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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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REGULATORY POLICIES & PRACTICES SUBCOMMITTEE

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WEDNESDAY

MARCH 19, 2014

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Dana Powers, Chairman, presiding.

COMMITTEE MEMBERS:

DANA A. POWERS, Chairman

DENNIS C. BLEY, Member

MICHAEL L. CORRADINI, Member

MICHAEL T. RYAN, Member

STEPHEN P. SCHULTZ, Member

GORDON R. SKILLMAN, Member

1 DESIGNATED FEDERAL OFFICIAL:

2 QUYNH NGUYEN

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P R O C E E D I N G S

(8:33 a.m.)

CHAIRMAN POWERS: This meeting will now come to order. This is a meeting of the Regulatory Policies and Practices Subcommittee, the Advisory Committee on Reactor Safeguards. I am Dana Powers, Chairman of the Subcommittee.

ACRS members in attendance are, and it says look around.

(Laughter.)

CHAIRMAN POWERS: But in fact we have a very good turnout, including Dick Skillman, Steve Schultz, Dennis Bley, Mike Ryan, and an esteemed professor from a major and prestigious University of Wisconsin, Dr. Michael Corradini.

Mr. Quynh Nguyen is the designated federal official for this meeting.

As announced in the *Federal Register* on March 11, 2104, the subject of today's briefing is the review of selected chapters, the Safety Evaluation Report associated with early site permit application for the PSEG Site. This is the first subcommittee briefing on this topic.

I will remind people the purposes of subcommittee meetings is to gather information that the

subcommittee will use in formulating draft recommendations to the full committee. As such, it will operate under relatively informal processes so that we can go in and gather the information we think we need.

In that regard, I would appreciate it if speakers would give us just a bit about their background before they launch their presentation, so we have some idea of their experience and qualifications in the subject at hand.

It just makes it more useful for the members.

Rules for participation in today's meeting were announced in the *Federal Register* Notice for a closed/closed meeting. However, we expect this meeting will be mostly open to the public. I am the asking the NRC staff and the applicant to verify that only people who require clearance and that need to know are present before we enter discussions that are closed, if that should be necessary.

We have a telephone bridge line for the public and stakeholders to hear the deliberations. This line will not carry any signal from this end, if we need to enter into a closed meeting.

Also, to minimize disturbance, the line

will be kept on listen-in-only mode until the end of the meeting, when ten minutes will be allocated for public comments. At that time, any member of the public attending this meeting in person or through the bridge line can make a statement or provide comments if they desire.

We have received written comments from the public and external stakeholders. In that regard, I want to make a small adjustment to the agenda and allow 15 minutes for Mr. Paul Gunther to make comments to the subcommittee after our mid-morning break. Mr. Gunter has spoken before to various subcommittees and I have found his comments, in the past, to be of use.

As this meeting is being transcribed, I request participants in this meeting use the microphones located throughout this room in addressing the subcommittee. That is a reminder particularly when you call on associates to make comments that they will come up to these microphones, identify themselves so that the transcriber knows who they are.

And again, I would like a little bit of background on them. I would just need something about their qualifications and experience in these matters. I know the applicant in this case has an experienced and highly qualified team. I know also that the NRC

has a very experienced and qualified people that are likely more on the personal issues.

Participants should first identify themselves and speak with sufficient clarify and volume so that they can be readily heard. We are asking people to silence their cell phones when they are in the meeting room.

Do members of the subcommittee have any opening comments they would care to make?

MEMBER SKILLMAN: No, sir.

CHAIRMAN POWERS: Again, this is only looking at some selected chapters of the application. We will undoubtedly meet again to look at the additional chapters and then we will try to integrate the whole in some way for presentation to the full committee.

We will now proceed with the meeting and I will call on Mr. John Segala of NRO to begin the presentation.

MR. SEGALA: Thank you, Dr. Powers. My name is John Segala. I am the Chief of Licensing Branch 1 in the Office of New Reactors. As Dr. Powers stated, we are here today to present the staff's advance safety evaluation report with no open items on the PSEG Site early site permit application for Chapters 3, 11, 13, 3, 15, and 17.

As you are aware, an ESP application is based on 10 CFR Part 52(a) on early site permits. It is intended for the approval of a site for 10 to 20 years. That is suitable for constructing and operating one or more nuclear power plant units.

As a background, the NRC has already issued four early site permits. In 2007, NRC issued the early site permits for Clinton, Grand Gulf, and North Anna. As background, I was the Clinton Early Site Permit PM and I am glad to see Dr. Powers if the new chair of the old subcommittee back together again.

Vogtle their early site permit was issued in 2009, so those were the four.

The staff, in the review that we did for our safety evaluation report, we did a four-phase review. Phase A is issuing a request for additional information. Phase B is issuing the advanced safety evaluation with no open items. And Phase C is the ACRS meeting on the advance safety evaluation. And Phase D is issuing the final safety evaluation.

So today we are here to do Phase C for these set of chapters. And at this point, I will turn it over to Mr. Prosanta Chowdhury, the lead project manager for the early site permit review and he will start the presentation.

MR. CHOWDHURY: Good morning, Dr. Powers. Good morning members of the subcommittee.

My name is Prosanta Chowdhury. I am the project manager, as John mentioned, for this PSEG Site early site permit application review.

I work at NRO. I have been with NRO since 2008 as the project manager. As far as my experience and background goes, my education is in electrical engineering, I have a master's degree, and a master's in nuclear engineering.

Also, I work for the State of Louisiana in the emergency preparedness activities associated with three nuclear power plants affecting the state from 1987 through 2003. And so there I was quite involved throughout my 18-year involvement in that program.

Coming to the NRC, I started with the emergency preparedness group and then moved to NRO as Project Manager. I have been managing this project since it was applied for in 2010. And I will go through the next few slides.

The purpose of this meeting is to brief the subcommittee on the staff's safety review of the PSEG ESP application. Today, we are going to present a subset of our chapters.

Another purpose is to support the

subcommittee's review of the application and subsequent interim letter from the ACRS to the Commission and then address the subcommittee's questions.

I am going to provide a brief overview of the PSEG project. John already mentioned some of the aspects. I will show you the scheduled milestones; Safety Evaluation Organization chapters that we have; and then the key review areas to this presentation are shown on this slide, the radioactive effluent release, quality assurance, aircraft hazards, radiological consequences of design basis accidents, and emergency planning.

The safety evaluation is advanced safety evaluation with no open items. It is a four-phase schedule, as John provided to you in his opening remarks. And we provide some conclusions and then there will be a presentation conclusion, and discussion/questions.

I would like to acknowledge here that all figures that the staff used in their presentations have been reproduced from the PSEG Site Safety Analysis Report.

PSEG used what is called Plant Parameter Envelope, PPE, in other words. They used four reactor

technologies to develop the Plant Parameter Envelope. And those designs are listed below, listed on this slide. It is the single unit U.S. EPR, single unit Advanced Boiling Water Reactor, single unit U.S. Advanced Pressurized Water Reactor or US-APWR, and dual unit Advanced 1000, which is AP 1000.

Now, the new plant may also a different design that falls within the parameters. And specifically, if there is a single unit, then it will be within 4614 megawatt thermal or for dual units, 6830 megawatt thermal and approximately 2200 megawatt electric power.

MEMBER SKILLMAN: When you say a different design, back to slide four, please, do you mean different design from the design certs that you have identified in the four previous bullets? What do you mean by that set of words, please?

MR. CHOWDHURY: Well, I will give you a brief statement on that and then PSEG may want to provide more clarification. They have come up with a solvent plan based on the parameters derived from these four designs. So, they have an envelope. And then they may choose to have another plan that falls within those parameters and not necessarily these four designs.

MR. MALLON: And I will go into the development in our logic for choosing a PPE pathway but my understanding in the Vogtle EPS, even that permit, which the parameters were for an AP1000 but when you look at the permit, the parameters are listed. It doesn't call out an AP1000. It says when your COLA comes along, the plant has to fit within these parameters.

So theoretically, Vogtle could have jumped to an ABWR. The ESP is issued for a set of reactor parameters. And rather than choosing a specific design and using those parameters, we developed a surrogate reactor across four different technologies.

MEMBER SKILLMAN: Okay, so let me repeat back what I think you just said. The power level may be different but it is going to be one of those four. It is not going to be a liquid-metal fast breeder reactor. It is not going to be a gas-cooled reactor. It is not going to be a --

MR. MALLON: We will talk about our logic and why those, from a commercial standpoint, are precluded in our company's thinking. I think that --

CHAIRMAN POWERS: I think it doesn't matter. But if they fit within the parameter range, then it is unlikely any of those that you mentioned --

MEMBER SKILLMAN: I understand that but I am trying to understand the fine wording on slide four.

CHAIRMAN POWERS: No, I mean this is part of the regulation. If it fits within their parameter range, I presume that it could be a gas-cooled, fast breeder, thorium-based reactor.

I mean, we are looking at the parameter envelope and that is really what is important to us.

MR. SEGALA: This is John Segala. I just want to add we developed the PPE and then they get the permit for that site. And they have outlined all of the parameters that fill that envelope. So, whatever those design parameters are, it lists the worst case from all those designs to build the envelope.

If at COL they came in with a design that wasn't considered in the development of the envelope, they would have to show that they are enveloped in all those parameters by that new design. If that design one particular parameter falls outside of the envelope, they would have to come in with a variance at the time of COL and explain why they are okay being that it exceeded the envelope and they may have to provide analysis and that would open up the review of that particular area.

But if they are able to show that the new

design is enveloped, then they can leverage that early site permit approval.

MEMBER SKILLMAN: Thank you for the clarification. Thank you.

MEMBER BLEY: I would like to ask you a naive question. I can understand the thermal power level and many other parameters being in the parameter set. Why from a safety point of view is it important that it not exceed the electrical output requirement?

MEMBER CORRADINI: Good question. I was wondering the same thing.

MR. CHOWDHURY: That is the applicant's choice. Right? You have chosen to bound your thermal and electrical powers within those.

MR. MALLON: We described a number of parameters in SAR Section, I think it is, 1.2. A number of the parameters are strictly only used in the ER and the EIS. So, from a safety standpoint, I don't remember that the megawatts electric enter into any of the analysis.

MR. CHOWDHURY: But this is from the general description of your application.

MEMBER CORRADINI: But I think all Dennis is asking is that is not fixed by the staff. That is fixed by the applicant and could change.

MR. MALLON: Yes.

MEMBER CORRADINI: Okay.

MR. MALLON: But it will impact the permit, as I understand it, will be issued with a set of safety parameters and a set of parameters that are used in the EIS. So, there megawatts electric would come in. And, therefore, if we changed it, we would reopen the environmental side of things.

CHAIRMAN POWERS: Well, the applicant can usually define parameters that have no bearing on any of our deliberations, and frequently do, in fact. But I mean they are just not operative for our purposes.

MR. MALLON: Right. Yes.

MR. CHOWDHURY: This slide five shows completed milestones. And we received the PSEG Site Early Site Permit Application on 25th of May 2010. We completed an acceptance review and docketed the application on 4th of August, 2010.

We have completed a number of site audit inspections during the review period through today. I have listed them here. Emergency planning, site visit was done in May of 2010. Hydrology we had two audits. One was in 2011, February and then one very recently February 2014. Quality assurance inspection was done in May-June time frame in 2011. Geology site audit was

done in September 2011. And meteorology site visit was done May 2012.

MR. ROBILLARD: What was the scope of the quality assurance review?

MR. CHOWDHURY: It is limited scope. And we have a presentation on it but later.

MR. ROBILLARD: Fine, no problem.

CHAIRMAN POWERS: I understand that the term limited scope has a particular meaning here because certain aspects of quality assurance cannot be defined until a technology is defined.

MR. CHOWDHURY: Selected, yes.

We issued a request for additional information in -- completed issuing in September 2013. And PSEG responded to all RAIs.

We have issued advanced safety evaluation with no open items in November -- from November to January 2014 except geology and hydrology safety evaluations pending.

CHAIRMAN POWERS: Easily the longest part of it.

MR. CHOWDHURY: They are. Geology is probably --

CHAIRMAN POWERS: Given the Chairman of the Commission, probably the one that will attract the

most high-level attention as well.

(Laughter.)

MR. CHOWDHURY: That is correct. Right now, we have tentative date of August 2014 to complete geology, seismology, geotech, engineering, advance safety evaluation with no open items. And hydrology we have an open schedule right now. We are expecting applicants' additional information to come in to develop the schedule.

CHAIRMAN POWERS: Yes. And right now, it is my anticipation that we will be in a position to respond when you are ready to submit.

MR. CHOWDHURY: You are talking about hydrology?

CHAIRMAN POWERS: For any of these.

MR. CHOWDHURY: Okay.

CHAIRMAN POWERS: When you are done with your SE right now, I don't see any impediment in our schedule. I mean it is just a matter of picking a time to do these things.

MR. CHOWDHURY: Yes.

CHAIRMAN POWERS: So, let us just work together to get done as expeditiously as we can and still have an opportunity.

We are doing this particular meeting kind

of covering a lot of material relatively prompt -- in a relatively short time because we think in light of the advantages this site has with adjacent sites, particularly in the area of emergency management, that we can. It is my hope that we can.

Some of these others, particularly geology, hydrology always seems to be troublesome. We will wind up scheduling a time for it but I don't see any difficulty in doing that on our part. So, I think we are just waiting for you.

MEMBER RYAN: Can you give us just a sense of where you might be on geology and hydrology at this point?

MR. CHOWDHURY: As far as the safety evaluation?

MEMBER RYAN: Yes.

MR. CHOWDHURY: The staff has completed the draft safety evaluation. They have completed it and they have provided the licensing branch their input. We are processing it. We are going to go through technical evaluation internally. And then we go through it concurrent.

So, the data that we have for geology, seismology, geotech, ACRS meeting is 16th of September this year.

MEMBER RYAN: Okay, that's great.

MR. CHOWDHURY: So, we are on schedule.

MR. MALLON: Good, thank you. That's perfect.

MR. CHOWDHURY: We do have another set of advance safety evaluation that will be coming that is meteorology, Chapter 2, Section 2.3. And then geography and demography, that is 2.1 and 2.2, those are scheduled to be presented to ACLS and we are going to confirm a date that is the week of the 19th of May. So, those will be ready.

MEMBER SCHULTZ: Prosanta, one question really was on your previous slide but that is okay. It had to do with the emergency planning. There was an early audit and inspection associated with that just after the application was submitted.

MR. CHOWDHURY: Yes.

MEMBER SCHULTZ: Are you going to cover later -- I don't want to get ahead of your presentation. Are you going to cover the details associated with that?

MR. CHOWDHURY: This was, the emergency planning was -- yes, we will do that -- it was a site visit in May 2010, as we received the application around that time frame. So, the staff went around and looked at the site physically, drove around. So, our

technical expert, Bruce Musico, briefly covered that--

MEMBER SCHULTZ: Thank you.

MR. CHOWDHURY: -- and answered any question regarding that site visit.

MEMBER SCHULTZ: I will wait for that. Thank you.

MR. CHOWDHURY: Yes, and he will probably show a lot of pictures, too, that he took.

The principal contributors we have today for these chapters that I mentioned are in sequence, Steve Williams, who is present in the audience. He will be the final speaker for Chapter 11, 11.2 and 11.3. And he was assisted by Zach Gran, who is also in the audience.

Quality assurance, Andrea Keim is here. Aircraft hazards, Seshagiri "Rao" Tammara. He is also going to present transient and accident analysis portion. That is part of Chapter 15.

And then finally Bruce Musico will be presenting emergency planning and he received support from FEMA for his review, Federal Emergency Management Agency, who is responsible for offsite emergency plans review and provide their input to the Nuclear Regulatory Commission as part of the safety evaluation. And part of the review was done through Sandia National

Lab.

The proposed site in the application is listed to be located in Lower Alloways Creek Township, Salem County, New Jersey. The location is 30 miles southwest of Philadelphia and 7.5 miles southwest of Salem, New Jersey. These statistics information taken from the site safety analysis report. It is adjacent to and north of Hope Creek Generating Station, which is an operating unit.

And the applicants are PSEG Power, LLC and PSEG Nuclear, LLC. In short, they are called PSEG.

And the ESP application is for a single- or a dual-unit reactor.

As I mentioned before, PSEG developed PPE using four reactor technologies. PSEG's application request for approval of early site permit for a 20-year term. PSEG does not seek approval for limited work authorization activities. And PSEG also seeks approval for complete and integrated emergency plans with ITAAC as part of ESP.

With that, do you have any questions before I move to actual chapter presentation?

So, with that, I will turn it over to Jamie Mallon from PSEG, who will do his introduction. And that is item number three on the agenda. And then we

will go into the chapters' presentation. Jamie?

MR. MALLON: Good morning. May name is Jamie Mallon. I appreciate the opportunity to speak with you, Chairman Powers, and the rest of the ACRS. We just need to go to slide two.

So for background, I have 30 years of experience in the nuclear power industry. I have worked in nuclear development, licensing, regulatory compliance, training, and radiation protection. I worked at operating reactors. I worked at decommissioning facilities and I have worked at construction of reactors in the '80s.

My bachelor's degree is in physics from Franklin and Marshall College in Lancaster, PA. And when I was at Peach Bottom, I was part of a SRO certification class, a four-month class to give me operator-level of knowledge of the facility.

So, I am PSEG's Nuclear Development Manager and I will begin by describing our efforts. Next, please.

So, PSEG operates in New Jersey. That is our headquarters. And we are -- that is a deregulated state. In that state, PSEG has a traditional utility as part of the company that provides electric and gas service to our customers but we also have PSEG Power

and Nuclear that are merchant generators, you know fossil and nuclear assets in the state and in the surrounding states.

As a merchant generator, we are subject to market conditions. There is no cost recovery from the state if we do not operate our facilities in an economic manner.

In 2007, we started to begin exploration of nuclear development at our site in southern New Jersey. The engineering evaluation concluded that it could be undertaken. In '08, we assembled a nuclear development team and we were initially tasked with developing a COLA. So we were told go pick a technology and figure out how to make it fit on the site.

As we started looking at the technologies then under review at the NRC, we saw a lot of uncertainty and this is in the '08 time frame. And we saw licensing uncertainty, we saw construction uncertainty, and we saw operational uncertainty because these plants, a number of them hadn't been operated ever.

With that, and thinking about what had happened in the '80s during construction, we said we may want to look at a different path. And at that time, we chose to go down the early site permit path where you get approval for the site and you say this site is

suitable for a nuclear power plant.

Again, with that, from the '80s, the problems were the environmental aspects and the emergency plan. And with an early site permit, you have those discussions out there with the public. You understand where you are at if this plant can be constructed.

So, we undertook the early site permit at that time. The application includes a safety analysis for the parameters that we know or can estimate, based upon the plant parameter envelope. The emergency plan, and we wanted a complete and integrated plan so the states we are in, New Jersey, Delaware, Pennsylvania, and Maryland are all part of our application. And then the environmental report to look at the aspects of the operation and construction of the facility at our site.

The first three ESPs were plant parameter-based applications. We looked at what they --

MEMBER BLEY: Excuse me.

MR. MALLON: Yes?

MEMBER BLEY: After you are granted an ESP and you later pick a technology to place on the site, how much do you have to revisit the environmental and

emergency planning aspects or are they, essentially, closed?

MR. MALLON: There are new and significant items that need to be addressed so that if there were changes in the environment, you would have to identify them in your COLA application, submit a supplemental ER and identify that for the staff. And the staff would then prepare a supplement EIS.

In the emergency plan, there is a number of things that we don't know about the on-site emergency plan because I don't know where the control room is. I don't know where the TSC is or the OSC. And those are the on-site facilities.

But by getting the counties, the state, the townships involved early, not to say there isn't an opportunity for future questions to be raised but you have had the discussions early and you have gotten them engaged and, hopefully, have their commitment to support the facility. And that is what we -- that is why we like the ESP.

