue. We have a number of battery energy storage projects. We even have a good chunk of wind projects up in northern Arizona. You know, that make up, as I said, it was approximately 50 gigawatts of requests.

MEMBER HAENICHEN: Yes, that's huge. Thank you.

CHMN. CHENAL: One follow-up question, Mr. Spitzkoff. And maybe this is a better way to ask the question than I was trying to before, now that I understand there is not going to be a separate 500kV

line interconnecting to TS-22. So what is the purpose then of TS-22, since this 500kV line is already there? It is simply to disburse power to this project and the load in the immediate area, is that correct?

MR. SPITZKOFF: Yes and no. So the 500kV line that's there, if I will use the map on the right here, and the Morgan substation is sort of right in the middle here that I am pointing to -- I will wait for the cursor; it is a lot bigger pointer -- that's where the 500kV line starts and it comes across to the Pinnacle Peak substation. And right now it just goes A to B.

TS-22 will put a point in the middle of that. So it will go A to a new B, to C. And so that new substation will then cut into the 500kV line. So we will have access to the power flowing through that line. And we will have transformers that transform it down to the 230kV part of the substation. And the power from the 500kV lines will flow down into the 230 system. And that provides the support for the 230 system, where previously, without TS-22, your support for the 230 system is only at the ends, the Pinnacle Peak end and the Morgan end.

So we are basically putting a support, an additional support of that 230 system in the middle of that line that will support the load that's on that 230

line.

CHMN. CHENAL: And Avery is the, is a substation that will provide the power to Phases 1 and 2. But if Phases 3, 4, 5, and 6 are built and come into operation, that power will come from TS-22, is that correct?

MR. SPITZKOFF: That's correct. And that's the next part of my testimony, to show you sort of what that buildout looks like.

MS. BENALLY: Mr. Chairman.

CHMN. CHENAL: Yes.

MS. BENALLY: I am sorry I interrupted. Did you have a question?

CHMN. CHENAL: No. I am waiting. I am waiting with anticipation for the rest of Mr. Spitzkoff's testimony.

MS. BENALLY: He won't disappoint.

We do have a Decision No. 73824 which is responsive to Committee Member Noland's question about the CEC term. So with the Chair's permission, we would like to make them available and also provide one to our witness, Mr. Spitzkoff, and he can respond to the question.

CHMN. CHENAL: Certainly. And just so you know, I have a hard time correlating decision numbers with CECs. So if you could tell us what CEC this relates to,

that would be helpful.

MS. BENALLY: Yes, I will do that. Thank you. So the decision that's before you amended the original Case 120 decision.

CHMN. CHENAL: Okay.

MS. BENALLY: As I mentioned earlier, Case 120, I believe, was certificated -- I can tell you, I will give you the exact date here -- was authorized on June 18th of 2003. Since that time, there were some changes that resulted that required APS to file an application to amend. And it is that opinion and order that's before you which is amending Case 120.

And to be responsive to Committee Member Noland's question, I would like to direct Mr. Spitzkoff to page 7, under Conclusions of Law, paragraph number 4, and respond to the question for the term authorized to construct the Avery substation and the Scatter Wash substation, please.

MR. SPITZKOFF: I am sorry. Do you want me to read that?

BY MS. BENALLY:

Q. Yes. I would like you to indicate the date as to when the Avery and Scatter Wash was to be constructed by.

A. (BY MR. SPITZKOFF) It says June 18, 2023.

Q. Okay. Thank you.

CHMN. CHENAL: That was exciting, Mr. Spitzkoff, not as exciting as if it had said June 18th, 2019.

Member Noland.

MEMBER NOLAND: So basically we are talking 20 years, is that right?

MR. SPITZKOFF: It appears that way from the original decision.

MEMBER NOLAND: Okay.

CHMN. CHENAL: I guess it is going to come up. And I am glad you asked the question, Member Noland, because I wasn't really thinking of the length of time it had not been built. But I guess it begs the question of what kind of a length of time are we going to consider for our decisions in this case.

MEMBER NOLAND: And in other cases, too. I mean it -- so many times we are going, oh, five years seems like a long time, or 10 years. But then you have something like this that they just energized, and after 18 years. And the other one they are just getting started on.

CHMN. CHENAL: And as a practical matter, in this case we know that Phases 1 and 2 will be powered by Avery, but it is Phases 3, 4, 5, and 6 is what is going to probably, you know --

MEMBER HAENICHEN: Delay.

CHMN. CHENAL: -- initiate the need for TS-22. So, you know, how -- it is kind of like the chicken and the egg. If you are not going to build TS-22 until those 4 -- 3, 4, 5, and 6 come on line, then how long do we have to wait for that to happen? So how long does this decision have to be, do we have to extend this for? That's -- we are obviously going to have to talk about or hear some testimony about, or guess.

MEMBER NOLAND: Mr. Chairman, let me just say thank you for supplying that. I really appreciate it. That's something we usually don't find out or think about after we have done a CEC, because it all ends up at the Corporation Commission, not with us. So thank you.

CHMN. CHENAL: Well, it was your question that prompted me to think about it.

Mr. Derstine.

MR. DERSTINE: Yeah. Thank you, Mr. Chairman and Member Noland.

I just wanted to note for the record, this Committee always, and the standard term of your CECs now based on a directive from the Corporation Commission is 10 years, and there is always the standard provision that, if we are seeking to extend that initial 10-year

term, that we have to go in, file an application, as was done with regard to CEC 120, and make out a case and establish good cause for extending the term of the CEC beyond the initial term. That's what was done here.

And so, you know, certainly this Committee is always mindful and careful about giving open-ended carte blanche to building facilities out over time. We have a termination date. But I think it is appropriate and your CECs always do carry the right for the applicant to go in and establish cause to extend the term.

CHMN. CHENAL: And not to quibble with the word, Mr. Derstine, directive, I sense more it was a recommendation. Because yes, one of the reasons was, as explained to me, was, if you could make it 10 years as, a norm, then that would probably reduce the workload on the Staff at the ACC and the Commission itself for people coming in to get an extension if we granted it for five years or six or seven years. But I certainly believe that if there was a good reason to issue a CEC or decision for more than 10 years that that's certainly within our jurisdiction to do that.

MR. DERSTINE: I agree with that.

CHMN. CHENAL: Yeah.

BY MS. BENALLY:

Q. Okay. So now, Mr. Spitzkoff, I think we are at

the point where you are going to talk in particularity really some questions that were raised earlier by Chairman and other Committee members. And it is the buildout. And I am at Slide 81 -- Slide 79, I beg your pardon. Let's have you walk through what the project buildout is for Biscuit Flats.

A. (BY MR. SPITZKOFF) Certainly. And what I wanted to do was to virtually walk the Committee through how the project and the electrical service will be built out. And I will start with orienting what we are seeing on the map on the right.

This is a zoomed in area of the TSMC property, which is shown in the green, the green outline. And actually I needed to caveat this is the background of -- this is a Google Earth snapshot that I took and just me drawing boxes and lines on here. It is not meant to represent specific geographic locations, more -- as you will see, I have some simulations or annotations that I will bring in. It is more to show the buildout electrically of what service is going to come from where, so no geographic intent necessarily meant with the lines that you see on here.

So again, the green area is the TSMC property boundary. What -- wrong button. The Avery substation you can see on the right side in the blue box, the TS-22

substation up in the pink box. On this I have rerouted the 500/230 line. You can see the red and blue, blue lines that come through here. The original routing is shown by the pink highlight. Just I left the pink on for reference to where the existing route is. What you see north and south through the middle in the orange line, when it turns to the pink, this is the route of the existing double circuit 69kV line that follows 51st Avenue alignment. Again, I have rerouted that around the property, as that is also lines that we were going to reroute around the property.

Q. Mr. Spitzkoff, I apologize for interrupting you, but if you would coordinate with your AV tech as you are moving around with your cursor, I think that would be more helpful to the virtual members.

A. (BY MR. SPITZKOFF) Yes.

MEMBER HAENICHEN: She is saying go slower.

MR. SPITZKOFF: Yeah, I think that's what she is saying.

So again, the orange, the orange lines are double circuit 230kV lines.

Now, what I am going to do is bring in the first phases of the TSMC project. And they are represented by the green blocks that I just brought in. The bottom green block here is Fab Unit No. 1 and the one above

that represents Fab Unit No. 2. The green circle is an architectural feature of the site that the fab units will be built around. This could be office buildings. It could just be a landscape feature. But I put it here, as you will see, just to orient the buildout of the six fabs.

MEMBER NOLAND: Mr. Chairman.

CHMN. CHENAL: Member Noland.

MEMBER NOLAND: Mr. Spitzkoff, I don't know if you know this. I am just curious. Have they decided where the access to this property is going to be, and is it off the 303, is it off the Carefree, is it off the 17? Because then they would have to go through some right-of-way that is owned by APS, is that correct?