As I started to say, the first three, so Clinton, Grand Gulf, and North Anna were plant parameter based envelope applications. When we looked at them, they included some designs that, frankly, weren't viable, we thought. They included pebble bed

reactors, CANDU reactors, gas-cooled reactors. And when I say viable, I mean viable in the United States. There is no design cert in for any of those technologies. So, we --

CHAIRMAN POWERS: Well, in fairness, there was a fair anticipation that there could --

MR. MALLON: At that time.

CHAIRMAN POWERS: -- have been a certification both for CANDU and pebble bed.

MR. MALLON: Pebble bed, yes, because Exelon was working pretty closely.

CHAIRMAN POWERS: People were working and actively considering that. And in fact, the staff was doing a pre-certification review on the ACR700. So, in fairness, the people that prepared those early plant parameter envelopes weren't pipe-dreaming and doing what I think is prudent, given this flexibility in the regulatory process of giving yourself maximum flexibility in the technology you choose because technologies evolve.

MR. MALLON: They do.

CHAIRMAN POWERS: A first of a kind engineering experience also evolves.

(Laughter.)

MR. MALLON: We wanted the ones that were

currently in design review to get in front of us a little further so that we could learn from them.

CHAIRMAN POWERS: Yes, well first of a kind engineering is just a major headache and an experience that takes some planning to engage in.

MR. MALLON: Next slide, please. So, our organization and Prosanta mentioned PSEG Power and Nuclear. And you might say why that. And one of our other lessons learned from the '80s was we wanted to minimize distraction of the operating units. We wanted to make sure any impacts on those were minimized. So, the nuclear development organization is principally in PSEG Power. We are separate, a little bit of a firewall between us and nuclear. And it was established to make sure we did not distract plant operations at that time.

PSEG Nuclear does own the land and that is why they are co-applicants. And ultimately, the facility would be rolled under their organization but while we are working on the development path, keep it separate, minimize distractions.

We hired Sargent and Lundy to help us with preparation. Sargent and Lundy has a lot of experience on our site. They are our engineer of choice and they have been working there for on the order of 20 years.

So, they are familiar with the site. They are familiar with the systems, the Delaware River, everything, the environment.

For some of the more specific analysis in the area of hydrology and seismic, we subbed out to MACTEC, who now has become AMEC to help us with those Niche disciplines.

MEMBER SCHULTZ: Sargent and Lundy subbed out to MACTEC or they are a --

MR. MALLON: Yes, Sargent and Lundy.

MEMBER SCHULTZ: Okay.

MR. MALLON: So, this is just a quick slide of what we did. So, we started in '08 and we submitted in 2010 a number of hydrologic activities to understand the river system that we are adjacent to. Meteorology, we did have our Salem and Hope Creek Met Tower with 30 years of data that we have been collecting. So, that data collection shows beginning but it is really going well back in time.

We also did the seismic, the geotechnical, and subsequent analysis. So, next slide.

Here is our activity since submittal. And the largest bars there are the support of the NRC review. We have answered over 400 questions from the NRC and are 89 percent within 30 days. So, we were able

to quickly turn around their questions and that has helped our review period.

Some of the bottom lines are projections for us. The schedule doesn't show when the NRC would issue the early site permit. That is what we are targeting, based upon other applicants.

MEMBER BLEY: In your early work, looking at the hydrology and environmental aspects, did you find anything substantially different about the new site from the existing two?

MR. MALLON: We did look back and make sure they were consistent. There was, comes to mind, an invasive species of frog. The green tree frog had come over from the Virginia, the mainland side and we discovered that in our ponds on-site. But then we went out into Salem County and we found it was everywhere.

MEMBER BLEY: Everywhere? Okay.

MR. MALLON: So that was about the only thing that comes to mind on the environmental side, on the hydrologic, and geotechnical no surprises.

MEMBER SKILLMAN: Let me pull a thread on the hydrological, please. A number of times that site has been impacted by grassing.

MR. MALLON: Yes.

MEMBER SKILLMAN: And it has pushed you

hard on Salem.

MR. MALLON: Sure.

MEMBER SKILLMAN: You have got a tower at Hope Creek. Salem has been forced to reduce power, do extra cleaning. What consideration in your hydrological review have you given to that?

MR. MALLON: If you will hold that question, when I have a photograph of the site, I can explain where we located the plant to minimize the grassy impacts.

MEMBER SKILLMAN: Okay, thank you. Thanks.

CHAIRMAN POWERS: And I do believe that hydrology is not among the chapters we are addressing.

MEMBER BLEY: Right.

MR. MALLON: Next slide. So similar to Prosanta, numerous interactions with the staff, we did add the pre-application subsurface investigation, where a number of geotechnical reviewers came to the site, when we were doing our geotechnical borings, when we were doing our shallow water wells on-site to understand what we were doing. So that is similar to Prosanta's slide. Next slide, please.

So our site. We have a 734 acre property. It is in the southern New Jersey. It is in an area known

as Artificial Island. And as Prosanta said, we are south of Philadelphia and Wilmington. Those mileages are to the edge of the city. So, we are 30 miles to the southern edge of Philadelphia or 18 miles to the southern edge of Wilmington.

About a hundred years ago, the Army Corps, at a shallow area of the river, started dredging the river and depositing dredge spoils there. They put in bulkheads and that became Artificial Island. And then over the ensuring hundred years, they filled in that island and then back to the mainland. So, that is why it is called Artificial Island and that is our site. And you will see as a result of where we are, we are very remote and no one within two miles. A great place to build a nuclear plant.

In addition, we are looking to acquire land from the Army Corps north of Hope Creek to aid in construction, lay down space, even put maybe the cooling tower up there. That will help us minimize our environmental impact on adjacent wetlands.

Next slide, please.

Okay, so where is Artificial Island? So down at the lower right-hand corner you see the mouth of the Delaware Bay between Cape May, New Jersey and Cape Henlopen, Delaware. Fifty-two miles upriver to

the red dot is where our site is and it is where the river is transitioning from a bay to a river system. The water is brackish and the flow in the river is dominated by tidal flow, which is on the order of 470,000 cubic feet per second. So, a significant amount of water available. Next slide.

This slide is a little tough. I think handouts are not as good as the presentation. But what we see here is the property and you can see the bend in the river heading north. The land area in New Jersey to the east and north of our facility is a bluish color and that is dominated by wetlands, unsuitable for development, and it is an invasive species of grass called Phragmites has taken over the entire area. So, it is a monoculture, not good for farming, of low value.

Our nearest neighbors are actually over two miles away on the Delaware side. So, 2.3 miles across the river to Delaware. And we have no one within two miles on the New Jersey side and our population in the zero to five miles is about 2,000 people. So, for New Jersey and a lot of people think of the Sopranos when they think of New Jersey, but we are a very remote area, not a lot of population.

MEMBER BLEY: Just to help me with scale, do you know the distance either to Hancock's Bridge or

Salem City?

MR. MALLON: Salem City is seven and a half miles.

MEMBER BLEY: Okay.

MR. MALLON: Hancock's Bridge is right around five, four and a half, five.

MEMBER SCHULTZ: You mentioned the population in you call it the five-mile zone. Was that including both Delaware and New Jersey?

MR. MALLON: Yes.

MEMBER SCHULTZ: Thank you.

MR. MALLON: Next slide. Okay, so here is a view of the site looking east. And you see the Hope Creek cooling tower there. And to the right is Salem Unit 1, Salem Unit 2, and then the next dome is Hope Creek. There was going to be a Hope Creek Unit 2. It was about 30 to 40 percent completed when it was abandoned in the '80s. And the site we are looking at is north of the Hope Creek cooling tower. You see a couple of ponds there. Those are for -- we have a permit for dredging our water intakes and that is where we pump to. So, that water is from our dredging activities.

The larger pond all the way to the left is part of the Army Corps land and that is a confined

disposal facility and it is active for their maintenance dredging along the Delaware for navigation. So, they actively pump silt to that area.

So to quickly go to your question about grassing, the next slide might be better. Okay, so at the bottom of the slide, right where you can see the bulkhead lines and the artificial lines of the bulkhead here on Artificial Island. But at the bottom the slide, the concrete structure is the Salem circ water inlet. And our challenges have been because of where that is located and it causes eddying around the river and the grass that we discharge tends to come back.

Hope Creek's intake is further up -- I'm sorry to do this but here is the Hope Creek intake. There has been very little grassing problems at the Hope Creek intake because the river flow is straight either north or south at that location.

So, when we were looking at where to put the site, where to put the plant, where to put the intake, it became clear to us that we want the intake on that side of our property. We don't want it on the southern border. We would have the same grassing problems. We want the intake north of Hope Creek on the area where the river flow will keep the grass away from the plant.

It also allows us to have a contiguous security boundary, which will aid in security planning.

MEMBER RYAN: I guess we are going north past the cooling tower. What is that? Is that just marsh land, the brownish area?

MR. MALLON: Yes, this is all the -- this area is all the wetlands. It is dominated by an invasive species of grass. It is from Europe. It is called Phragmites. The normal local grass is called spartina.

When you get out in a boat and see this, it is incredible what it does to the ecosystem. And it really hurts the habitat for juvenile fish and then subsequent older fish.

So, this is low-economic value, can't be farmed, not useful property. We are talking about developing the plant in this area right here.

MEMBER RYAN: Okay. Do you have any concerns about infiltration of that species moving toward you?

MR. MALLON: We have undertaken, because you see Salem does not have cooling tower, as part of our negotiations with the State of New Jersey around our effluent discharge permit, we have restored over 20,000 acres of wetlands along the New Jersey and

Delaware river, on both sides of the river, to get rid of the Phragmites and reestablish the spartina grass in there.

So we have, it is actually the largest private restoration of wetlands in the United States.

CHAIRMAN POWERS: I understand why you are so familiar with the names.

MR. MALLON: Yes.

(Laughter.)

MR. MALLON: Six years ago, I did not know this.

CHAIRMAN POWERS: One of the joys of nuclear, you get to work in so many diverse areas.

MR. MALLON: Yes. Okay, and let's go on to the next -- thank you, Prosanta.

So, as we prepared our application, we made sure we satisfied the requirements of Part 52. We filed the guidance of the Regulatory Guides 1.206, NUREG-0800, and Review Standard-002, which is specific for early site permit applications.

We did a number of site studies and investigations. We had to do some conceptual design to establish what our interaction would be with the environment. So, the reactor designers didn't know what the river temperature would be, what the ambient

air temperature would be, and therefore, what our heat cycle would be. And we had to define that. And we developed our plant parameter envelope.

MEMBER BLEY: I just have a quick question on RS-002. I wasn't involved in the earlier ESPs that came to the committee but I have read back through some of them. It seemed at the end of those, there was some concern that the guidance existing at that time wasn't clear enough and it led to some issues during the process.

How did you find the guidance this time? Was it pretty straightforward?

MR. MALLON: There were questions and you will see -- or actually I already showed it. We had pre-application meetings with the staff to talk about what is the plant parameter envelope. And I think that was a large source of -- you know I can't tell you how many times people would say to me, just pick a technology. Make it easier on yourself because you have to get your head around it is a surrogate reactor. If you think about it in those terms, that is what you are analyzing. That is what impact you are trying to assess.

So, I know there was a lot of NEI interactions with the staff and it tended to be

primarily around the PPE.

And as I mentioned earlier, the studies, seismic, hydrology, we did compare them to Salem and Hope Creek licensing and they were consistent. So, we didn't see anything odd. Next slide.

Okay, the plant parameter envelope. So, as I mentioned, Clinton, Grand Gulf, North Anna all use that North Anna. Then subsequently, has filed a COLA and ESBWR, then they went to Mitsubishi. Now they are back at ESBWR but they have used their ESP to move into the COLA space.

We looked at the ABWR, as Prosanta had mentioned. They are the ones in '08 we felt were the most viable, the ones that we would be interested in developing. Next slide.

So, our experience with the plant parameter envelope, we worked with NEI and there is an NEI guidance document 10-01 about how to develop a plant parameter envelope. And this slide is from that document.

So, we developed vendor information worksheets by going to the SERs and EISs that the NRC had written and we said what parameters did they rely on. And frankly, some of the early work had too many parameters. So, we looked at the early lists of plant

parameters and then looked at what the NRC really needed for their safety and environmental conclusions and collapsed that list somewhat. We used that to develop our vendor information worksheets.

CHAIRMAN POWERS: You are absolutely correct about that initial parameter range will fill pages.

MR. MALLON: Yes.

CHAIRMAN POWERS: And we don't use them all.

MR. MALLON: You don't need them.

CHAIRMAN POWERS: They just don't enter into the regulatory process.

MR. MALLON: Right. Vendors filled them out, gave us their information. That went down into the reactor parameters. In addition, we took their information and developed owner-engineered parameters. And this would be the ambient temperature of the Delaware River and what your cooling tower will do determines your blowdown rate and the salinity in the river. So, you have to do some engineering work to determine your blowdown rate because that is your dilution flow for your liquid effluent releases. So, those become owner-engineered parameters and they are boxed together in the plant parameter envelope. That

goes into the early site permit application.

In addition, there is a lot of site information. The meteorological information, what you learn from your geological goes into the site characteristics and that also goes into the ESP application. Next side.

So, this information is in SSAR Section 1.3. I think I said earlier SSAR Section 2, so I spoke incorrectly. It is 1.3. There is about 150 parameters in that table and they are primarily the two types, reactor and owner-engineered. And it lists them and lists the value used and gives a definition of them. Next slide.

In that table, they are broken down into categories. So the structural ones, the ones associated with the heat sink and they are binned out that way to aid the reviewer and to aid anyone who might be looking at our application. Next slide.

Our application organization. So, we have Part 1 is administration; 2 is the SSAR; 3 is the ER. Part 4 is not used. We did not request a limited work authorization. You need to have a technology selected in order to have the detail required for that section.

We do have a complete and integrated

emergency plan in Part 5. And Part 5, we did not submit any security SUNSI information.

MEMBER BLEY: So, when you get to that point -- just to help me better understand the process here. When you have picked a technology and decide you want to begin construction, you would go back with an amendment to ESP?

MR. MALLON: We would go and do a COLA.

MEMBER BLEY: You would go straight to the COLA.

MR. MALLON: We would go to a COLA. Part of what we would have to do is compare the parameters that are defined in the early site permit and then our technology and we would do that comparison.

And let's say we picked a new technology now. I would have to make a commercial decision about whether I want to do that first of a kind engineering on that, take a deviation from my early site permit. Does that make sense? That goes into the economic evaluation of that particular technology.

MEMBER BLEY: I guess what I was really asking is if you want to do a limited work authorization to begin the cooling water systems, --

MR. MALLON: Okay.

MEMBER BLEY: -- would that be an

amendment to the ESP or would that be based out of the COLA?

MR. MALLON: I don't know.

MEMBER BLEY: Okay.

CHAIRMAN POWERS: It is part of the COLA. We did that for Vogtle.

MEMBER BLEY: Is that right?

CHAIRMAN POWERS: Yes, Vogtle had to have -- they had to get started on -- their foundation material was not suitable and they had to replace that. And so they did that, had a limited work authorization --

MEMBER CORRADINI: They had to do that at their own risk.

CHAIRMAN POWERS: Yes, that's what I meant. You betcha.

MEMBER CORRADINI: LWAs at your own.

CHAIRMAN POWERS: Yes. I mean, it is part of COLA process.

MEMBER BLEY: Right.

MR. MALLON: We have looked at the construction process, not in great detail, but we have an 800-line schedule of what that would look like. And later on we will talk about -- in our application we talk about a new causeway. Right now we have one access

road that is about four and a half miles long. And we have talked about adding another road to accommodate operating employees as well as the 3,000 plus construction workers. So, the long coil in the tank critical path looks like a causeway. So, that would not be an NRC-regulated construction. So, that would drive our schedule. So, I don't know that we will need an LWA right now.

MEMBER BLEY: Okay.

MR. MALLON: And with that, --

MR. CHOWDHURY: Before I go, Jamie, are there any questions for Jamie at this point?

I just want to get back to your question. You had a question about the aspects of emergency planning that will be addressed now.

MEMBER BLEY: Yes.

MR. CHOWDHURY: Just to mention to you that the NRC staff did a very thorough review of the emergency planning information and then they will talk about the permit conditions and civil action items that they have come up with that we will have to address at that time. And that will probably answer at least more questions.

MEMBER BLEY: Okay, thanks.

MEMBER SKILLMAN: I would like to ask a

question back on your slide 10, before you leave, Jamie.

MR. MALLON: Sure.

MEMBER SKILLMAN: This is some geography that I know very, very well, having shipped on that river many, many times.

MR. MALLON: Okay.

MEMBER SKILLMAN: The question is to the north and to the west you have got -- that is the C and D Canal. To the immediate east -- excuse me to the north and west. To the immediate west, you have got people that are the 2,000 within your zone. How do you handle the transient individuals that are on the river?

MR. MALLON: The Coast Guard would aid us if we have to evacuate people. We would inform the Coast Guard and we have an agreement with them. That is part of our current emergency plan for the operating units, to inform them and they would clear the area.

MEMBER SKILLMAN: Clear the area?

CHAIRMAN POWERS: I think at least in the application they indicated that the Coast Guard helicopters and other boating facilities would be used to try to individually contact its boaters of a problem here because they are not going to be able to hear the public announcements --

MEMBER SKILLMAN: The sirens.

CHAIRMAN POWERS: They may hear the sirens but they are not going to hear any public announcements.

MEMBER SKILLMAN: And to that point, your notifications, you are notifying Lower Alloways, Hancock's Bridge, Salem. But over the east -- excuse me, to the west, ditto for the municipalities in Delaware?

MR. MALLON: We would, the way our plan works with the states, we notify New Jersey and we notify Delaware and then the states take over.

MEMBER SKILLMAN: Take it from there?

MR. MALLON: They administer their emergency plans. So, they would get the counties informed.

MEMBER SKILLMAN: And if you were to build another causeway to give you an alternate route except for your present single access, is that a construction activity that is complicated with the State of New Jersey and the environmental people in New Jersey?

MR. MALLON: The permits for that causeway are probably 20 to 30 lines of what we have in our schedule. So, yes, because of the nature of it.

Now, the path we have drawn as a potential for it is along the existing transmissions lines right away. So, this is an area that has already been

modified for the transmission lines because you have to access them. So, we would go along that path to minimize our environmental impact.

MEMBER SKILLMAN: Okay, thank you, Jamie.

MR. MALLON: Sure.

MR. BURGIN: Excuse me. David Burgin. I am the Corporate Functional Area Manager for Emergency Preparedness and I just wanted to add a couple of things to the river alerting. We also work with the Delaware National Guard, the New Jersey State Police. They have their own little Navy, so to speak. And we also work with the Delaware Natural Resources Organization, which also takes care of getting into the marsh areas where it might be difficult to get into. So, it is very extensive and we actually practiced the flyover and announcements to make sure that people can hear messages that would come from helicopters. So, there is a point of clarification.

CHAIRMAN POWERS: It is a fairly extensive description in both the application and the SE on that. I noticed that and paid a lot of attention to it.

MEMBER SKILLMAN: Thanks.

MEMBER BLEY: How far away is Maryland?

MR. MALLON: Maryland is within the 50-mile, not within the 10-mile plume exposure planning

zone.

MEMBER BLEY: It is not within ten. That is what I couldn't remember.

MR. MALLON: It is within the 50-mile ingestion pathway planning zone.

MEMBER BLEY: Okay.

MR. MALLON: Okay, so I am going to introduce Joe. I am the primary presenter but if questions arise, I am going to turn to Joe Johnson. Joe, you may want to come up here and sit with Dave Robillard.

CHAIRMAN POWERS: If Joes is going to participate, he can sit right up there.

MR. MALLON: Okay. Dr. Johnson has over 35 years of diverse experience in radiation protection design in nuclear facilities. He has been responsible for design applications in the area of radiological system analysis, radiation source term determination, and radiation shielding evaluation on many nuclear power stations.

He has been responsible for off-site dose determinations, the evaluation of health physics aspects of plant design, and the development of computer software for use in radiation shielding analysis and emergency planning.

Dr. Johnson obtained a BS degree in engineering from the U.S. Military Academy, a master's of science and doctorate degrees in nuclear engineering from Kansas State University.

Dr. Johnson also has an MBA from DePaul University and is a registered professional engineer in the State of Illinois.

So with that, we will start into Chapter 11. Next slide, please. Oh, I'm sorry. I should have waited for you, Steve.

MR. WILLIAMS: That's okay.

MR. MALLON: Chapter 11 is where we look at the normal plant liquid and gaseous effluence from normal operations. We used the plan parameter envelope and we assembled the list of anticipated liquid releases by radionuclide in curies per year. And then we looked across and said which has the release of cobalt-60. That is the one we analyzed. And we went through iodine-131, who is highest? But that into our surrogate plan.

So, we used a source term that was the highest of any of the four technologies under consideration.

We took that curies per year, we used the cooling water blowdown rate of 45 cfs and that is

dependent. That is an engineering work that we did to analyze what our blowdown would be from our cooling tower. And we used a near-field dilution factor in the Delaware River of 20. Now, the Delaware River water flow is 470 cfs. The result was less than one percent of the 10 CFR 20 Appendix B, Table 2, Column 2 values, the effluent concentration limits. So, a small fraction of the limits and that is for the concentration piece.

For the liquid does, we used a LADTAP computer program. The drinking water pathway, because the Delaware River is brackish is not a viable pathway. And we analyzed both the total body and organ doses and they are also a small fraction of the Appendix I limits.

And for the collective annual dose within 50 miles, the total body collective dose across the population within 50 miles is 45.5 person-rem. Next slide.

Gaseous, we treat it the same way with the plant parameter envelope, taking the maximum from each one for each radionuclide and analyzing that. We used the annual average chi over Q value. That was based upon the years 2006 to 2008 from our met tower. Because we are a brownfield site, and we will get into this in meteorology, but we had a met tower. Greenfield sites,

starting nuclear development, that is a critical path is getting a met tower up and collecting the data.

We have the data. We have 30 years of data. We looked at the three years' of data versus the 30 and we showed that it is not an anomalous three years. We didn't cherry pick years. It is reasonable. It represents the 30 well. So, there is our annual average chi over Q -- excuse me. That is the atmospheric dispersion factor and it allows you to develop gaseous effluent concentrations at a distance.

MEMBER RYAN: What kind of margin did you find around that chi over Q value that you settled on? Was it plus or minus a few percent or 20 percent?

MR. MALLON: Margin in terms of?

MEMBER RYAN: In terms of your uncertainty.

MR. MALLON: I can't answer that. We will call back to Chicago because we don't have a meteorologist here.

MEMBER RYAN: That's fine.

MR. MALLON: So, we will get you an answer.

MEMBER RYAN: Yes, I am just curious because the area around that central tendency is fairly important.

MR. MALLON: Yes, it is.

MEMBER RYAN: Okay, thanks.

MEMBER SCHULTZ: Jamie, what is meant by per unit here? Because you have got actually within the four options, you have got a one-unit option, which is a larger, I thought, unit than two, the per unit for two.

MR. MALLON: Right.

MEMBER SCHULTZ: So, what is meant here by per unit?

MR. MALLON: When we went across and we said so the Mitsubishi, say, or the AREVA plant, very large single units, obviously should have higher gaseous effluent releases than a single AP1000 but we still took the higher number and then doubled that number, when we considered two units.

So, we, on an individual unit basis, went across and got the maximum gaseous effluence --

MEMBER BLEY: Even if you had two of any of those units, you bounded it.

MR. MALLON: We are still okay. So, when we developed the plant parameter envelope, then we doubled it to say this is what a two-unit Westinghouse might be. So, some additional conservatism in that analysis.

MEMBER SCHULTZ: Yes, it is --

MEMBER SKILLMAN: Per core.

MEMBER SCHULTZ: -- an unrealistic bounding evaluation because you have expanded the range beyond what you would potentially build.

MR. MALLON: Yes.

MEMBER SCHULTZ: Thank you.

MR. JOHNSON: And I would point out, though, that the concentrations are actually based on on a two-unit plant. That is why we called out for the doses if they were only for one unit. We actually call them site exposures, and that includes the two units.

MR. MALLON: So again, the concentrations at the site boundary are for two units.

MEMBER SKILLMAN: Thank you.

CHAIRMAN POWERS: Can I ask a question?

MR. MALLON: Yes.

CHAIRMAN POWERS: It may be as much to the staff as it is to you. But there was an indication associated with RAI 24 that in using the GASPAR-II code there may or may not have been an transposition error in the input for GASPAR-II. And the response, as described in the SE, I don't quite understand how this issue was resolved, its population distribution starting from the south or the north.

If you are looking for it in the SE, it is

on page 11-9, second paragraph under 10 CFR 50, Appendix I, gaseous dose compliance.

And while they are looking, I will ask how confident -- I mean the GASPAR has been around as long as I have, I think. It has been somewhat of a legacy but are we confident in its -- we apparently have some confidence in it. Do we know where that confidence springs?

MR. WILLIAMS: Say again. I didn't hear the first part.

CHAIRMAN POWERS: Do we know where our confidence in GASPAR comes from?

MR. WILLIAMS: Well, it comes from the early '70s, as far as when it was initially --

CHAIRMAN POWERS: Yes, like I said, it has been around as long as I have.

MR. WILLIAMS: All of the operating plants and all the operating experience that we have over that time period, that they actually have presented a fairly good model to take care of the effluents and the effluent projections that we do for every plant and every proceeding that we are going to do.

CHAIRMAN POWERS: Do we have a documentation of comparison of GASPAR-II predictions against experience or some validation report on it? If

you would give me that reference, I would appreciate it, whenever you can get it.

MR. WILLIAMS: Reference for the GASPAR comparison with actual plant data? Is that what you asked?

CHAIRMAN POWERS: Yes, some sort of basis for validating the predicted occurred.

MR. WILLIAMS: Well, and the other thing that I was going to finish talking about is our research branch is also in the process and we are in consultation with them to revise the GASPAR LADTAP and also the GALE code.

So, that is an ongoing process right now that we are doing. And then what we will do is use a lot of the information you were talking about as far as the preceding history that we have and any projections plus any new updates in ICRP information, dose conversion factors and so on and so forth. When we get to that point, we will issue that from the Agency and then that for any preceding plants or applications, then that would be passed on for them to utilize with updated information and updated codes.

But your initial question was that it has been looked at as we have gone, EPRI, I think, looked at it also, some of the values were from there, and it

has actually held up with the past history, although it does need updating with current technology. And I will get to that comparison as far as the GASPAR.

Are you talking about GASPAR LADTAP also or just --

CHAIRMAN POWERS: I am going to ask the same question about LADTAP, so yes, you might as well get them altogether.

MR. WILLIAMS: Yes, so GASPAR, LADTAP.

CHAIRMAN POWERS: And if you could, ask your brethren at NRES if they could provide something of what they are planning to do to upgrade those codes.

MR. WILLIAMS: What their plan is?

CHAIRMAN POWERS: Yes.

MR. WILLIAMS: Yes, we are going through that with them right now.

CHAIRMAN POWERS: It would be useful to know that.

MR. WILLIAMS: Okay.

MR. MALLON: So, in closing, our gaseous pathway doses are also a fraction of what the Appendix I limits are.

CHAIRMAN POWERS: I'm still struggling to understand this response to RAI 24.

MR. MALLON: Oh, okay.

MR. CHOWDHURY: Why don't you introduce yourself, since you are speaking?

MR. WILLIAMS: Oh, okay. All right. Good morning. My name is Steve Williams. I have over 40 years' experience in health physics. My educational background is a bachelor's degree in radiological health and a master's degree in environmental pollution control.

I have worked at the NRC in the New Reactor Organization, the NRO, for six years. I have worked at the NRC at that time performing technical reviews on three DCD applications, five COL applications, and two preceding early site permits.

Previously, I have worked eight years for the State of Pennsylvania and the bureau of radiation protection, 16 years in nuclear power at Three Mile Island, six years in performing industrial x-ray, and two years performing university hospital health physics.

I guess back to you.

MR. MALLON: Sure. So, I think --

CHAIRMAN POWERS: Am I going to get an answer to my question?

MR. WILLIAMS: Oh.

(Laughter.)

MR. MALLON: He is persistent.

MR. WILLIAMS: Zach was involved in that RAI and wrote that. I will let him give you the specifics. Zach Gran is another health physicist in our group.

MR. GRAN: Zach Gran, NRO, four years NRC with a master's in health physics.

That RAI, I think you are referring to the population distribution table.

CHAIRMAN POWERS: That's right.

MR. GRAN: So for that one, the question was more that there was a misunderstanding in what they provided in our code because in GASPAR there is something you can change so that it starts from either south or north. For us, we were starting from north and they were starting from south. So, we had confusion over what the actual distribution was. So, we just asked the question.

MR. WILLIAMS: The result of that was --

MR. GRAN: The result was that we were both in sync with each other.

CHAIRMAN POWERS: Yes, I noticed that the results you get are out to the second decimal point in agreement.

MR. GRAN: Right.

CHAIRMAN POWERS: So, if you use the same code, you get the same input. I just didn't understand the text here because it seems to say there was a transposition here.

MR. WILLIAMS: Yes, so in closing, it doesn't matter which way you ended up but we weren't sure of that. So, we also wanted to check with them and they probably went through the same gyrations we did. And in the end when we finally resolved it, it was like everything seemed okay on both ends.

CHAIRMAN POWERS: I just didn't understand the text.

MR. WILLIAMS: Yes, it was hard to write it.

(Laughter.)

CHAIRMAN POWERS: Thank you.

MR. MALLON: And with that, I am done. I will turn it over.

MR. CHOWDHURY: Okay, Steve already introduced himself. So, he is going to cover the Chapter 11, 11.2 and 11.3, this review of the staff evaluation and findings. Steve.

MR. WILLIAMS: My part in this ESP application review is in the Chapter 11, rad waste effluent review.

The review I did was similar to the same information that -- reviewing the same information that PSEG used as far as the -- and provided to us. And basically, the review included confirming the liquid and gaseous effluent releases; confirming the appropriate effluent exposure pathways; confirming the use of appropriate effluent liquid dilution factors, which Jamie described earlier; confirming the atmospheric dispersion and deposition factors, we get the factors I think they come from Chapter 230 or something like that; and confirming the radioactive liquid and gaseous effluent source terms for use in the models concerning the effluent releases. If you see in the SE, we had a few questions on the PPE process and we asked some questions there that we were able to resolve.

The staff also verifies the applicant's dose calculations, based on the information that the applicant provided. And finally, the staff performs an independent dose assessment for the pathways described and showing the applicant's doses to be conservative.

CHAIRMAN POWERS: When you do your independent assessment, as I understand how you did this, you went back and you look at the plants, you said

take the maximum in each of the categories and use that one in your parameter envelope. Do you go back to that four or do you just spring from his plant parameter envelope?

MR. WILLIAMS: We look at what they have done. And he mentioned previously the NEI information that went back and forth that they tried to straighten this out as far as PPEs. The one RAI we did have is we wanted to be specific to the actual revisions that they used to get the actual most critical nuclide value for each of the different designs. Because as the revisions change in the DCDs, they may change their source terms. So, if they change source terms.

CHAIRMAN POWERS: Yes. I mean I can't keep up with all the revisions in the DCD either.

MR. WILLIAMS: Exactly. So, for me to do that --

CHAIRMAN POWERS: I mean I understand that -- I certainly read that there was a confusion over 17, 18, and 19.

MR. WILLIAMS: Exactly. So, if I am going to review something, I need to know what exact revision that they are using that I need to review. So, I can make sure that they have all the correct values.

CHAIRMAN POWERS: Some difficulty in

referencing exactly which. But I can't keep up with them either.

MR. WILLIAMS: And this is another thing that follows like in Section 24.13 or something like that in the hydrology part, they have another source term there that they utilize for the ECLs and that was the same thing. And they also listed the revisions for which PPEs they use there also. So, we wanted the consistency so that they did things the same way in Chapter 2, Chapter 11, and so on.

CHAIRMAN POWERS: I mean this can be a formidable task. I understand.

In that regard, there was another response in connection with liquid and gaseous effluent dose compliance. Looking on 11-13 in the SE, where it indicates effluent dose information in SSL, our Table 11.3-9 was not transferred correctly from Table 11.2-7. I was really confused on it. Okay, now what.

MR. WILLIAMS: I was confused, too.

CHAIRMAN POWERS: I see.

MR. WILLIAMS: I wrote the RAI. And 11.3, as Jamie previously explained, is where the PPE values are pulled from for the different designs. And once they have decided what designs they are using and what values they are going to use, the maximum values for

each nuclide, that information then got transposed out into Chapter 11.

CHAIRMAN POWERS: Okay.

MR. WILLIAMS: And I think there was a question as far as some of the values didn't get transposed properly. And so we asked them an RAI on that and then we got together to resolve that and made sure that everything in 1.3 agreed with Chapter 11, and then went on from there for the dose calculations and our 10 CFR 20 calculations. Okay.

CHAIRMAN POWERS: It's fine.

MR. WILLIAMS: Okay. Let's see. The next slide is Slide 11. And Slide 11 includes all the results of our calculations for the information we are talking about as far as liquid and gases and the effluent dose calculations and also the 40 CFR 190 calculations. The next to the last column to the right is the applicant SSAR values. And then our independent calculation, going through their application and pulling the information independent parameters, we did the same calculations they did independently with the same code and you can see that the values came up fairly close, which --

CHAIRMAN POWERS: To the second decimal place.

MEMBER RYAN: Do you have any uncertainty on these numbers? I am a little nervous when I see 5.0 and 4.6 as being different, when they are probably not.

MR. WILLIAMS: Which one?

MEMBER RYAN: Gaseous total body. There is only a couple of them that are sort of right on top of one another. It kind of begs the question what do you have for uncertainty bars around any of these levels?

MR. WILLIAMS: Well, that is part of the analysis process. And I think you know as far as when you do a lot of calculations and you have a lot of decimal points and significant figures, things like that, --

MEMBER RYAN: I am asking the question are they all significant figures? Because 5.0 and 4.6, to me, aren't very different, particularly in that kind of calculation.

It raises the question did you do any uncertainty analysis at all, analysis of variance or any kind of -- what could the range of this number be?

MR. WILLIAMS: No, I can't say that we did that.

MEMBER RYAN: Okay, it might be something to think about.

MR. WILLIAMS: Okay.

MEMBER SCHULTZ: Steve, let me ask a question that pertains to that. On your previous slide, you said you performed an independent dose assessment for liquid pathways showing the applicants doses to be conservative. In terms of that demonstration of conservatism, how was that done?

MR. WILLIAMS: The answer Jamie gave before about the conservatism with the choosing of the highest values and the PPE, plus the values for the reactor designs that they chose and the actual two units rather than one to consider whether they met the design criteria based on two units. And they have gone through all that and they haven't exceeded any of the values in the design basis.

MEMBER SCHULTZ: Did either you or the applicant try to evaluate the degree of conservatism, given the approach that you have used?

MR. MALLON: There are a number of radionuclides from the different designs that had differences that when -- no. The short answer is no.

But when you look at the data and you see how we are choosing them, you see that there is significant over-conservatism, possibly half to a factor of two in there. And I think an important point

is your COL action item.

MEMBER SCHULTZ: Correct, yes.

CHAIRMAN POWERS: John, maybe you can help here a little bit. He has abandoned you, left you alone. Well, maybe the staff can help me.

It is my perception or understanding that the demonstration of conservatism is to show you are below the regulatory limit, that the regulatory margin is built into the definition of that limit. Simply establishing that they come in with a value below that regulatory limit is sufficient for the applicant to have demonstrated conservatism because any regulatory margin exists in both that limit.

And I look to the staff to correct me, if I am wrong.

MEMBER SCHULTZ: That is my understanding also but I just to respond or to add on to Mike's concern or consideration, it would be a way to provide a response to this.

MR. MALLON: I think the COL action item that the staff is proposing will go directly to this.

MEMBER SCHULTZ: I'm sure.

MR. MALLON: Because then have to re-perform these analyses with the actual technology selected. So, we are going to strip out a lot of this

conservatism, times two, the maximum of each, and it will collapse to a more realistic number, which should open up margin to the regulatory limit.

MEMBER SCHULTZ: I understand. Thank you.

CHAIRMAN POWERS: Caution. You want to be careful about creating margins on top of margins, on top of margins here.

MR. WILLIAMS: And in the process of all the calculations, I think I tried to say earlier there are a lot of variance in the values that you use for all the different parameters in your dose projection process, all the way from the chi over Qs that you mentioned before, everything carries some variance in some area.

MEMBER RYAN: I often describe that as scuba diving in oatmeal. It is very hard to know or to systematically pick an uncertainty bar or band around some parameter and then multiply it, divide, or add or subtract, or whatever you want to do, that with other parameters and say okay now I have done a calculation, what is my overall uncertainty for this or --

MR. WILLIAMS: Exactly.

MEMBER RYAN: -- my integrated

uncertainty. However you want to look at it. That is the tough part.

MR. WILLIAMS: I had that same question when I was at Three Mile and doing effluent program there. And you get to Reg Guide 1.21 and you have to tell what is the uncertainty to all the values that you are providing to the NRC that say how many curies you released or concentrations. And when you start adding all the uncertainties, mathematically if you were to do it, some of the numbers were astronomical, as far as uncertainty involved in the numbers that you were using to come up with your curies and your effluent releases.

MEMBER RYAN: And all of that. What I am trying to figure out is are you going to overcome that or have you overcome that. I think the answer is not quite yet.

MR. WILLIAMS: Not quite yet but that would be another thing, including as far as with research as we get on the path to revising our codes and stuff like that.

MEMBER RYAN: Okay.

MR. WILLIAMS: Okay, next slide.

The COL action that is actually consistent with all the other previous submitted ESP applications

was that site-specific -- and this is what Jamie was talking about -- site-specific details on how the new facility will control, monitor, and maintain gas effluent and liquid effluents are not available in the ESP stage. So in other words, their radwaste systems are going to be possibly newer technology, their releases will be lower. They may be a zero release plant. As far as, you know, it depends on what they end up finally providing in their actual application. And things that they provided in the ESP are, again, conservative. And when they get down to the actual site-specific meteorology, it might be a little different. And the COL, that all pans out there as far as the specific items.

The rest of it is an actual item that the applicant needs to perform effluent dose calculations based on the site-specific information. They need to reference the site ESP and associated radiological effluent doses. In fact, to stay within the bounds of that, you were speaking about that earlier, verify that the site-specific effluent dose calcs are bound by the effluent doses. Provide and justify any specific details on the effluent dose calcs concerning differences in the reactor design, re-look at the source terms, the effluent flow rates, providing

detailed information on solid waste systems and address any radioactive gas and liquid effluents to reflect the plant and site-specific COL design considerations.

So, we have a lot of work to do and the ESP isn't the end, as far as dose calculations. They have to do the final specific dose calcs based on the plant and the design that they choose and the rad waste system that they may choose. Next.

So, in conclusion, the staff finds that the applicant provided information adequate to provide reasonable assurance to control, monitor, and maintain gas and liquid effluents from the ESP design site, as far as 10 CFR 20, Appendix B, Table 2; the applicant will maintain gas and liquid effluents at levels consistent with the effluent design objectives we spoke about in 10 CFR 50, Appendix I; also under the requirements of 10 CFR 20.1301(e), the applicant demonstrated compliance with the environmental radiation standards of the EPA, which is 40 CFR 190.

And finally, the only action item from the review was that the item needs to be addressed and that would be in the COL stage.

That's all I have. Any additional questions?

CHAIRMAN POWERS: I have a question on

11.4 but I don't -- are we about to escape Chapter 11?

MR. WILLIAMS: Yes.

CHAIRMAN POWERS: Then I will ask it. Your Table 11.4.2-4 includes direct radiation. It says direct radiation from dual units but you seemed to have use a single ABWR. It just confuses me.

MR. MALLON: We need to look at that.

CHAIRMAN POWERS: Yes, I think I can understand what you are doing. It is just the heading on it just really confuses me. I mean, there is a footnote down here that says that value use here, correct dose contribution from one ABWR unit. But the column says a dual unit design, which could only be an AP1000, according to your discussion. It just confused me.