MR. SPITZKOFF: It is -- so I don't think we own the right-of-way. It is all State Land Department and we just have easements on this. But, you know, we have been working with the City of Phoenix, I think is the one, ultimately the one that decides where the roads go. There will be -- this may be preempting some further discussions, but they will be creating access off the 303.

And I should caveat this. This is information I have heard in meetings with City of Phoenix and understanding, you know, what they have discussed as the

buildout, so not trying to testify to this as necessarily fact.

MEMBER NOLAND: That would make sense. It is just, in looking at the layout of the existing right-of-way, be it leased, given, purchased, and you are going to remove those then.

MR. SPITZKOFF: Yes.

MEMBER NOLAND: And that would give there easy access without having to go through lines, correct?

MR. SPITZKOFF: Yes. Again, they are going to have access off the 303. I do believe the buildout of the Dove Valley alignment, which is basically the top of the parcel here, is going to occur across the screen, east-west across here, and will be accessed off of Dove Valley.

And I also believe that the 51st Avenue alignment, which goes up and down basically following the pink corridor and the orange lines, I do believe they are going to develop 51st Avenue as well, and probably all the way up to Carefree Highway for that access.

MEMBER NOLAND: Thank you.

MR. SPITZKOFF: Okay. So --

MEMBER DRAGO: Mr. Chairman, this is Member Drago.

CHMN. CHENAL: Sure.

MEMBER DRAGO: Mr. Spitzkoff, how many acres is that mass of land there that they plan to do full buildout on? Do you know how many acres that is?

MR. SPITZKOFF: That is the 1,140 acres that Mr. Harrison referenced.

MEMBER DRAGO: Okay. And they expect six fabs, up to six?

MR. SPITZKOFF: Yes.

MEMBER DRAGO: Okay. Thank you.

MR. SPITZKOFF: Okay. So what I am going to bring in now are the 230kV lines that will come from the Avery substation to the first two fabrication units. And as you can see with the blue, the blue lines that come from Avery and to each of the green boxes, there are two 230 lines that come to each fabrication unit. And that's for reliability and redundancy for their manufacturing process.

And those will be underground 230kV. They will exit the Avery substation underground, go all the way to the electrical buildings that are basically behind the fabrication plants that Mr. Harrison described, and come up into their switchgear on-site. So those will be underground 230kV.

CHMN. CHENAL: Do you know the approximate

distance?

MR. SPITZKOFF: I -- we have that. I don't have that with me. I can get that info for you.

MEMBER HAMWAY: Mr. Chairman, I had a quick question. Why are you undergrounding them? What is the reason?

MR. SPITZKOFF: TSMC requested these be underground for a couple of reasons. One, this is going to be going through busy portions of their site area. So from a reliability perspective with trucks and other activity going around, from what I understand, they had a site in another part of the world where they had some activity knock down lines to one of their fabrication units. And anytime they are out of service, it costs an extraordinary amount of money for them. So from their perspective, it pays to underground these lines. So it is out of the way of all of their site activity. And also it, underground lines, it is easier to control the design and electromagnetic property of that service coming in.

CHMN. CHENAL: Well, will they be paying for the undergrounding?

MR. SPITZKOFF: Yes.

MEMBER HAMWAY: Excuse me. Are they also paying for the line removal?

MR. SPITZKOFF: Yes, they are.

MEMBER HAMWAY: Okay, thank you.

The E33 standard that requires the thousand mile distance, or, excuse me, thousand foot distance, is from 1994. And, to the best of my ability, it has not been updated since then. And I was just curious. Do you think that in 27 years your industry has done work to mitigate EMF fields?

And so I guess my question is -- I have a hard time working off of a 27-year-old standard that's forcing a thousand foot relocation of a line. Since they are paying for it, I have less of a problem with it. If they put that in the rate base, I would have a real problem with it, because I just think that it is probably time to update that standard.

Nothing is going to happen between now and when we do this to do that, but if, if I was APS or if I was T -- what is it -- TSMC, I would be questioning that standard. It is 27 years old, and I think that your industry has done work to mitigate EMF fields. So I don't know that a thousand feet is still a requirement. You know, I am not an expert. I am just throwing that out there.

BY MS. BENALLY:

Q. Mr. Spitzkoff, before you respond, it might be

helpful to confirm the standard that Mr. Harrison was referring to relative to the standard that Committee Member Hamway is.

MEMBER HAMWAY: I would be glad to send you the link that I found.

MS. BENALLY: I am certainly not doubting Member Hamway's information, but I would just like to have the witness have that before him.

MEMBER HAMWAY: Please. I would like to know if it has been updated since 1994.