I don't think there is anything significant there, it just confuses.

MR. MALLON: The ABWR with the N-16 has a significant direction on --

CHAIRMAN POWERS: Yes, I understand you got a little more direct from a BWR, as you well know.

Fine, thank you.

MR. WILLIAMS: Good. Thank you.

CHAIRMAN POWERS: You are happy?

MEMBER BLEY: Yes, sir.

CHAIRMAN POWERS: All right.

MR. MALLON: Okay, I think Dave Robillard is going to come up and join me. Mr. Robillard has over 35 years of diverse experience in the nuclear power industry in the areas of licensing, quality assurance, work management, and outage management at operating reactors, as well as experience in the U.S. Navy Nuclear Power Program.

At Oyster Creek, Mr. Robillard was a member of the QA organization for 18 years, during which time he qualified as a Level 3 inspector in mechanical, electrical, and I&C disciplines and certified as a lead auditor.

Mr. Robillard gained an associate's degree in nuclear technology from Excelsior College in Albany in 1993 and a bachelor of science degree in business administration from Excelsior College in 2012.

And with that, we will start into our QA.

So, the Early Site Permit QA Program was developed using the NEI 06-14A template, which is endorsed by the NRC in an SER July 13, 2010. Also, at that QAPD that we developed is also based on NQA-1-1994.

And the ESP safety-related design activities were performed under Sargent and Lundy's Appendix B program, which has been reviewed and

approved by the NRC.

The Geosciences, demographic, and hydrologic investigations that were performed by MACTEC were performed under their 10 CFR 50 Appendix B program.

So, that is the scope of our activities in the SSAR that were covered by Appendix B. And that is our QA program that is presented.

CHAIRMAN POWERS: You guys have what I consider an interesting proposal here. It is under the general heading of procurement document control but it struck me as a good idea. And it says that QAPD proposes that procurement document allow the supplier to work under the applicant's QAPD program and apparently the staff agrees with you on that.

I guess my question is not to you but rather to the staff. Is this one of the things that we want to flag as a lesson learned here that can be thought about when we go back and change regulations or guidance? Because that seems like a basically good idea.

The questions that come up, of course, is when you allow a supplier to work under your QA program, what do you do in monitoring his compliance and when he finds corrective actions, does that corrective

action go into your corrective action program, which I think it would have to?

MR. ROBILLARD: Yes, this is Dave Robillard. The Appendix B and QA topical reports for the operating units do allow a vendor who does not have a Part 50 Appendix B program to work under the licensee's program. The licensee is required to confirm that the safety-related activities performed by that vendor are performed in accordance with accepted standardized engineering practices and review the results of that engineering service with technical experts to confirm that it is a sound basis for safety-related design.

CHAIRMAN POWERS: I mean it just seems to me that it expands the world of suppliers that you can draw on to provide things for you, except with the downside that you take now a big responsibility for assuring quality.

But you are really not gaining -- you are not really assuming anything because in the end you have the responsibility anyway.

MR. ROBILLARD: Yes, correct.

CHAIRMAN POWERS: I mean this seems like a win-win kind of thing here. And it looks to me like it is something that we need to flag a little more

prominently. I mean, it is a question more to the staff than it is to the applicant here.

MR. CHOWDHURY: Introduce yourself first.

MS. KEIM: My name is Andrea Keim. I have been with the NRC for 19 years. I started out in the intern program. I have worked in NRO in the vendor and quality assurance areas for the past five years. My current duties include reviewing QA programs and vendor inspections.

I have a bachelor's of engineering degree and a master's of science degree both from Stephen's Institute of Technology and my major was in material science and engineering.

CHAIRMAN POWERS: Good schools.

MS. KEIM: So, I guess we can take this back but it is when they work under their QA program, then they are following their procedures. But when they work under their own QA program, the licensee still has to go and verify that they are implementing their QA program properly.

CHAIRMAN POWERS: It didn't seem like he was gaining all that -- I mean losing all that much by subsuming a small supply and can't maintain it on an Appendix B program. And if he can work under yours and you can train him adequately in that, it seems that we

have come with a robust outcome here that everybody is happy with and expands the supplier, since supplier is a problem right now in the nuclear community.

Anyway, I flagged that one. I mean, we get lessons learned out of these ESP things and maybe this is a lesson we have learned here.

MEMBER SKILLMAN: I would like to build on Dr. Powers' question.

Who conducts audits for Sargent and Lundy and for MACTEC? It seems to me that the ultimate responsibility for 10 CFR 50 Appendix B for the ESB rests with PSEG Power.

MR. MALLON: That is correct.

MEMBER SKILLMAN: And so whatever is going on in PSEG Power under its program PSEG Power owns, also PSEG Power owns what is going on in the QA Program for Sargent, Lundy and MACTEC.

MR. MALLON: That is correct.

MEMBER SKILLMAN: So, talking about audits and back to Dr. Powers' first question, if there is a criterion 16 item, corrective action, how does it get accounted for at the PSEG level?

MR. ROBILLARD: Specifically to Sargent and Lundy, Sargent and Lundy is on our approved suppliers list for the nuclear plant. We use the

nuclear plant's procurement system. So, on a, I believe, it is a two and a half to three year basis, the NUPIC Organization performs an audit of the Sargent and Lundy Appendix B program.

In turn, Sargent and Lundy performs audits of the MACTEC QA program. They share those reports with us. If a deficiency is identified at the MACTEC level, then MACTEC will enter a corrective action item in their corrective action process. Sargent and Lundy will follow-up on the disposition of that corrective action. We will follow up on Sargent and Lundy's disposition of that corrective action.

If we identify a discrepancy in a product that Sargent and Lundy has provided to us, we will issue a corrective action item in our program, direct Sargent and Lundy, if they haven't already, to issue a corrective action in their performance improvement program and we will review the disposition of that corrective action.

MEMBER SKILLMAN: Thank you, Dave.

Beyond the NUPIC audits, how often does PSEG conduct audits on Sargent and Lundy and on MACTEC?

MR. ROBILLARD: We are members of NUPIC. We take credit for the NUPIC audit. So, once every three years --

MEMBER SKILLMAN: So, that is the single audit that occurs.

MR. ROBILLARD: Correct. They specifically look at -- NUPIC will specifically look at new nuclear activities because they are also doing that for our owner's engineer contract.

We also perform periodic surveillances of Sargent and Lundy where one of the vendor auditors will go out and pick a product and look at the training of the engineers, a certification of the engineers.

MEMBER SKILLMAN: Okay. Let's suggest for a minute that there is a finding, maybe a significant finding. Will that come out as a Part 21 from one of those two vendors?

MR. ROBILLARD: Not necessarily. It could come to a Part 21 if it was a significant defect.

MEMBER SKILLMAN: And there have been none to date, nothing like that?

MR. ROBILLARD: Not that we have seen out of Sargent and Lundy or MACTEC since 2009.

MEMBER SKILLMAN: They haven't been affected by this counterfeit part?

MR. ROBILLARD: No. S and L provides us engineering activities, no parts. MACTEC, the same thing.

MEMBER SKILLMAN: Okay, thank you.

MEMBER SCHULTZ: Is MACTEC subject to the or a part of the NUPIC audit program?

MR. ROBILLARD: I do not believe they are.

MEMBER SCHULTZ: So, it is directly through Sergeant and Lundy that those audits are prepared.

MR. ROBILLARD: Correct.

MEMBER SCHULTZ: Have you -- has your program audited MACTEC directly or are you relying solely on Sargent and Lundy?

MR. ROBILLARD: We rely on Sargent and Lundy. When we initially formed the team, I did review the MACTEC Appendix B program. I had some minor comments. They were resolved.

MEMBER SCHULTZ: Thank you.

MR. CHOWDHURY: Anything else?

MR. MALLON: No, I think that is it.

MR. CHOWDHURY: Okay. So now we will switch to the staff's presentation.

CHAIRMAN POWERS: Actually, I prefer this back and forth. It may be a little confused because we are doing a bunch of chapters. It is a lot easier if we just do a back and forth like this.

MR. CHOWDHURY: Thank you for the comment.

Andrea will cover slide 14 and then will do 15.

MS. KEIM: All right, since I already did my introduction, I will go on with our staff review of Chapter 17 included the PSEG early site permit quality assurance program description document. This is a separate document and it is based on, as they said, the industry topical report NEI 06-14A, which was approved by the NRC.

In June 2011, the staff inspectors went and performed a QA implementation inspection at the utility, at the applicant site. The inspection covered the QAPD policy documents implementing plans and procedures of the applicant and its oversight of its contractors for activities important to safety. Those included data collections, analysis, evaluation methodologies, and included site characterization.

The inspection report from the QA implementation inspection was dated June 27, 2011 and it identified one violation. The violation was against 10 CFR Part 50, Appendix B, Criterion 2, which is the quality assurance program. The criterion requires that quality assurance programs shall provide for indoctrination and training of personnel performing activities affecting quality.

The applicant's implementing procedure

also established requirements for indoctrination into training for personnel. Specifically, the procedure required indoctrination and training be accomplished prior to performing activities governed by the implementing procedures. So, contrary to their procedure and to the criterion, they had accepted or they had personnel review, a performance acceptance review of two safety-related calculations from Sargent and Lundy.

By letter dated August 24th, they provided their response to the NOV and the staff found their response acceptable or responsive to the issue. Next slide.

The staff's review of the QAPD, which is in the safety analysis report, found that the applicant described the authority and responsibilities of management and supervisory personnel in the performance and verification personnel and self-assessment personnel. It gives adequate guidance for the organization and persons to perform verification and self-assessment functions with the authority and independence from responsibilities of costs and schedules.

The QAPD provides guidance that the applicant to apply the QAPD to activities and items that

are important to safety and the QAPD meets our requirements and regulations. And the acceptance criteria in SRP 17.5.

So, in conclusion, the staff finds the applicant's QAPD for early site permit activities is acceptable.

MEMBER SCHULTZ: Just a question, Andrea. The notice of violation that is referred to here happened in 2011. And that, looking at the calendar slide of work performed, there had been quite a bit of work performed at that time in terms of calculations and so forth. The extent of condition, was it evident that there was just a couple of incidents found or did the -- maybe this is --

MS. KEIM: During the inspection I only had found two. And I think one was two years' earlier and one was more recent at the 2011 time frame.

MEMBER SCHULTZ: Okay. All right. So, it sounds as if the audit was extensive in terms of going through all of the information that had been produced over that time frame, 2008 to 2011. So, was there anything coming forward from the applicant related to extent of condition that caused any concern?

MS. KEIM: No, that is in the response where they went over what their corrective actions

were, related to the notice of violation.

MEMBER SCHULTZ: Okay, thank you.

CHAIRMAN POWERS: And this quality assurance becomes really critical in the site characterization part of this review. We will undoubtedly talk more about this in the future because that is where really there is a massive amount of data and keeping it all straight is pretty difficult.

MR. MALLON: This, if I may, it was one individual. They had signed off as an inter-discipline reviewer of the procedure. They had not signed off for the read and sign for training on that procedure. So, I applaud the NRC. Very thorough. It found a documentation.

When we divvied up activities, who had to review what, we tried to look at people's background and match them to those calculations.

In this case, the person had extensive knowledge of that topic. So, there was not a qualification question involved. He was fully capable of conducting that review. But rather, it was simply that he had not signed the read and sign. But we did have documentation that he had read the procedure because he had signed as an interdisciplinary reviewer of that revision.

So, that helped us to understand the consequences of this problem.

MEMBER RYAN: Is that the extent of condition?

MR. MALLON: We looked at a number of documents to see if there was a larger extent of condition. But this was what I am saying is folks from the consequences of that review.

MEMBER RYAN: So as far as the consequences of that review, you did kind of push the extent of condition.

MR. MALLON: We looked at the extent of condition as well.

MEMBER RYAN: And I recognize your saying that is kind of a narrower context in the big extent of condition review.

MR. MALLON: Yes.

MEMBER RYAN: Okay, fair enough.

MEMBER SCHULTZ: I appreciate that additional information, Jamie. Thank you.

MR. MALLON: Sure.

CHAIRMAN POWERS: Good. Thank you.

MR. CHOWDHURY: Thank you, Andrea.

MR. MALLON: Mike, are you going to join me?

CHAIRMAN POWERS: Don't lose any aircraft on your site. Do not lose 777s on your site. It could be lost in the grass but don't do that.

MR. MALLON: Let me introduce Mr. Launi. He has over 30 years of diverse experience in the nuclear power industry. This includes licensing, fire protection, shielding design and radiological safety analysis. Mr. Launi has a bachelor's of science degree in nuclear engineering from the University of Virginia, a master's degree in nuclear engineering from the University of Virginia and a master's in business administration from the University of Chicago.

So, the aircraft hazards, our analysis was conducted in accordance with the DOE standard for accident analysis for aircraft crash into hazardous facilities. We looked at the non-airport crash impact frequency evaluation and used the continental United States average values to understanding the probability of an aircraft crash in a specific square foot. And then we used the effective plant area to evaluate that.

CHAIRMAN POWERS: The continental U.S. averages don't really apply to the east coast Florida corridor -- I mean the east coast corridor.

MR. MALLON: Mike?

MR. LAUNI: Yes, we looked at the airways

in the area and, obviously, what the DOE standard does is evaluating crash probabilities for the facilities like Brookhaven, Argonne, whatever their labs are. And so we try to match it up against some of those facilities to see if those are the same. But in the cases of say Brookhaven, there were, I think, two -- there were several more airways nearby than there were at PSEG. And then we were looking at some of the -- while the data was hard to use from the FAA because of where the airways were, it wasn't too far off from what the CONUS averages were, as we could tell.

And also, we looked at the -- when we looked at the -- like I said, the number of airways was less and the traffic in the areas wasn't too much different. And we also looked back at, even though it was early, we looked at Salem and Hope Creek, what they had done, just to make sure that it wasn't anything that was really different. I mean, obviously, there is changes over time and we took that into account.

So, we thought that the CONUS average did make sense in this case.

MR. MALLON: And so this effort is to understand is to evaluate our compliance with the NUREG-0800, which where we have to determine that the probability of an aircraft crash causing a significant

radiological release, that probability has to be less than ten to the minus seven. So, you have to understand the probability of an aircraft release impact. And then if you meet the ten to the minus seven with that, then you don't have to evaluate the radiological consequences. So, next slide please.

In the case of a large aircraft crash probability, that probability was less than ten to the minus seven. So, we did not have to further evaluate any releases because the actual impact frequency is less than that.

For the small aircraft impact, however, it did exceed, the probability exceeded ten to the minus seven. So, then we had to contact the vendors and look at the core damage frequency from the small aircraft impact, what would that frequency -- what would the probability of that release be? Because you need to have core damage to have a significant radiological release.

And all four technologies had a core damage frequency of less than ten to the minus seven so that the net result is that we meet the ten to the minus seventh requirement for the probability.

MEMBER SKILLMAN: Jamie, may I ask you please to just expand a little bit on large aircraft

versus small aircraft and speed of the aircraft?

MR. LAUNI: There is, and I don't have it in front of me, but there is a definition in the DOE standard for the definition of small and large aircraft and we followed that. And it may have -- it is based on the size of the aircraft.

Because in the standard they have a definition. And then we used that definition and determined -- from that definition we took the information that was from the standard on those crash probabilities per square mile and put the categories in for like the CONUS averages and that is what we use in the evaluation. I can get the exact definition for you. I would have to look it up.

MEMBER SKILLMAN: Yes, I would like to see that and I am raising the question because the C5A or a Starlifter or a 747 or a 777 will create one type of scenario, very large aircraft probably moving slowly because they are low versus a Mach 1 Phantom jet or a modern, up-to-date naval aircraft, F-18 at low altitude at Mach 1, not armed.

And the difference is what happens with spindles of the turbines. At least, that is the experience I have had in the U.S. and in Europe.

So, I am curious. Is there a larger story

here that is masked by assumptions that needs to be explored?

MR. LAUNI: I don't think so, at least from a standpoint of one, talking about the speed. All of the three federal airways that are nearby are the commercial airways. There were military airways that uses the say F-18s whatever on. Those were a considerable distance away and did not fail the criteria for being less than five miles from the edge of the airway for the military airways, except for one example. Like the normal military, I think the closest one was about 30 miles away, somewhere in that area.

Now, there were some slow speed military training routes that are used. These are not the high-speed routes that some of the transport planes used. There were six of those that were within the five-mile distance and those were evaluated. And there was very little traffic on it. I think it went from I have a table here, it is 358, per year they went from 48 flights per year to 144.

So, when it comes to the probability analysis, it is insignificant no matter what you assumed in these things. These are very small numbers versus what is in the federal airways that are nearby.

MEMBER SKILLMAN: Okay, thank you.

MR. CHOWDHURY: And with that, why don't you introduce yourself?

MR. TAMMARA: My name is Rao Tammara. I am the technical reviewer for this section.

I have a master's degree in chemical engineering from India and also I have another master's in chemical and nuclear from the University of Maryland. And also another master's in environmental engineering from University of Maryland.

I joined the workforce in 1974 with a consulting company in the U.S. working on writing the several ERs in the '70s and later on switching to performing a lot of EISs for DOE sites, site-wide EISs and facility-wide EISs.

I joined NRC in 2006 and I have been given the assignment of reviewing Chapters 2.1, 2.2, and aircraft hazards. Since then, I work on Vogtle ESP, Victoria ESP, Vogtle all CWLs to date because I am the only one performing the analysis for all the CWLs. That is my qualification.

I reviewed PSEG's aircraft hazards analysis section and the purpose of the review is to determine whether or not it is a design-basis accident. A design-based accident is defined as an accident or event which has the probability not exceeding the 10

to the minus 7 having a radiological dose impact in excess of 10 CFR 50.34.

So, if that is there, then it is designated as design basis accident. So with that prospect, too, the review has been performed. And first we reviewed the PSEG supplied information with respect to the nearby airports, airways, and how they screened out on the basis of the flight to the distance information, which has been described on slide 16.

The only airways which did not -- next slide please -- satisfy the requirements are the airways, which are listed in the second bullet. And also in the review process, we identified six military routes within the five miles that has been missed by the PSEG and it has been included, too for the evaluation.

So, --

MEMBER CORRADINI: These were the training routes that they mentioned?

MR. TAMMARA: Right, that is correct.

And you can see on the right-hand side all the airways and routes for the military training grounds.

They performed the analysis with taking the DOE information and they calculated the probability

for each of the reactor technology by calculating the area. That is the only variation. And they used the other information and calculated it.

So, as they pointed out, the small aircraft probability did not meet the acceptable criterion. And now most of the six airways, I mean the original military airways also similar results were obtained because the higher the bigger aircraft did not pose, but the smaller aircraft did.

So, we looked at that independently within all the airways and those things reported are reasonable. That is why we identified those aviation model military airways. And to make a confirmatory calculation, we have obtained the FAA data for all the flights flying within five miles of the site and also ten miles of the site for the five years, latest five years, from 2006 to 2010.

So, we used that data to calculate what kind of probability we will calculate using the crash probability rates. And if we use the bigger aircraft probability, the probability calculated was less than ten to the power of minus seven.

But when we used the small aircraft probability crash rate that is given by the Sandia report, some data is, we use that one and then confirmed

the calculation that it exceeded. We calculated two ten to the power minus five per year. So, I mean that confirms the applicant's value in the range of same magnitude.

Therefore, that is the only the probability of the accident event of the crash. But in radiation, we have to see whether it is posing a problem of releasing radioactivity that such it will be in excess of dose requirement.

So, since this is an ESP, there is no really specific technology, then the applicant used the conditional core damage probability numbers for each of the technology. So, that approach we thought is reasonable for the ESP and that would satisfy the requirement that it is not a design-basis event because it will bring it to the acceptable probability acceptance criteria.

Therefore, it is okay as far as the ESP is concerned but we do not know the ambiguity whether they will keep up with one of these design technologies are. They might choose another design technology. Therefore, we put a COL action item. At the time of COL application, they have to consider the actual design, whatever they have selected. And they have used the core damage frequency, conditional core damage

frequency of that particular design. And also, they have to satisfy the requirements, probably PRA requirements specified under Chapter 19, if there was any design-basis accident was identified in any of the --

MEMBER BLEY: That sounds reasonable to me and I was going to ask, based on what they had done, I think you said you went back to the vendors on this issue for the small planes, but the exact, I suspect the parameters aren't in the parameter list that really define this because it is details of the structures.

MR. TAMMARA: Right, yes.

MEMBER BLEY: So, that makes sense to go back and look at it when you have a new design. I heard you mention the military aircraft and I didn't hear what the conclusion was on that.

MR. TAMMARA: We identified the routes for the analysis. Because in the original ESP application, that information was not --

MEMBER BLEY: Is there a different crash rate for military aircraft?

MR. TAMMARA: Yes.

MEMBER BLEY: And they are still okay on military?

MR. TAMMARA: That is correct.

MEMBER BLEY: Okay. And I had one last question. I thought there was a reg guide for doing this calc.

MEMBER RYAN: There is.

MR. TAMMARA: Yes, 3.5.1.6.

MEMBER BLEY: Yes, I am curious --

MR. TAMMARA: Not the reg guide. It is not the reg guide.

MEMBER BLEY: It is not a reg guide?

MR. TAMMARA: Yes, NUREG-0800-SRP.

MEMBER BLEY: Yes, so it is an SRP.

MR. TAMMARA: Right.

MEMBER BLEY: Okay but they used a DOE.

MR. TAMMARA: Yes, DOE is a guidance you can use what steps to follow.

MEMBER BLEY: As the SRP points you to that.

MR. TAMMARA: That's right.

MEMBER BLEY: Okay, because I didn't go check that.

MR. TAMMARA: Then they use that crash rate all the crash rate which is ten to the power minus ten for the airways and the -- in relation they have suggested that the Sandia actual data they have collected the data on various aircrafts and also

various sites. It is a data collected by Sandia a long time ago.

MEMBER BLEY: Okay.

MR. TAMMARA: But that is also a very big documentation where you can find fine-tuned crash rates. So, I apply that crash rate and see whether conservatively whether it is -- so that matches exactly with the small aircraft calculation.

MEMBER BLEY: Okay, that is what I was wondering.

MR. TAMMARA: Yes, because that is ten to the power minus five and the actual FAA data I used all aircrafts, whichever year it gave the highest. So, 2006 gave me the highest number of flights within five miles. I have the numbers here, actually.

Total flights were 163,000 miles -- 163,884 flights within the give miles. But total military flights are 3,768.

So when the FAA used the data, they categorize from which origination to which destination and what type of the aircraft it is. And they gave the number of flights. That is how the data they gave it to me and better data used when they calculated using the highest crash rate.

So, that give everybody close calculation

conform with their calculation. So, that was my independent analysis.

MEMBER SKILLMAN: I would like to ask another question. Back to slide 18, please.

So ESP, once granted, is good for about 20 years. So the crash rate data is 2006 to 2010, roughly. Will the crash rate data be revisited 15 or 18 years from now before actual construction for what could be a very different flight path usage?

MR. TAMMARA: The aircraft crash rate is really determined by either statistics or observation of the data. That is, crashes per square mile. So, the question is you take that crash rate and multiply by the number of the flights, by the distance, so that you will get the probability.

So, the only thing is the crash rate data probably may vary may not vary, it is very difficult because we may not have a good handle unless somebody really researches and produces a new number. But the only thing is, due to the time frame, you could expect the number of flights to increase, potentially.

MEMBER SKILLMAN: Well, I don't know what will happen 20 years from now and that is why I am asking the question. Is there a COL item to revisit this sometime?

MR. TAMMARA: No, no, there is not. There is not.

MEMBER SKILLMAN: So, once the ESP is granted, --

MR. TAMMARA: Right.

MEMBER SKILLMAN: -- the aircraft crash frequency and consequences are locked in, based on this standard review plan.

MR. TAMMARA: Right. That is correct.

MEMBER CORRADINI: Can I ask the question differently, though? So, let's just say, let's just taken an extreme, just so I understand Dick's question and your answer.

So, if ESP is granted or, accepted for this site and 15 years from now, plant design X, which is certified as picked, it has to first fit within this envelope but they have to then do calculations based on the current information. Is that not correct or am I wrong about that? That is what I was trying to --

MR. TAMMARA: That is the COL condition we have imposed.

MEMBER CORRADINI: Okay. Okay, that is what I thought.

MR. TAMMARA: At that time, they have to take this quote conditional core damage frequency of

that particular technology and show it will meet it is not a design-basis event.

MEMBER SKILLMAN: At the time of actual licensing.

MR. TAMMARA: At the time of -- yes, right. In addition, in the COL there is a requirement if that is categorized as a design-basis event. Then they have to do a probabilistic analysis to show it, as a part of Chapter 19, to show the core damage frequency requirement is met.

If it is not met, then they have to make a design change or whatever at that time. I do not know to answer that question. But there are a couple of steps. In addition to this one, it is so conservative right now, if you take a look at the actual crash probability and multiply by the core damage frequency, the margin is reasonably assures that it will meet.

So, we look at it in that perspective and then we are concluding yes, it has a reasonable assurance. However, you have to do this COL action also in the COL stage.

MEMBER SKILLMAN: Okay, thank you. Understood.

CHAIRMAN POWERS: I have in my notes an indication to me that, unfortunately, I would fail a

QA audit here because it is not a very good note, that the applicant interrogated the local aircraft areas and did not see any evidence that they anticipated massive upgrades.

Did the staff independently verify that? Because one local aircraft, I assume it is just a commercial aircraft site and --

MR. LAUNI: You know like the airports' traffic?

CHAIRMAN POWERS: Yes.

MR. LAUNI: Yes, that is because we checked on what the expansion plans were for the airports in the area.

CHAIRMAN POWERS: And they didn't indicate anything. And asking the military what they plan is a waste of time.

(Laughter.)

MR. TAMMARA: We looked at it and reviewed the current existing ones but not beyond that.

CHAIRMAN POWERS: But you asked them and they had no plans for an immediate upgrade to handle lots of leer jets to benefit a major casino that is going to be built in this area or something.

MR. MALLON: It happens.

MR. TAMMARA: But that might probably --

at the time of COL maybe they will look into recalculating the probability. I do not know. Maybe that will --

CHAIRMAN POWERS: Yes, in these ESPs because, as Mr. Skillman pointed out, we are looking 20 years in the future. We are trying to anticipate what changes in the flight path are and it is very frustrating because the military won't tell you and the commercial sector gives you very not useful information, in general.

But local airports, if they are planning something in the next five years, you kind of know. It is usually a politician advertising that is pushing this thing.

MR. TAMMARA: Next slide. The staff independently verified the applicant's assessment and looked at aircraft hazards at PSEG site and finds that the estimated probability is acceptable and also the aircraft hazards do not present any undue risk to the safe operation of the nuclear units at the proposed site.

And PSEG site meets the relevant requirements related to the aircraft hazards. The only thing is the COL action item 3.5.1.6 must be addressed at the COL stage.

CHAIRMAN POWERS: Any other questions on this matter? I am going to take a break at 11:00. And at that time, I am going to interrupt this and ask Mr. Gunter to provide his comments on this application and I look forward to that.

And then following, we will come back and resume the chapter by chapter discussion.

And we will break until 11:00.

(Whereupon, the foregoing matter went off the record at 10:46 a.m. and went back on the record at 11:00 a.m.)

CHAIRMAN POWERS: I would like to come back into session. I would like to invite Mr. Paul Gunter to address the committee. And Paul, you may not have been here when I introduced, I did ask people to give a little bit of background about themselves before they provide their comments.

MR. GUNTER: Thank you, Dr. Powers. My name is Paul Gunter. I am Director of Reactor Oversight Project at Beyond Nuclear. I have, for the past 37 years, I have been involved in the public interest, a public advocate, and a public intervener.

We have been before the NRC Atomic Safety and Licensing Board on license renewal, such as the Oyster Creek nuclear license extension. New

licensing, we were a co-intervener in the Calvert Cliffs Unit 3 proceeding. And also I have been involved as an intervener in the Grand Gulf early site permit.

So, I would like to basically start off our comments by saying that the early site permit process isn't, of itself, very problematic in terms of the public interest.

In fact, the process puts the public at significant disadvantage from the very beginning, principally because we are dealing with a dream reactor, maybe more appropriately a mirage reactor, where you can see something but really there is not -- you know the parameters are so broad that the substance is not tangible in terms of particularly the intervention process.

And it is important to note that you have raised the question several times here how the ESP impacts the whole licensing process. Well, it most effectively does, is it drives the intervener out of the process early on with very little tangible parameters to work with in a legal challenge.

And the concern, of course, is that there is a big difference between questioning and adjudication, particularly with regard to the ability

to cross examine and discover. So, the ESP process itself puts the public at significant disadvantage.

And I just wanted to -- I appreciate the time you have given me but I am going to run through several concerns fairly quickly, in the interest of time.

One of the first concerns, of course, is that the broad parameters of the reactors design options PSEG has put forward, four options but it is clear that the sky is the limit, in terms of what could come up within the next 20 years. And in all these cases, however, it is our understanding that the NRC process through the ESP interrogation relies largely upon the vendor data and that is personally for a under of uncertified designs.

So, this presents a problem in terms of that a lot of the parameters right now have not really been validated and verified through a design certification process, for example.

Another concern, of course, is that the ESP essentially qualifies the site under the national environmental policy act and then you can park it for 20 years. This is significant, particularly in terms of an intervention that would seek to evaluate a site for alternatives that are less harmful, as defined

under NEPA and more affordable, frankly, in terms of projecting the economy out 20 years.

This is specifically significant for the PSEG site because New Jersey has demonstrated a legislative commitment for renewable energy. I am sure some of the New Jersey folks are going to speak later, are going to provide you more detail on that. But one that I just wanted to draw out is that currently the Atlantic Wind Connection, which is offshore wind development has set forth to under financing under Google Corporation to begin the process of 189 miles of high voltage DC line specifically dedicated for offshore wind farms along the licensing term that we are talking about here for the PSEG project.

So, that again, it demonstrates that the intervention and the intent behind the national environmental policy act is essentially undermined by the ESP process.

Another concern I wanted to -- and I have provided this in written comments as well is one principle concern we have right now is for the licensing process post-Fukushima. And this particular site we are talking about co-location of one or two additional nuclear power plants of unspecified design adjacent to a GE Mark I boiling water reactor.

I am sure you are all aware, deeply involved in the protracted process currently in the Fukushima Lessons Learned Task Force and the action items that are unfolding but not yet determined. So, we are moving forward for environmentally qualifying the site to be co-located with three other nuclear power stations, one, in particular, very problematic in terms of unreliable containment and raising a number of issues, including the venting of containment.

And environmentally qualifying additional nuclear power plants on a site where we could see containment venting procedures not only for the Mark I but also for the two Westinghouse pressurized water reactors, where venting is projected to be considered somewhat down the line.

So, locating an unspecified design, environmentally qualifying the site, given the open-ended nature of the current problematic designs and unreliable containment specifically for the BWR there raises some concerns that are essentially masked by the ESP process.

I think it is a public concern that the current probabilistic risk assessment process is essentially based on single event units. And this, again, underscores the concern for co-locating

additional nuclear power plants on multiple sites and this has been dramatically now demonstrated by the simultaneous events at Fukushima Daiichi.

Another concern that I wanted to raise is the whole issue of emergency planning in a post-Fukushima world. We clearly saw that the accident at Fukushima went beyond the ten-mile emergency planning zone, which is what we currently base our plans on right now for the emergency response actions. But more of concern is that it has also demonstrated a much larger complication by evidence of the fact that the unsecure annual dose assessments for one millisievert per year, we now have many, many Japanese living in areas that are contaminated under 20 millisieverts per year and they are not being provided with any relief. So that, I think that that further underscores the public concern that is out there that is evident -- that sees the evidence that the consequences of multi-unit reactor accidents potentially dwarfs and actually has dwarfed the emergency procedures, specifically for evacuation of people from contaminated lands. And that, again, raises a concern that basically escapes the radar of the ESP process.

One concern I noted here this morning with

Chapter 11, again, with the issue of groundwater contamination. The Salem-Hope Creek site has gone through extensive review with regard to groundwater contamination from tritium releases at that site. And it raises the question about again, given that we don't have a specified design parameter for this mirage plant where we can actually evaluate the environmental impact of buried versus engineered pipes that carry radioactive water. We have no sense of what the PSEG plan is right now, whether it will bunker pipes to contain future leaks, whether it is prompting an environmental review that is based on actual monitoring, rather than burying a pipe system that carries radioactive water. So again, another example where we raise concerns where the ESP essentially masks the environmental review.

One more concern, of course, is with regard to the aircraft hazard. I can attest that our experience in the community and our central concern is not so much the ability of a piloted aircraft to avoid a nuclear power plant either by flight plan or by corrective actions but our concerns are more focused on deliberate impact with an improvised explosive device from an aircraft. And this applies to any of the small aircraft that could fly from a number of

airfields around the PSEG site where you don't have strict pilot review secure cockpits, checked supplies. You know there is a public concern that there is a chink particularly in going through a process that is based on probability as opposed to deliberate acts.

This again, we raise the concern that you are talking about co-locating one or two units on a site that has already been identified by Argonne National Labs to have reactor units that were never designed or constructed for aircraft impact. Now we are talking about a bigger target set and increased source term. This should prompt an evaluation of the significant radiological releases from the aircraft impact. But you know we understand that you are working in the confines of (b)(5)(B) but we are concerned about the fact that core damage events can be initiated by aircraft impact outside of the containment structure, control rooms, for example.

Again, we don't have any idea of what the proposed design would be. So, it is very difficult, impossible to basically raise this issue.

So, I think that will conclude my remarks and I thank you for the time.

CHAIRMAN POWERS: Thank you, Paul. I hasten to remind people that the ACRS does not typically

review issues of deliberate acts on attacking a nuclear facility.

Any questions for Mr. Gunter? No? Okay, Paul, I appreciate it.

MR. GUNTER: Thank you.

CHAIRMAN POWERS: On to Chapter 15.

MR. MALLON: Chapter 15, the accident analysis for the design-based accidents. A little harder to do using a plant parameter envelope because each technology has different effluent pathways for how the accident source term gets out. So, rather than try to evaluate each one, what we did is we evaluated all of the design basis accidents for all four of the technologies. And this was done because the dose calculations that are done in the design cert for an EAB and LPZ, those dose values are linear with respect to the atmospheric diversion factor, the chi over Q. So, you can ratio the site accident chi over Q, the worst-case chi over Q to the values used in the design cert to develop what the expected EAB and LPZ doses would be for each design-basis accident from each technology. So, that is what we did and we showed that we are well within the regulatory limits with those.

With that, any questions?

MEMBER SCHULTZ: One question on the chi

over Q, I guess it was in the NRC's presentation associated with the -- about the determination of that, that it was based on three years of meteorological data. What three years was that? In the charts that you provided earlier you show starting in 2008.

MR. MALLON: It's '06, '07, and '08.

MEMBER SCHULTZ: Oh, okay.

MR. MALLON: We used our existing met tower and we used those three years. We did also compare what we determined from those three years to the 30 years, some gross indications, some wind rows, --

MEMBER SCHULTZ: That's my question.

MR. MALLON: -- to understand that this three years was not anomalous, that it was consistent with the other 30 but it represented the most recent data when we were preparing the application.

CHAIRMAN POWERS: You have a real advantage of having a big database to compare on. There is a question, of course, is that we have a sizeable community of people claiming that, with some foundation, that the weather on the Atlantic Coast goes through periodic variations. And so the question is, does your 30 years, where does it stand in that periodic variations? We have another group of people with

someone less established technical basis claiming that there are more shifts in the weather that is going to be experienced. So, how do you address that?

MR. MALLON: I think I am going to wait until the May meeting when I will have my meteorologist here. Those are good questions.

CHAIRMAN POWERS: The first question, the one on the periodic shift because it does seem to be founded with a substantial amount of data, I think you would. I will guarantee the second one there is no answer to. The answer that we have adopted in the past is well, if at the time of COL we see global warming or cooling or whichever it is, we will have to confront that when we get to it because there is no answer to that one.

But the one on the periodicity of whether on the Atlantic coast, I think is one that I would enjoy hearing from the meteorologist and I am willing to wait for that.

MR. MALLON: Okay.

CHAIRMAN POWERS: Because it will come up again, I guarantee you. It has come up in every ESP so far. So, I wouldn't want to deprive you of the opportunity to expand on that one.

MR. MALLON: Thank you. And with that, I

turn it over to you, Rao.

MR. CHOWDHURY: The staff's presentation on Chapter 15, 15.0.3, Rao is again the reviewer.

MR. TAMMARA: The staff reviewed the Chapter 15 transient and accident analysis section with respect to the radiological consequences of postulated design accidents related to the proposed site. So we give you entails the conformance to the requirements addressed in 10 CFR Part 100 and also 10 CFR 50.34, and also the EPS 10 CFR 52.17 ESP requirements.

As the applicant presented that they have evaluated all four designs source terms and doses and they also presented for each of the accident the source terms as a typical source term that they have presented in the application, we reviewed -- we glanced at the releases and looked at the appropriateness and reasonableness with respect to designs but this is not considered to be a blessing with finality on the source terms. But we looked at that and then accepting assured ourselves the source terms they have presented for each of the accident is not unreasonable. They are, from the design perspective, whatever the documentation in DCD and whatever they have documented in the SSA.

Based upon that one --

MEMBER SKILLMAN: Let me ask a question. Mr. Gunter raised, in my view, a very important question. The question was what you are talking about here is a mirage. It is a vision of something that will be many years from now. Operational safety kind of trumps everything we do in this business but knowing that we are enveloped by accurate accident analysis gives us the ability to sleep at night.

So, to his question, why is it acceptable to use this PPE methodology for a mirage plant?

MR. MALLON: We didn't use the same PPE approach for accidents as we did for normal gaseous or liquid releases. If you remember, we took the maximum from each technology for each radionuclide for normal operational effluence. In this case, we didn't. We evaluated every design basis accident for each reactor technology. So, we did --

MEMBER SKILLMAN: Well now wait a minute. You already said you can use a gas-cooled reactor and you can use something else on this site.

MR. MALLON: For the four technologies that we evaluated, that is what we evaluated. When we get the permit, the permit will say these are the accidents and these are the releases. If I choose a very different design, then I am going to be challenging

my envelope and I will have to resolve that in the COLA space. And that will be fully a public process. That submittal will be in the public domain for people to review and open.

MEMBER SKILLMAN: Okay, fair enough. Thank you.

MR. TAMMARA: So, basically, we looked at the site chi over Qs and compared again as to the each of technology documented chi over Qs, whether they will follow the envelope, and we took the doses documented by the design, those four designs. And we ratioed the site chi over Q to the design chi over Q and multiplied by the dose and then looked at whether it will meet the requirement for each of the accident scenario they have addressed.

So, in meeting that one, we compared and looked at for each design LPZ and EPZ -- I mean EAB. The dose criterion is met for each of the accident for each of the technologies.

MEMBER SCHULTZ: And that ratioing approach is the same that the applicant gives.

MR. TAMMARA: Because the information is same, it is not --

MEMBER SCHULTZ: I understand.

MR. TAMMARA: However, I want to make an

emphasis that their chi over Q values we recalculated or confirmed that the calculations were performed under Chapter 2.3 and therefore assessed, approved, or concluded that they are comparable and consistent.

So, those are the chi over Qs we used. So, therefore, we are -- I did not do a confirmatory calculation but in a way, we used our chi over Qs to make sure their chi over Qs were consistent. So, that is the approach we have taken.

MEMBER BLEY: And just to follow up on Dick's question earlier. If when they actually, when they come to a COLA, if they put in completely technology that has different accidents that have to do their accident analysis but still, you would be comparing the chi over Qs from those accidents to the bounds that were set up through this process.

MR. TAMMARA: No, at that time, probably they will do the actual calculation of the dose for that technology using whatever the chi over Q, maybe site chi over Q. We do not know. That is an ambiguity. But at that time, the review will be taking calculation --

MEMBER BLEY: Of the whole Chapter 15.