MR. SPITZKOFF: Certainly we can try to do that. And that standard is part of the semiconductor industry, not the --

MEMBER HAMWAY: Right. No, I know. It is outside your realm.

MR. SPITZKOFF: Yeah. Okay. So the next slide, what I will do is bring in the first air products plant, which is shown by the new green box I brought in that's more toward the western part of the development area. And again, as I mentioned earlier, that's an on-site supplier that will supply different gas and chemical products used in the manufacturing process. And this will also have -- there we go -- two underground 230kV lines as the source out of Avery, as you are seeing with the blue lines here.

So these are what will make up the initial service for the TSMC project. And it will come out of the Avery substation, six new underground 230kV lines, again, which will support approximately 200 -- 380 megawatts of load.

And what I will do next before moving to TS-22, just provide a little bit more detail on Avery. Again, it was certificated in CEC 120. We have to expand it to the 64 acres to add all of the additional 230 terminations that you just saw that will be supplying the TSMC project.

And on the right screen is a simplified one line of the Avery substation. What you are looking at is what is called a breaker and a half configuration. So for every two terminations, you see one line here, one line here, there is three breakers. So it is one and a half breakers for every termination. It is a very reliable and robust substation design.

And what is depicted here is all of the lines coming out on the left side of that picture are showing the feeds over to the TSMC project. For instance, this is -- I think that says TSMC 1 Tie No. 1, and so that would be the first 230 line to their Fab Unit No. 1. What is shown here and labeled as Lindie Tie No. I think that says, 2, Lindie is the name of the supplier for the

gas, the air products plant. So that's what that is.

So you have one, two, three, four, five, six lines that represent what I was depicting on the previous diagram on the other side. The right side of the substation drawing is the -- I am sorry. I have got to find -- okay. Here. If you can go to the third one, this is the 230 line that would be going -- that we are cutting into, and this is the line going to the west. And then this line here would be the one that would be going back towards the east. So this is what is providing the 230 source for the lines that are feeding TSMC.

The rest of these are for future buildout. So if you move the cursor up to the top two, for instance, you see it is labeled 230/69 Transformer No. 1 and Transformer No. 2, that's to accommodate the future 69 buildout at Avery. And then we also, the ultimate design has a 12kV bus that's designed into that.

So ultimately Avery will support Phases 1 -- or Phase 1 and Phase 2 of TSMC's project. But there is also provisions for future load service for the general Biscuit Flats area beyond just the TSMC project. So as the area continues to develop, be it other industrial, commercial, or residential uses, Avery substation will also be used to serve those additional loads also.

Okay.

MS. BENALLY: All right. Thank you, Mr. Spitzkoff.

Mr. Chairman, Mr. Spitzkoff has just a few more elements in his testimony. My understanding is that the AV committee, or AV team, pardon me, needs about 15 minutes or so -- correct me if I'm wrong -- to set up for the public comment. I am happy to continue going forward and having him continue the one or two elements he still has left in his testimony or pause at this point.

CHMN. CHENAL: Well, if the AV team needs 15 minutes and the public meeting starts in 15, in 16 minutes, maybe this is a good time to take a break or take our -- conclude for the day. And we will look forward to starting up with Mr. Spitzkoff in the morning.

I believe I heard you say, Ms. Benally, that Mr. Spitzkoff is going to talk about the other substation. Is that -- when you say he has got a couple more elements to talk about, that's what you are referring to?

MS. BENALLY: That's correct. He is going to talk about TS-22, and then I just have a closing slide on the semiconductor plant benefits.

CHMN. CHENAL: This is a good place to stop then. So we can start up tomorrow with TS-22 and anything else that he has to testify about.

So let's stop for this evening, adjourn. We have our public comment session at 5:30, and then we will resume tomorrow morning at 9:00 a.m. So thank you, everyone.

(The hearing was recessed at 5:15 p.m.)

(The evening public comment commenced at 5:37 p.m. with all Committee members and parties present.)

CHMN. CHENAL: All right, everyone. This is the time set for the public comment portion that was noticed for the Biscuit Flats relocation project. It is the time for us to take public comment.

As it turns out, it is now 5:35 roughly, a little past that, and there is no one that is here live from the public to comment. And an option is available for the public to appear by telephone or by Zoom, and I am told by the crack AV team that there is no one that has appeared either by, you know, telephone or by video to make any public comment.

So that being the case, let's conclude the public comment portion of the hearing. And we will see everyone tomorrow morning at 9:00 a.m. when we resume the hearing.

Thank you, everyone.

(The public comment concluded at 5:38 p.m.)

STATE OF ARIZONA)
COUNTY OF MARICOPA)

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