MR. TAMMARA: -- take our chi over Qs and the dose calculations and see whether their dose

matches.

MEMBER BLEY: Okay.

MR. TAMMARA: So, whether they are within the regulatory requirements.

MEMBER BLEY: All I was saying is we are not reliant on it being the same set of accidents.

MR. TAMMARA: No. Even though they have given the source terms in the application, we are glancing but we are not approving those source terms there. There might be a warning because they are not unreasonable. That is why we are saying but they are not actual.

CHAIRMAN POWERS: I appreciated the language in the SE "are not unreasonable." Talk about faint praise.

This part of the analysis is more critical at other sites that are more sensitive. I mean if they were locating this in Westchester County, probably it would be much more difficult for them to pass this aspect. But for this particular site with its low population, it may seem a little weak but it serves a function that they were located outside New Orleans or something like that.

The ESP applicant calculated site-specific doses for a variety of LWR designs and

a variety of postulated DBAs. Doses for the spectrum of transient and accidents for each reactor technology considered to meet the dose acceptance criteria specified in Reg Guide 1.183 and NUREG 0800, LWR DBA analysis.

Based on this review meteorology data presented, staff considers the applicant approach reasonable and acceptable in meeting the DBA radiological consequence requirements, meeting the requirements.

MEMBER SCHULTZ: So from the applicant's discussion, and I will ask Jamie, would you say that you calculated site-specific doses? In other words, it sounded as if you demonstrated that the chi over Q value was lower than what had been used in the calculations that had been done for the designers, the reactor designers, what they had done for the Chapter 15 evaluation, not that you calculated it. I guess by a ratio you may have presented results.

MR. MALLON: We did a simple arithmetic ratio because the doses, and there is multiple pathways, you know how does it get out a steam line, how much iodine plates out.

MEMBER SCHULTZ: Right.

MR. MALLON: These are very complex

analyses. So, we can't do that because we don't know the orientation of the site. We don't know where our risk point is going to be.

MEMBER SCHULTZ: Exactly.

MR. MALLON: So, we assumed a footprint for the plant and we assumed the release was on the perimeter of the footprint so that that maximizes the dose. And then we, just because it is linear with respect to chi over Q, a simple ratio is arithmetically correct.

When we do a COLA, because we don't know the orientation of the plant, where are the control room air intakes, I don't know that, I will try to position them in a favorable manner but I have to redo the analysis for control room habitability and TSC habitability. And at that time it is a simple matter of putting another receptor point in for the EAB and LPZ. And then I will have a truly site-specific analysis.

MEMBER SCHULTZ: Good, thank you. I wanted to get that explanation on the record because calculated may be interpreted in different ways. And that is a good description of what not only has been done now but what needs to be done in the future. So, I appreciate that. Thank you.

MR. MALLON: Sure.

MR. SEGALA: This is John Segala. I just wanted to add something just maybe for some perspective. When we do design certifications, we don't know where we are going to be putting the design. So, the applicants come up with site parameters. It is kind of like the PPE envelope but they envelope sites. And so they pick maximum wind speeds that cover 75 percent of the sites out there and then they do analysis based on that.

Likewise, on ESPs, we don't necessarily know the designs we are going to put, so we do an envelope of the design parameters, which becomes part of the plant parameter envelope. So, those chi over Qs that are done on the design search, we don't know what site we are putting it on, so they come up with the bounding chi over Qs, that bound a lot of sites, so that they can potentially put that design on as many sites as practical.

So, there is a lot of similarities. It is done from a different perspective but I just wanted to highlight that.

MEMBER SCHULTZ: I appreciate that, too. Thank you.

MR. TAMMARA: Any questions?

CHAIRMAN POWERS: I think we are in a position to move to the meeting topic here.

Undoubtedly, we will interrupt this for a lunch break sometime here. So, if you happen to know an appropriate place to interrupt, otherwise I will break at the scheduled time, which is 12:30.

MR. MALLON: Okay. I would like to introduce Dave Burgin. Dave had spoken earlier when a question came up associated with our emergency plan. Mr. Burgin is the Corporate Functional Area Manager for Emergency Preparedness for PSEG Nuclear. He has over 29 years of EPA and public affairs experience. In addition, Dave is a member of an NEI EP working group. The utility service alliance, ESA, US EP working group, and he is also part of the INPO EP Advisory Group.

Dave did his master's thesis on public and political opinions surrounding the Salem and Hope Creek Nuclear Generating Stations and he has been published several times addressing nuclear power plant emergency planning standards.

Dave also works closely with state, local, and regional emergency response organizations.

So, with that, we will move into this.

So, as I had mentioned at the beginning, we saw emergency planning as an important part of our

ESP application. We had a desire to make sure that we could submit a complete and integrated plan with all the state involvement, local involvement in there. And we needed to comply with all the regulations that I have cited here. We did that by basing -- next slide please --

We based our ESP emergency plan on the existing operating units' emergency plan. It is separate from those operating unit plans. So, it is stand-alone but it is directly modeled on that plan, a plan which has been in place for 20 some years and is exercised every two years integrated exercise. So, we know this is a plan that is functioning.

We did perform a new evacuation time estimate study and it showed reasonable times. And again, given our population --

CHAIRMAN POWERS: That is not the -- in the evacuation time estimate, time is not so important. It is the impediment issues and things like that that are crucial in the evacuation. So, you probably want to talk about those.

MR. MALLON: Okay. We submitted the state emergency plans from New Jersey and Delaware, which are part of the plume exposure planning zone. Maryland and PA are part of the ingestion planning zone.

We provided the updated cert letters and memorandum of understanding, with the various entities, be it the Coast Guard, the Army Corps, and the various states.

Now, here is a typo in this next one. It says here we are deferring to COLA the emergency facility details. That is true of the TSC and OSC. The EOF location is known. It will be co-located with our existing EOF, which is in the Town of Salem, about seven and a half miles from the site. So, that is a typo. I apologize for that.

CHAIRMAN POWERS: When we get to the EOF, we would want to discuss that and how that interfaces because that is the same EOF you use for --

MR. MALLON: Salem and Hope Creek.

CHAIRMAN POWERS: -- Hope Creek, yes. We would like to understand that a little better.

MR. MALLON: Sure. Okay. So, the on-site, this bullet really gets to the facility-specific on-site details are not known. We don't know where the control room is TSC. We don't know how the communication system power supplies will be configured. And therefore, that information is deferred to COLA.

And we will, we have committed to revising the E-plan to implement the revised EP rules regarding

the drill cycle duration and frequencies. And that submittal will be with three of the ESP, which will be submitted at the end of this month.

MEMBER SCHULTZ: So Jamie, you have written this so that it presents what I believe to be true, that you have different emergency plans for Salem and Hope Creek.

MR. MALLON: Yes.

MEMBER SCHULTZ: Two, you have two plans?

MR. MALLON: We have one plan for Salem and Hope Creek and one plan for the new nuclear plant.

MEMBER SCHULTZ: Okay.

MR. MALLON: They will be co-located with a contiguous security boundary.

MEMBER SCHULTZ: Right. But the TSC, the OSC is different for Salem and for Hope Creek.

MR. MALLON: Salem TSC and OSC are different.

MEMBER SCHULTZ: You have one plan that --

MR. MALLON: Yes.

MEMBER SCHULTZ: -- integrates the site operational as well as the offsite emergency planning.

MR. MALLON: That is correct.

MEMBER SCHULTZ: Okay, thank you.

MEMBER SKILLMAN: Well just let me ask

this, please.

MR. MALLON: Sure.

MEMBER SKILLMAN: There is a good distance between Hope Creek and Salem. I suspect there will probably be a fair distance between Hope Creek and what would be the new unit to the north. I am just guessing, based on my knowledge of your site.

MR. MALLON: Yes, 100 yards.

MEMBER SKILLMAN: What will the security be like? Will you have one perimeter or three perimeters for security?

MR. MALLON: Well, right now we have one perimeter for Salem and Hope Creek. When we chose our location, one of the factors was that we could make it a contiguous security boundary between Salem, Hope Creek, and the new unit. And we don't have a whole lot of details on that. We did not submit a security plan in our application. But we did review location selection with our security director to get some input about different locations and it was a preferred location. He felt it broadened his possibilities to respond to an event.

MEMBER SCHULTZ: Let me go just a little bit further while and this is almost off topic. It is not quite. You have your own firefighting team

on-site.

MR. MALLON: We do. We are unique in that.

MEMBER SCHULTZ: Yes. And would that firefighting team also respond to your new unit as you envision it?

MR. MALLON: Yes.

MEMBER SCHULTZ: Okay, thank you.

MEMBER SCHULTZ: I just want to pull the string a little bit further. It sounds as if, for the purposes of this application, you have conceptually separated the emergency plan for the units we are -- for the site we are discussing here from the operational unit emergency plans. But if one envisions the COL process and moving forward the installation of the unit or units, that you will have an integrated emergency.

MR. MALLON: We haven't committed to that yet but we are keeping that option open. We think that that may be valuable to us, moving forward.

Certainly, most of us, for me, I will speak in my terms, being a plant guy, I thought the E-plan was largely on-site. And then getting a little closer to it as part of this process, I have come to realize the largest portion of the emergency plan is offsite.

MEMBER SCHULTZ: Correct.

MR. MALLON: So, by being able to submit that and having that reviewed and making sure the State of Delaware wants to participate, that is really important. That was the problem at Seabrook and Shoreham.

MEMBER SCHULTZ: Right.

MR. MALLON: And so making sure we have everybody at the table is very important. The details of on-site are small compared to that.

MEMBER SCHULTZ: Right. But if I were the state looking forward, I would want to be assured that there are not two separate emergency plans I would need to deal with.

MR. MALLON: From their standpoint, there is one. We call them.

MEMBER SCHULTZ: Okay.

MR. MALLON: And they implement their plan.

MEMBER SCHULTZ: I understand.

MR. MALLON: So, here is our ten-mile emergency planning zone. On this slide, we put the proposed causeway. That is that yellow and black dashed line going up to a little south of the Town of Salem. What is not shown here is the road system that would then disperse the folks off.

When we were doing the ETE for the on-site people, how do they get out in a site area emergency, and you would evacuate the site, it aided us in that instance. The road system, the current access road can only handle 1400 cars in an hour. So, there was a need to supplement that in order to evacuate construction workers as well as the additional plant staff. And you can see where the five-mile radius is.

And then in terms of impediments, we are fortunate in Delaware that there is a nice road system. One in 13 are good north-south roads. So you can get people out of the way quite quickly and that helps us in the ETE side. Next slide, please.

MEMBER SKILLMAN: Let me ask a question.

MR. MALLON: Sure.

MEMBER SKILLMAN: I have been to your site a number of times and I have always been interested in how on an icy day how tricky it can be to come down through Glassboro into Salem and find your way down through Hancock's Bridge and find your way onto the site.

If this plant were to be built and it was a two-unit, you would have five units down on Artificial Island.

If you had an all-call for all five units

for whatever reason, a multi-site event, whether it is security or something else that is pushing you beyond an unusual event, you are heading to a site or perhaps in general, will the road system on the New Jersey side allow your EOF to be staffed in time?

MR. MALLON: Do you want to talk about Sandia?

MR. BURGIN: David Burgin, again, from the Corporation Functional Area Manager of Emergency Preparedness.

The Sandia study took a look at our road network and also the times that we have to get down to our plants. One of the things that we have worked with our locals very closely with over the years is making sure that those main roadways are cleared for us during snow storms and other types of emergencies so that we can get our people down to the plant.

A prime example is last week we had snow. The road network going down to the plant are the first roads to be cleared through our counties that we work with in New Jersey. Those have agreements with the bridges. So, even during emergencies where the bridges may be closed, what we can do is we can still get people in from Delaware by using our identification. And if still safe, they will take us

over the bridge to get people in there. So, that is a very critical and very important and very serious commitment that we have, is to make sure that we get our emergency response organization in, obviously, to support the station to make sure we safely shut down the plant and that we work with our state and local response organizations.

MEMBER SCHULTZ: Is that same commitment valid for populating the EOF up in Salem?

MR. BURGIN: That is correct.

MEMBER SCHULTZ: Yes, okay, thank you.

MR. MALLON: Okay, next slide. Here is our 50-mile emergency planning zone. And now this is the ingestion pathway for food products in the area that might then be ingested by people in that population. So you see now that we encompass Philadelphia and the upper portion of Maryland as well. And that is why they were included in our application.

CHAIRMAN POWERS: I noted that milk was identified as one of the primary foods for ingestion in there. And assuredly that is true if I integrate over a year. It is not clear to me that that was true seasonally.

I am not as familiar with the territory as Dick is but it struck me that fruit and vegetable crops

might be more likely to be ingested during certain times of the year. I mean you focus on milk.

MR. MALLON: Yes. I am thinking about my own experience where I live in Pennsylvania and the dairy cows are out in the winter, unless there is snow on the ground and they --

CHAIRMAN POWERS: I don't doubt if I integrated over a year milk is the item that you would focus on a lot. But it struck me that seasonally in that are that I could find apples and other kinds of things that would be a primary candidate for ingestion in that area during particular seasons. And I am interested in having you comment on that.

MR. MALLON: I will go back to milk. I think milk because of the iodine-131. We saw that at Chernobyl.

CHAIRMAN POWERS: Yes, there is also a strontium problem as well.

MR. MALLON: Yes. Other food products, I think that what we are seeing there is that it is informed by the nuclide transport and the dose pathway. So, I don't know how --

CHAIRMAN POWERS: I can assure you that apples were the primary interdiction in the Ukraine area.

MR. MALLON: Were they?

CHAIRMAN POWERS: Yes.

MR. MALLON: Surface deposit, though.

CHAIRMAN POWERS: Largely surface deposit deposition, yes.

MEMBER SKILLMAN: I will venture a thought tongue and cheek. I would think Campbell's soup would have something to say to you guys. All those tomatoes that are grown in that huge swath of land, at least used to be, fed up to the Campbell's soup place. I think there were tens of thousands of acres of tomatoes under cultivation, Vineland and all of the areas just outside of Hancock's Bridge.

CHAIRMAN POWERS: Yes, tomatoes, cucumbers, things like that were also interjected in the Delaware area.

MR. MALLON: But I think fundamentally, I don't know the answer to your question. I think there is a piece of it that is involved with the State of New Jersey who is responsible then for implementing that. That is part of their emergency plan to control food products and limit their exposure.

CHAIRMAN POWERS: They are the ones that make the decisions on that. It is just that in your application, you focus strictly -- well maybe not

strictly -- but pretty much on milk as bellwether here. And it struck me that there are probably times when it is not the only thing. Milk always, because cows produce milk all the time but there is probably times when you need to consider other things.

MR. MALLON: Okay. Now, you said you wanted to hear about the EOF. And so while I don't have a prepared slide on that, I don't know, Dave, if you are comfortable talking about our EOF.

MR. BURGIN: Are you looking for how the EOF would handle a common site event?

CHAIRMAN POWERS: Yes, a common site event when you go from -- I mean you do have I think a real possibility of an operator SCRAM accident here. So, you have got any event is an all-event situation.

MR. BURGIN: So, as you are here today, we are in the process of upgrading our EOF as we talked, to make sure that we can accommodate better than we have in the past a common site event. And we have the ability to monitor and take a look at what is going on down at the plant, based on a common site event and our EOF staff is considered common staff and will have the right technical expertise to complement that staff so they can address each individual unit and their different technologies.

MR. MALLON: They also, being a member of the ERO, we drill what is the effected unit, what is happening in the other units. That is part of every drill that we conduct. So, we are always watching the other units. And what Dave is saying about the staff there, we will have a mixed staff. So, the ED might be a Salem guy but he also got some SRO-type people supporting him. So, we have a mixed makeup of teams.

CHAIRMAN POWERS: It seems to be very critical because the technology you choose for this new site is not going to be at all the same as the existing units. And it is hard enough to be expert in one.

MR. MALLON: Yes, it is.

MEMBER SCHULTZ: So, if I understand what you have just said in terms of the improvements, then are you adding more personnel to the EOF response, in order to augment your capability for the overall site response than what you have done before, which has been perhaps more design-focused?

MR. BURGIN: That is correct. You would augment. That is what you have to look at with a common site event is making sure that you have got the right technical expertise in the facility to respond to all three units.

Remember, you have your initial augment

with your emergency response organization and then you go after any person that you need to best take care of that situation. So, we would use both of those methods to get the right people to address the situation on-site.

MEMBER SCHULTZ: And the upgrades are largely around capability.

MR. BURGIN: Capability and information. It is also critical that we have our states co-located right there in our EOF with us, too, so they can get that first-hand information as well.

So, there is no delay in making sure that the states have what they need to make critical decisions.

And one of the things that we have done, even though it is not necessarily something that you have to demonstrate, but we have to make sure that our teams in the emergency response organization understand how to respond to a common site event. So, we have given them similar scenarios already to make sure that they can respond. And we would do the same thing if we brought another technology on.

MEMBER SCHULTZ: Thank you.

MR. MALLON: Okay, with that, I will turn it over to you, Bruce.

MR. MUSICO: Thank you.

CHAIRMAN POWERS: We can do this but I do want to come back to delegate identification of authorities, especially the on-site authorities and who transfers that. It is rather well-described, I know but I would like to hear you go over that one more time for me.

MR. MALLON: Do you want us to go now?

CHAIRMAN POWERS: If you are prepared to.

MR. MALLON: You ready? Okay.

MR. BURGIN: The way the emergency response organization is set up on-site and one thing that we have worked on very hard is also to make it very similar to the incident command system. That is out there with our offsite folks. But we have what we call an emergency coordinator. A lot of people also call it an emergency director. That starts off, obviously, in the control room with the shift manager who is in charge.

The shift manager, obviously, makes the initial classification, notification and then you would transfer over to their --

CHAIRMAN POWERS: Okay, you mean to say call in an alert.

MR. BURGIN: Correct.

CHAIRMAN POWERS: Track me from there.

MR. BURGIN: From the alert, you would then make the notifications to our offsite organizations. You would also activate, and actually it is his first step, our emergency response organization.

So, as he is going through the rest of his procedures, he has already activated our emergency response organization reporting to his technical support center and also reporting to our emergency operations facility and our emergency news center.

MEMBER BLEY: Just for me, those are different site. The same words mean different things at different places. Tell me the role of the shift manager. What is his normal role?

MR. BURGIN: His normal role, as far as the emergency response organization?

MEMBER BLEY: No, where he is sitting before the emergency happens.

MR. BURGIN: Well, he has got the oversight of the plant, obviously.

MEMBER BLEY: But that is an oversight role.

MR. BURGIN: Yes.

MEMBER BLEY: He is a licensed SRO but he

is not the SRO who is hands-on controlling the plant.

MR. BURGIN: Right.

MEMBER BLEY: He is over him.

MR. BURGIN: He is over him.

MEMBER BLEY: So I mean he is the same guy then who does these emergency calls.

MR. BURGIN: That is correct.

MEMBER BLEY: Okay, so he is out of that process for a little while while he is doing this.

MR. BURGIN: Well, for a short while because we do not want to create too much distractions from him, making sure he has got oversight of that plant.

So, the plant is designed so that we can get relief so he can concentrate on the plant as quickly as possible. That is why you want to get your technical support center up and running.

At the alert, it is not required. We typically, because of the way we practice, we will bring that TSC up during the alert phase, and that is what we practice because we want those folks, again, to make sure we take that burden off of the shift manager and his team, to make sure they take care of that plant.

We transfer over to what we call our emergency duty officer. He is the person in charge of

our technical support center and he is getting the technical expertise in to help with the evaluation of what is going on at the plant.

MEMBER SCHULTZ: When does that transfer occur?

MR. BURGIN: That transfer occurs, typically we will do this within 90 minutes.

MEMBER CORRADINI: I don't know what you mean by transfer. The authority still sits with the shift manager and he is getting advice from the person --

MR. BURGIN: He is getting advice from the TSA, correct.

MEMBER CORRADINI: Okay.

MR. BURGIN: The shift manager has the license and is always in charge of the plant.

MEMBER CORRADINI: Okay. So, it is advice from this person who is running the --

MR. BURGIN: That is correct.

MEMBER CORRADINI: -- as the TSC gets up and going.

MR. BURGIN: Correct.

MEMBER CORRADINI: Okay.

MR. BURGIN: And he has his engineering staff, his technical staff, his radiological staff all

there to help with those decisions at the plant but it is still directed by the control room.

MEMBER BLEY: But he is not a guy who is necessarily on-site. He can come from outside about 90 minutes ahead.

MR. BURGIN: That is correct.

MEMBER SCHULTZ: So what you were describing before is the activation of the Technical Support Center.

MR. BURGIN: That is the activation of the Technical Support Center, correct.

MEMBER SCHULTZ: Thank you.

MR. MALLON: And the function of that is the event classification and notifications. That is what transfers from the shift manager to the TSC.

CHAIRMAN POWERS: Now we escalate beyond alert. Who makes that call?

MR. BURGIN: We escalate beyond the alert and if the TSC is activated within that time frame, we escalate from there and that decision would be made by the emergency duty officer in the Technical Support Center.

MEMBER BLEY: But if it happens within the 90 minutes, --

MR. BURGIN: It still could be with the

shift manager.

MEMBER BLEY: It could still be there.

MR. BURGIN: He has not turned over. So, it is not an automatic turnover. It is a call. They do a formal turnover and the TSC then would assume what we call the emergency coordinator function.

MEMBER SKILLMAN: And that call is based on the EALs?

MR. BURGIN: That call to activate the facility?

MEMBER SKILLMAN: No, you are already activated.

MR. BURGIN: Right.

MEMBER SKILLMAN: You have cleared unusual event alert. The question was, what happens if you go beyond alert.

MR. BURGIN: Beyond the alert, then you would have the TSC, again. If it is within 90 minutes, it may be still the control room. Otherwise, the TSC would take over and they would make that emergency action level decision.

MEMBER SKILLMAN: Based on the EALs.

MR. BURGIN: Based on the EALs. That is correct.

MEMBER SKILLMAN: Thank you.

CHAIRMAN POWERS: Okay at the alert level, the elderly and decrepit shift manager has a heart attack and your TSC is not activated. Who makes the call to go to a site emergency?

MR. BURGIN: The shift supervisor would then take over.

MR. MALLON: And the operating crews train on this.

MR. BURGIN: Yes.

MR. MALLON: This is part of normal SRO training and they train as a crew.

CHAIRMAN POWERS: And you train for the shift manager being incapacitated.

MR. BURGIN: Correct.

MR. MALLON: Yes, and they go all the way up to general emergency as part of their scenarios in the simulator.

CHAIRMAN POWERS: Now your elderly and decrepit EDO suffers a heart attack when he hears that you have gone to an alert but your TSC is activated. Who replaces him?

MR. BURGIN: Technical support supervisor would replace him.

CHAIRMAN POWERS: Oh, okay.

MR. BURGIN: And actually, we could have

our radiological assessment coordinator do it as well. We cross-train to make sure that we have more than one person actually assume that responsibility. And per chance if that emergency duty officer was a little late, they could still do that function.

MEMBER CORRADINI: So, I guess to ask Dana's question differently, you have two or three layers of succession, just in case.

MR. BURGIN: Just in case.

MEMBER CORRADINI: Okay.

CHAIRMAN POWERS: In fact, the staff gives you higher marks for a success plan. I like to hear about these things.

MR. BURGIN: And again, if you know about the incident command process, which is used, we use a very similar process so that we have those functions and we have those defense-in-depth, so to speak, with those individuals.

MEMBER SKILLMAN: In your graded exercises, have you ever given a red card, you are no longer in place, emergency director because, it is a drill, you have just had a heart attack you are out, and watch the organization perform with the next layer of leadership?

MR. BURGIN: We have not done it during a

graded exercise. But we have done it during our quarterly exercises and our tabletops and, as Jamie mentioned, in our simulator as well.

MEMBER SKILLMAN: Okay, thank you.

CHAIRMAN POWERS: Do you ever do exercises where people in the control room or in the TSC with breathing apparatus?

MR. BURGIN: With the CBAs?

CHAIRMAN POWERS: Yes.

MR. BURGIN: We do scenarios with that and talk that through. As you mentioned earlier, we have a fire brigade that is right on-site that would assist with that. Those who maybe not be familiar with that apparatus, we make sure that that is something to get with the job brief and they would take care of.

MEMBER BLEY: It is a talk-through or do you actually sometimes have put it on and try to communicate?

MR. BURGIN: We usually have one individual that does it and then you have to measure the safety of that individual working in that apparatus, based on the function and the importance of the mission. So, there is a number of different things that go into that decision. That is not always the best environment, as you know.

MEMBER BLEY: It has always seemed to me it is a good one to practice before you have to do it.

MR. BURGIN: And you validate that you can take care of the head count that you have committed to so that you have that apparatus there.

MEMBER SKILLMAN: Well, more importantly, it is the communication when you are in that apparatus. It is difficult to communicate. And the individual who is in the breathing gear has critical communication accountabilities. And that is what needs to be tested.

MR. BURGIN: Correct.

MEMBER RYAN: I guess I am not real clear. Do people actually get into the respiratory protection equipment and the coveralls and all of that and go through the exercise dressed that way or not?

MR. BURGIN: Not the entire exercise but we will pick on people to do that to demonstrate that we have that capability.

MEMBER RYAN: The skills to put it on but maybe not the stamina to spend three hours in it.

MR. BURGIN: Correct.

CHAIRMAN POWERS: It is the guy that pissed him off gets to do it.

MEMBER RYAN: That is kind of an important thing because I would have to be an observer in that

exercise. But two of the observers called the guy that was controlling the exercise it is getting hot. It is in the desert. It is out in the southwest. And he passed out, boom.

So you know, I mean, people have to understand even their own physiology and what is going on. You know, I am getting a little woozy. I have got to get out of here. Something has got to give, instead of just standing there and keeling over.

So, I just, the idea of a drill, at some point, has to kind of be as real as you can make it.

MR. BURGIN: And realize we do those things also during our outages. So, we take a look at those lessons learned from what we do during our actual outages.

MEMBER RYAN: Sure, that's something that comes up. Okay.

MR. BURGIN: So, it is demonstrated on a regular basis.

MEMBER RYAN: Fair enough.

CHAIRMAN POWERS: I think you have satisfied my -- scratched my itch there on that.

MR. BURGIN: The only thing we didn't mention is we would then transfer to the EOF, the emergency response manager. That is the last transfer

out to there.

CHAIRMAN POWERS: I'm good. As I said, the staff did give you high marks for your succession planning.

MR. MUSICO: Good afternoon. My name is Bruce Musico. I am a senior emergency preparedness specialist in NRC's Office of Nuclear Security and Incident Response.

CHAIRMAN POWERS: Reorganization is catching you, too, huh?

MR. MUSICO: That's right. I got it wrong, once.

(Laughter.)

CHAIRMAN POWERS: It happens to us all.

MR. MUSICO: Sometimes I just say NSIR.

A little bit of background. I have a BS in nuclear engineering from the University of Michigan. I also have a law degree and am a licensed attorney in the Commonwealth of Virginia and D.C.

I have over 30 years of experience in the commercial nuclear power industry in all aspects of operation and primarily emergency preparedness, to a great extent. I am a former startup and plant engineer for North Anna Unit 1. And I have worked to a great extent in many aspects of licensing and regulatory

affairs in many plants, including Ontario Power Generation and at Pickering Station in Canada.

CHAIRMAN POWERS: A diverse background here.

MR. MUSICO: Yes. As far as my experience with the NRC, I have been with the NRC a little over 12 years now, exclusively in the area of nuclear emergency planning for new reactors. I was the principle author of the standard review plan, Section 13.3, emergency planning. I was also the author of Section 14.3.10 of the standard review plan, which is emergency planning ITAAC.

I was also the author of Regulatory Guide 1.206, of the EP portion that deals with directions to applicants for COL applications, which would be, to a certain extent, applicable here, because the application includes a complete integrated emergency plan.

I was also the author of the Emergency Planning Section for Review Standard RS-002, which dealt with ESPs. Now, a little clarification from the earlier question that came up with respect to RS-002. RS-002 and John Segala, correct me if I am wrong, was originally written at a time when the Standard Review Plan had not been updated yet. The Emergency Planning

Section for the Standard Review Plan, the previous one was written in 1981 and consisted of four pages for EP and only dealt with the Part 50 licensing process, which is the two-part licensing process, construction permit and operating license. So, it didn't address new reactor licensing at all.

So, in preparation for the anticipated three early site permit applications from North Anna, Clinton, and Grand Gulf, the NRC developed RS-002. Now, the material in RS-002, at least for emergency planning, which I wrote, I basically moved that into the standard review plan, which has its own sections and discussion regarding early site permits. So, in essence, the standard review plan superseded RS-002. But the information in RS-002, the documents still exist but it is not really applicable here. The standard review plan was adequate to do the review.

I also participated in some of the revisions to the updates to Part 52 and conforming changes to Part 50.

I was the reviewer, the emergency plan reviewer for the North Anna early site permit application, the very first one. I was also the reviewer for the Vogtle early site permit application. I was also the reviewer for the AP1000 DCD, the ESBWR

DCD, and most recently the US-APWR DCD.

And finally, I was the reviewer for the Vogtle COL application.

MEMBER SCHULTZ: So, you are a new person?

MR. MUSICO: I am -- yes. It has been an adventure.

What is interesting about this application, the PSEG Site ESP application is that it is very similar to the Vogtle ESP application in that they were both early site permit applications for an existing site that came in with a complete and integrated plan. While we had various aspects of the Vogtle ESP application, such as the TSC location and various other nuances that we addressed here, the PSEG site has its own challenges that we had to address.

Of reference to the Vogtle ESP application, Dr. Powers, as you may recall, I presented before you on December 3, 2008 regarding the Vogtle ESP application. And I remember it well. In fact, I carry around the transcript of our conversation.

(Laughter.)

CHAIRMAN POWERS: I did not give you that hard of a time.

MR. MUSICO: Well, I took what you said to heart and actually, having sat through a presentation

regarding liquefaction, just as I was getting started, as I am now, I mentioned that I -- I will quote myself -- I got to see some beautiful slides. That meant a lot. And in response you said, and I will quote, in regard to my slides, "Yours pale. You have got to dress up these slides."

(Laughter.)

MR. MUSICO: So, I took -- like I said, I carry this around with me. I took your advice to heart and --

MEMBER CORRADINI: At least somebody reads what you say.

(Laughter.)

MR. MUSICO: And you can see that we have some beautiful photos in the presentation this time, which I thought you would appreciate. That was directly attributable to you.

Okay, getting down to business here.

CHAIRMAN POWERS: I have had some impact.

MR. MUSICO: Before I start, I just wanted to introduce, we have a representative from FEMA here today, from FEMA Headquarters, Al Coons. And he is welcome to stand up and opine on anything that I had discussed.

CHAIRMAN POWERS: He is, indeed, and we do

thank FEMA for their contribution to this review. It is mentioned frequently here and it is obvious that FEMA worked very hard on this project.

MR. MUSICO: Yes, they did and they are a very integral part of this process.

CHAIRMAN POWERS: And you made that very clear in the SE.

MR. MUSICO: Yes, sir.

CHAIRMAN POWERS: It is a compliment to both agencies that they have found a way to work effectively together.

MR. MUSICO: As we have for years.

All right, the first slide, as I mentioned, PSEG came in with a complete and integrated emergency plan, which means it includes the on-site plan and the offsite plan. That is what is meant by complete and integrated plan. They work together.

What is unique about this application and distinguishes it from the Vogtle, there are three basic features. One is this application deals directly with the new EP rule, the new EP regulations that were put into place. The *Federal Register* notice, I believe, was at the end of November 2011 and those new regulations were effective and applicable to this application. They were not to Vogtle. So, those were

new aspects of the review that we had to deal with.

Secondly, the Fukushima Daiichi incident. That was a very significant area of review that impacted this application in which the staff looked at those aspects of the Near Term Task Force recommendations that were applicable that have been, to date, implemented by the agency, consisting of for EP, the Near Term Task Force recommendation 9.3; 9.3 has two pieces to it.

The first piece is staffing levels for multi-unit events and the second piece is the backup power for a prolonged station blackout for the communications systems and equipment that comprises the recommendations associated with the Near Term Task Force 9.3.

We also have an evacuation time estimate that was submitted for the 10-mile EPZ. And they also submitted the Inspections, Tests, Analyses, and Acceptance Criteria, ITAAC, as required for a complete and integrated plan.

And then the third major aspect that distinguishes this application is that they came in with the plant parameter envelope. If you recall, the Vogtle application came in identifying that the AP1000, it would be the chosen design, the DCD. However, the

AP1000 was not part of the scope of review for the ESP. It only came into effect at the COL stage, where it was incorporated by reference and then reviewed in the context of the incorporated ESP application and any additional information that was required for the COL. However, the staff had the benefit at the ESP stage for Vogtle of knowing what the technology would be and, therefore, could ask certain questions and accommodate that in the ESP application. And the ESP, I believe we had some permit conditions that directly reflected the anticipated or reference of the AP1000 at the COL stage. And then at the COL stage, they did in fact incorporate it and I was involved in that review as well.

So, that is it in a nutshell. Next slide, please.

I want to just make an aside point here, a very important point, that what is significant to the site, and this is similar to Vogtle, what is significant with the site here, as far as the review of the emergency plan, both on-site and offsite, is the length of time that the existing plant has been in effect.

The Salem Unit 1, the operating license was issued on December 1, 1976. The Salem Unit 2 operating license was issued on May 20, 1981. That is a

significant date. And Hope Creek Generating Station Unit 1 operating license was issued on July 25, 1986. What is significant about that is that the TMI accident in 1979 was the genesis of essentially what are the existing emergency planning rules today, essentially, 10 CFR 50.47(b), Appendix E. Those all came about as a result of the TMI accident.

So, if you look at the Salem Unit 2 operating license issuance on 5/20/81, at that time, that was after 1980 when the 10 CFR 5.47 and Appendix E went into effect, specifically August 1980, and they would have to comply with the emergency planning regulations in effect in 1981, when they got their operating license. The Salem Unit 1 would have to come up to speed to that as well.

And then we had the Hope Creek Plant in 1986 operating license and they would also have to comply with those existing emergency planning requirements.

Now, from the 1981 Salem Unit 2 operating license to the present, I counted 33 years. So, the existing emergency plan has been in effect, in essence, 33 years, since 1981 or maybe 34 years if they implemented it in 1980. So, there is a high level of confidence that they have gotten it right by now.

Now, what the NRC does, it continuously

monitors and reviews and inspects the on-site plans with our partners as well, FEMA, as an ongoing and very active, very comprehensive offsite inspection program that they do and there is an yearly certification as far as the offsite plans. So in short, there is a very high level of confidence going into it that the existing plans are adequate but are not within the scope of the review.

However, the proposed plans for the PSEG site that they submitted are based upon the existing plans and, therefore, that implies there is a high level of confidence in them as well. Okay, next slide.

CHAIRMAN POWERS: I wonder if this would be an appropriate place to take a lunch break.

MR. MUSICO: I could go very fast, if there are no questions but --

MEMBER CORRADINI: No, Dana will make sure there are questions.

CHAIRMAN POWERS: This is a fantasy world where there are no questions.

MR. MUSICO: I am offering some flexibility.

MEMBER SCHULTZ: Nice try.

MR. MUSICO: It probably is. We have got a little ways to go.

CHAIRMAN POWERS: I think we are moving right along here, so I don't think we are time-constrained but at least one of the members has signaled to me he is internal-sustenance constrained.

MEMBER CORRADINI: You are the chairman. I do whatever you say.

CHAIRMAN POWERS: You never do anything that I say, Mike.

(Laughter.)

CHAIRMAN POWERS: So why don't we go ahead and take a lunch break until 1:20?

And I am sorry to interrupt your presentation because --

MR. MUSICO: Oh, not at all. Not at all.

CHAIRMAN POWERS: -- you have got to have beautiful slides.

(Whereupon, at 12:17 p.m., a lunch recess was taken.)

A F T E R N O O N S E S S I O N

(1:20 p.m.)

CHAIRMAN POWERS: Let's come back into session. We are reviewing Chapter 13, Emergency Plan. And Bruce was dazzling us with his gorgeous slides, unparalleled in their median expertise.

MR. MUSICO: There is more to come and there are some teasers before we get to the good ones.

CHAIRMAN POWERS: Oh, I see. Okay.

MR. MUSICO: They are all attributable to your performance last time.

CHAIRMAN POWERS: Yes, I understand that this is completely my fault.

MR. MUSICO: Well, thank you Dr. Powers.

Moving right along at blazing speed, we are on my second slide. As I said earlier, the PSEG has come in with an early site permit --

CHAIRMAN POWERS: Before we go to your second slide, can we go back to your first slide?

MR. MUSICO: Sure. Should I repeat everything else as well?

CHAIRMAN POWERS: All right.

MR. MUSICO: I'm sorry.

CHAIRMAN POWERS: I want to go back to your recommendation 9.3 from the Near Term Task Force.

MR. MUSICO: We have a slide coming up with that but I would be happy to discuss it now, if you would like.

CHAIRMAN POWERS: Well, if you are going to come up to it, I will wait then. But I will just telegraph my question.

MR. MUSICO: Okay.

CHAIRMAN POWERS: Have we really gotten enough digestion of the events at Fukushima and the emergency response at Fukushima to start drawing conclusions with some definitiveness?

MR. MUSICO: I really can't answer that. The NRC's response to Fukushima is an ongoing process right now. I am not directly involved in it but there are various tiers of areas that have been identified, Tier 1, Tier 2, and Tier 3.

This recommendation, Near Term Task Force Recommendation 9.3 is part of Tier 1. It is also part of Tier 2. But the significance of it here is that it has been implemented for purposes of licensing at this time. The Tier 2 and Tier 3 aspects of the Fukushima recommendations I don't think it is decided yet how they are going to implement those. Again, I am not involved in that.

CHAIRMAN POWERS: I mean it is just

something you can't escape this particular application because of a multi-unit site. I always get nervous when we start jumping on accident events and saying oh, we know this and this and we haven't had a chance to digest and understand well what is going on and especially in the Fukushima accident because here you are dealing cross cultures. I mean it is hard enough when you try to take PWR land and apply it to BWR land. These guys are multi-lingual but most of us are not.

And so, you know, how much do we actually know and how carefully are we looking? Things like how well does the communication system function and equipment function, communication equipment function in Fukushima accident and is that at all applicable to the American experience? I worry about these things.

MR. MUSICO: I understand that. But the ultimate recommendations that will come out of Fukushima, we don't know what those are yet. The reviews that we are doing here for PSEG are to the current regulations, not to some possible future regulation. Whatever comes up, we have processes that can deal with that in the future.

CHAIRMAN POWERS: Well, I know that in the application they spend surprising attention to the language given to where the power supply is for the

communications and things like that. They are clearly responding to exactly this issue and they are very clear on that. And they have got backups on backups on backups. I started diagraming and realized I don't have enough paper here.

At any rate, that and then the issue of staffing levels. Again, that has to be so culturally oriented that I would be suspect -- you know, we do these experiments and hold a reactor on operator performance and I cannot believe that a Swedish operating crew working on a Norwegian reactor has any relevance to an American crew working on an American reactor. I just don't believe it because of the differences in culture, background, base education, training methods. I mean there is just -- even things like interpersonal communications and the hierarchical nature of society influences these sorts of things. I think American crews are much more willing to speak up to supervisory crews than you will find in European crews.

So, those things just worry me about jumping too preemptively on the Fukushima experiment.

MR. MUSICO: Well, we certainly appreciate that in the review. However, the review was limited in scope, specifically for emergency planning, staffing and communication.

The backup communication capabilities that you have alluded to, those are required by the existing regulations. So, to a certain extent, the extent to which the existing backup power for existing communication system or future communication systems exist will, in part, satisfy some of that particular Fukushima recommendation.

However, it goes a little bit beyond in that it deals with the prolonged offsite power loss for station blackout. That is a little different. And so that is why we have a requirement to do a study, communication backup power study, and we have a permit condition that reflects that.

CHAIRMAN POWERS: Okay, well, the issue of coping times and station blackouts is one we still have to confront here. And that is a problem but I did note your language. And like I said, I started at level one. I need a bigger sheet of paper here.

MR. BARSS: Dr. Power, if I could add -- Dan Barss, the team leader for Emergency Planning Reviews in Office of Nuclear Security and Instrument Response. And to your question about the Fukushima items, there is an ongoing rulemaking effort at this time, where we are looking at those and we are integrating not just 9.3 but all of them into a

rulemaking process. And the staff is actively working on that. But, as Bruce has characterized, we can't review to a rule that doesn't yet exist.

CHAIRMAN POWERS: That's right. And he has looked at the rules as they stand. That's good.

MR. MUSICO: Yes, I used the existing rules.

Okay, I have another slide with respect to Fukushima we can get into a little later, if you would like. Second slide, please.

As I said before, PSEG has come in with an early site permit, with a complete and integrated plan. One of the requirements for complete and integrated plan is to identify significant impediments to the development of emergency plans.

Dr. Powers, you mentioned the use of an ETE to facilitate that. That is one of what I consider three uses of the ETE, where specifically it is addressed in Supplement 2 to NUREG-0654, where they talk about how an ETE can determine whether there are, in fact, significant impediments to the development of emergency plan, which also happens to be the requirements in Part 100, as far as siting is concerned, mimics it.

There are two other considerations or two

other benefits of an evacuation time estimate, an ETE, is that the results of the ETE is to inform the licensing for making recommended -- protective action recommendations to inform that. And then the third one is for the offsite agencies to use in making protective action decisions in their procedures. So, I look at three aspects for benefits of the ETE.

And as you said correctly, there is no specific time limit within which you have to be able to evacuate everybody. That just does not exist.

Okay, the second one, describe contacts and arrangements. PSEG did identify that. They provided the certifications from the applicable offsite agencies in regard to the proposed new units. They also provided letters of agreement and memoranda of understanding.

The third bullet, that is just to let you know that there is a major feature option of emergency plans that you can come in with an early site permit. They did not utilize that. They came in with a complete and integrated plan.

There is a third option under early site permits that applicants can come in under and that is merely to identify significant impediments to the development of emergency plans and to describe contacts

and arrangements, period. That's it.

So, they basically get pre-site approval up to a limited extent. They don't get a lot of finality or any substantive details of the emergency plan but they get a little advanced finality of our acceptability of the site with respect to developing plans and acceptance by offsite agencies.

CHAIRMAN POWERS: Where they have a long-term interaction with the state and local agencies, it just makes sense to go ahead and push this to the extent you can. I mean, we learned that for 34 years you have been dealing with these people, so you probably know them, their kids and --

MR. MUSICO: Yes.

MEMBER SCHULTZ: And they want to know what the plan is.

MR. MUSICO: Yes, that is one of aspects of emergency planning in that of all the SER sections, all the sections of the applications that come in, EP is probably the most understandable and recognizable by the people that are directly impacted by it at the sites.

CHAIRMAN POWERS: I think it is the best PR the plant has got. That is the one tangible item that everybody in the community can say yes, I know this

plant is worried about my safety. I think it is the best advertising they have got.

MR. MUSICO: And I do, too. As a matter of fact, we discussed that, you and I, when we did the Vogtle application, in that you made a comment that the Vogtle application provided a lot of good training for me, personally. And then I responded that the benefit of was a total new baseline review of the plant to the benefit of the offsite people, so they can see what is going on.

CHAIRMAN POWERS: Yes, I think it is just a tremendous demonstration of safety is an important aspect of these facilities.

MR. MUSICO: And we look at the people that live around the plant who are impacted by this, primary stakeholders really need to understand, appreciate, and accept the site. Not from us but from the applicant. We just have to make sure, in that regard, that they are consistent with the applicable regulations, which we have here.

CHAIRMAN POWERS: Well, the NRC helps by setting standards that are understandable by the community as well, what things should look like.

MR. MUSICO: And I guess a footnote, too, the primary document that we use in the 16 planning

standards is NUREG-0654 and we are currently updating that, revising that. That is an ongoing process. I believe we are coordinating that with FEMA? Yes.

CHAIRMAN POWERS: Is Randy Sullivan involved in that?

MR. MUSICO: I don't think he is involved in that aspect of it. Al, would you like to say something here?

MR. COONS: No.

MR. MUSICO: Oh, okay. But that is an ongoing project right now. But that doesn't apply in this case.

Okay, I think we are done with that. Oh, just the ITAAC is also required in the ESP application with a completed and integrated plan.

CHAIRMAN POWERS: Yes, that is one we are going to have to discuss and you are going to have to educate me a little bit about this ITAAC, with the emergency planning.

MR. MUSICO: Well, I was the creator the EP ITAAC.

CHAIRMAN POWERS: I know.

MR. MUSICO: So, I think I can respond.

CHAIRMAN POWERS: Well, that may make you disqualified from being able to train me.

MR. MUSICO: Bring on the question. Next slide, please.

All right, this just lists the applicable regulations and guidance that the NRC uses and, the ones at the bottom, FEMA uses.

All right, FEMA review. As PSEG mentioned, there are four states that are impacted, New Jersey, Delaware, Maryland, and the Commonwealth of Pennsylvania.

The first two, State of New Jersey and the State of Delaware, each have two counties that are impacted by the 10-mile emergency planning zone. So, that is why I have listed them here. But these are the primary impacted offsite governmental organizations. There are additional ones, for example, municipalities that exist that are also impacted but they are subsets of these. These are the primary entities that are impacted.

CHAIRMAN POWERS: It is my perception, having read the material that certainly in -- well, I guess in the case of both Delaware and New Jersey, that the State Police Department plays a key role here in integrating between other political distinctions/districts.

MR. MUSICO: Well, PSEG can comment on

that. I will mention that each state has its own equivalent of the Department of Health. I forget the name of the agency that takes the lead with respect to radiological issues. And then the rest of hierarchy and other responsibilities you might want to address.

MR. BURGIN: The way that New Jersey and Delaware are both set up and they are relatively similar, the state takes the lead on emergencies that happen down at the plant. Through the state's emergency planning process, they then would get the information down to the county and the county interacts with the municipalities. Each one of the counties and each one of the municipalities, not so much in Delaware, Delaware is a smaller state. It is more county oriented, all of them have approved emergency plants.

What we really have enjoyed with both states is the emergency plant for the radiological aspect of the plan is an annex to the state plan. So, if there is emergencies, you go to the rep annex, which FEMA takes a look at for us. And then if the emergency grows or there is other issues involved, natural, technological, you can then morph into the state emergency plan because it is an annex. And that is what we pride ourselves on. We want to have an all-hazard response from our site and we want an all-hazards

response from our offsites. And we really work hard to make sure we know who all the players are and what the hierarchy is.

In fact, we are getting ready to do a trip up to New Jersey's Emergency Operation Center with our senior leadership and actually give them a calls on incident command so they understand the process that the state uses, they meet their counterparts, as opposed to just talking to them on the phone, and that is a critical aspect of what we do with offsite.

CHAIRMAN POWERS: Very good. You are right, the face-to-face knowledge --

MR. BURGIN: And the other part we do, is we make sure that those offsite folks, if they have a question, regardless of what it is, we want them to give us a call so that we can make sure we get the right information to them. So, we would encourage any type of question, please give us a call so that we can take care of it right away.

MEMBER SCHULTZ: I wanted to be sure -- I wanted to suggest that you mentioned that some training is ongoing here. It sounds like it would be a mutual training exercise that you are bringing personnel from your facility to their facility and so forth.

MR. BURGIN: Correct.

MEMBER SCHULTZ: Hopefully, it will be a discussion and not a one-way training episode.

MR. BURGIN: It is a discussion. And again, it is circled around the incident command process. So, we will talk through what happens at our control room, what happens at our TSC, what happens at our EOF. And then we will conversely get what happens at the local EOC, what happens at the county EOC, what happens at the state EOC.

And once a year, we actually have an annual meeting, where we bring our chief nuclear officer and we have the secretary with the Department of Public Health in Delaware. We have the lieutenant colonel from the State Police who runs the Office of Emergency Management. We bring them together, at least on an annual basis. Besides the tours that we ask them to come down and do, we make sure everybody understands what their role is, who they can talk to, and who they are going to talk to during emergencies, so, it is not a surprise.

MEMBER SCHULTZ: I'm glad to hear that. Thank you.

MR. MALLON: It isn't even just drills. Like Hurricane Sandy.

MR. BURGIN: Hurricane Sandy is a good

example.

MR. MALLON: You know, we staffed our facilities, the state obviously staffed theirs and we were exercising that communication during that event.

CHAIRMAN POWERS: Well you are certainly not the first site whose emergency plan triggered states to create emergency plans.

MR. BURGIN: It is a real benefit to the locals that we have got this enhanced planning.

MEMBER SCHULTZ: Right, to use the plans for other types of activities, independent of whether the site has a problem or not.

MR. BURGIN: Oh, absolutely.

MR. MUSICO: Okay, I moved back to the previous slide. I want to identify four documents that are actually identified on page 13-2 of the SER that I wrote in that they don't have the ADAMS numbers listed for them.

Yesterday, we made publicly available three of these four. The fourth one was already publicly available but I want to give you the ADAMS numbers, so at least you have access to them.

CHAIRMAN POWERS: Giving us the ADAMS numbers is next to useless. Give him the ADAMS numbers.

(Laughter.)

MR. MUSICO: I don't consider it next to useless because these are the ADAMS numbers for the offsite reviews that FEMA did.

CHAIRMAN POWERS: Like I said --

MR. MUSICO: Oh, you want me to give them to him afterwards?

CHAIRMAN POWERS: Yes.

MR. MUSICO: Okay, I can do that.

CHAIRMAN POWERS: Giving it to the members is just about useless.

MR. MUSICO: Some people can't wait.

CHAIRMAN POWERS: We can't figure out how to use ADAMS.

MR. MUSICO: All right. As far as the figures, these are the ticklers here. This just out of the application is a figure of the site, which shows you the orientation, New Jersey on the right, Delaware on the left, and you can see the four counties. On the left, the New Castle County and then at the bottom Kent County. In Delaware on the right Salem County at the top and Cumberland at the bottom. And that just shows where the site is in reference to that. Next slide.

MEMBER SKILLMAN: Back up please, or stay right there. I have seen this chart in large scale

many, many times from a maritime perspective. And the question is, you show the division between Maryland and New Jersey, is in the river south of site but as you go north of the site, you show the state boundary over against the west shore of New Jersey. Is that accurate?

MR. MUSICO: That is correct.

MEMBER SKILLMAN: Is that right?

MR. MUSICO: That is correct.

MR. MALLON: It goes back to colonial times where the boundary was. And I am going to say based on New Castle, an arc was struck, and that describes the northern part of Delaware, that arc, and then goes over to the shoreline.

And when Artificial Island was created by the Army Corps with the dredge spoils, then that land that had been underwater, now became Delaware. And about once a quarter, someone from Delaware will come over to the site via our access road and go up to see the land that is Delaware's land that is the Army Corps Confined Disposal Facility.

MEMBER SKILLMAN: Thank you. Thanks.

MR. MUSICO: Next slide, please.

This is just another diagram showing the site orientation with respect to being north of the

Salem Units 1 and 2 and Hope Creek. Again, that is the proposed location for the PSEG site. Next slide.

This is a ten-mile emergency planning zone, which you can see it impacts both New Jersey and Delaware. I think we saw this earlier. If you look at the dotted line here, you saw that on the other figures. That is the proposed causeway, which are not sure yet if they are going to build it. They don't have to but it is a possibility. So, that is where it is. Next slide.

And this is the 50-mile emergency planning zone, which shows its impact on four states and that would be the ingestion pathway, EPZ. All right, next slide.

All right, now it gets fun. This is probably the most interesting aspect of this review in that we have identified COL, eight COL action items and five permit conditions. This slide we had the help from the Office of the General Counsel in distinguishing between COL action items and permit conditions and this is what we came up with.

In short, for the COL action items, the eight COL action items, they consist of -- six of which deal with the reactor design coming from the plant parameter envelope. One addresses the proposed

causeway and the final one addresses an updated ETE for the PSEG site to reconcile the differences with the recently updated ETE for Salem and Hope Creek site because the application, when it came in, came in with an ETE that was based on the 2000 census data.

Now, the subsequence of the application coming for the PSEG site, the ESP application for the existing licensee, consistent with the updated new EP rules, they were required to update the ETE as the licensee, which they did. However, for the ESP site, they are not a licensee. They are an applicant. And in the new EP rule it specifically eliminates or does not require applicants to update their ETEs.

So, we found ourselves with two ETEs, one for Salem and Hope Creek, one for PSEG Site. PSEG Site reflected the 2000 census. The Salem/Hope Creek Site reflected a 2010 census. And so we needed some mechanism to ensure at the COL stage, even though an EPS applicant is not required to update the ETE, they would have to update it at the COL stage. Hence, we identified a COL action item. So that was how that came about.

MR. MALLON: So just one clarification, if I can.

MR. MUSICO: Sure.

MR. MALLON: And that is that the ETE was based on the 2000 census but it was updated to 2008 population projections. So, it wasn't eight to ten years old at the time we submitted. We had updated it, based upon state information about population projections and that is what our ETE was based on. So that the difference between them, there is a difference but it is not large.

CHAIRMAN POWERS: Yes, my memory was that the population boost was modest.

MR. MALLON: Very modest.

MR. MUSICO: The population what?

CHAIRMAN POWERS: The population change was modest.

MR. MALLON: In New Jersey. There was some population increase in Middletown, Delaware but in New Jersey, it was almost flat. And I think it might have even been --

CHAIRMAN POWERS: In some of the earlier ESPs we actually had population decreases in remote sites because of the tendency to run people -- move people out of small towns.

MR. MUSICO: Especially southern Jersey.

MR. BARSS: If I could add a little bit. This is Dan Barss again.

The EP rule that was issued in 2011, November 2011 is effective now, had eliminated the requirements, as Bruce mentioned, about requiring licensees to update their ETEs. And as Bruce mentioned, we specifically note in that for those that have a COL, they don't have to update their ETE until 365 days before they want to load fuel. And we purposely did that with applicants and COL holders in mind because if there is no plant there, there is no risk or hazard to the public. We don't want to waste any money updating an ETE and us having to review it until it is going to actually need to be used for something. So, that is why we built that provision in. So, there is really no update for someone that is an applicant or a COL holder, until they are getting close to loading fuel point in time.

CHAIRMAN POWERS: It seems to me that for ETEs and sites like this where population changes are not going to be dramatic, that updating in response to census data is not nearly so important as updating in response to state highway construction and things like that or destruction. I mean, I think we are focusing on the wrong thing here for this site. It is more likely for somebody to decide to run a commuter train through things or something like that might have a

bigger impact than relatively -- I mean 20, 30 percent population change is not going to change the pertinent part of the ETE. It may change a number of people you have go run through and it may take a little longer to do it but it is not going to change the issue of impediment.

MR. MUSICO: Okay, just to expand on what Jamie said in regard to the ETE that was submitted in support of the ESP application being updated to 2008, that ETE did in fact project certain increases in population to 2008. It also projected increases in various populations to 2010. However, those were just projections. And then the 2010 census being reflected in the updated ETE for the existing site, I haven't seen that yet. We haven't seen that yet. But we will see it at the COL stage and we will reconcile any differences.

But again, for purposes of the ESP, our rules are written that don't require an ESP to update the ETE. From a safety standpoint, it is not a safety issue because there is no plant there and we will take care of it. We get another bite at the apple in that sense.

MR. BURGIN: But the current ETE is already associated with the current E-plan. So, the

current 2010 ETE is documented.

MR. MUSICO: Yes. And also understand there are not going to be two ETEs for this site. There is one ETE that supports the site, no matter how many reactors you have on it.

CHAIRMAN POWERS: I mean that will all get squared away once you build your plant.

MR. MUSICO: Yes, it will.

CHAIRMAN POWERS: That problem will cure itself.

MR. MUSICO: And also to address an earlier question you had regarding a separate E-plan for the new unit, versus an E-plan for the other unit. We anticipate that the differences will be reconciled at the COL stage -- I'm sorry, at the construction stage, where the construction stage, like Vogtle, for example, they would combine them. They were combined into one plant. North Anna is going to be doing that. Vogtle is a little different because Vogtle's emergency plan that they submitted in support of ESP was for four units. But my review was limited to just two and three -- I'm sorry, Units 3 and 4. So, they already had a self-standing emergency plan for all four units. But for North Anna, North Anna came in with a self-standing emergency plan for the proposed new site, similar to

what they have done here. However, when they build the plant, they will combine them. And we had discussions early on that we were curious as to okay, how is this going to be implemented. And they would likely use the 10 CFR 50.54(q) process to implement it because when you change the existing emergency plan, that is the process you use.

And there are other, they have license amendments or other procedural tasks that they have to take on to accommodate the implementation and we are going through that with Vogtle at this time. So, I am not concerned about two separate plans now with respect to the PSEG Site.

I wanted to clarify that for you.

MEMBER SCHULTZ: I appreciate that.

CHAIRMAN POWERS: Well during the new construction phase, you are going to have a different set of emergency problems because you have got a lot of construction folks on-site. A lot of them are going to be completely unfamiliar with this whole idea.

MR. MALLON: Well, there would have to be training for them. Even though they may be members of the public from a radiological standpoint, there would have to be a site familiarization process. When that siren sounds, where do you go? Where is the assembly

point? Given the large numbers of people, you would have to.

CHAIRMAN POWERS: Yes, that assembly and accountability issue that you deal with in your application becomes a whole lot more challenging during the construction phase.

MR. MUSICO: And during the construction, those construction forces would fall under the existing emergency plan for Salem 1 and 2 and Hope Creek 1.

MEMBER SCHULTZ: I took from a comment I thought I heard from the presentation earlier, Jamie, that the proposed causeway, some of that had an effect on at least the thinking associated with construction personnel evacuation.

MR. MALLON: That was one factor. The most significant factor that drove us to -- two that drove us to the causeway. The first was they were building. Salem 1 was operating. Salem 2 was under construction. And Hope Creek was under construction.

MEMBER SCHULTZ: Yes.

MR. MALLON: And when you talk to folks that were there at the time, shift change could be difficult.

Now, if we had three operating units and an outage on one of those units, and I have a shift

manager who has to get to the site for shift turnover, I don't want him sitting in a traffic jam of ironworkers. So, I have to solve that problem.

Second, it is one of the few sites I have ever been to that has one access road. So, just think about that and when we look at photos of how that road was constructed, it is a fill road. They backed up dump trucks and emptied them and they just kept doing that until the finished the road.

So, it is something that would seem like okay, let's get a causeway in, something that is a little more robust. So that was the second. And then the third benefit was to improve ETE for the on-site personnel.

MEMBER SCHULTZ: It sounds like a good plan.

MR. MUSICO: Now, my understanding is that, and correct me if I am wrong, Jamie. Maybe you told me this a few years ago that you just mentioned how the existing road was constructed. Will the causeway, that will be an elevated road?

MR. MALLON: Yes, we looked at that because of the environmental impacts of an elevated road are less than a fill road. We felt that it would be difficult to get a fill road permitted in the State

of New Jersey. So, it would be an elevated causeway with pilings going out across the wetlands.

MR. MUSICO: Okay, thank you. That wasn't within the scope of my review, though.

MEMBER SCHULTZ: Understood. Thank you.

MR. MUSICO: A point of interest, though, with respect to the causeway. I looked at the ETE for the PSEG Site, even though it had the 2000 census data. It did account for the inclusion of the causeway. And as far as the ultimate evacuation times associated with the EPZ, there was little if any. The only impact, the primary impact was on the site because it would lessen the time to get out of the site itself because it was a direct exit.

As far as overall evacuation time estimates were concerned, there was really no impact for the public.

CHAIRMAN POWERS: Yes, because there is nobody there.

MEMBER BLEY: But for the people on-site, it is a big deal.

MR. MUSICO: Yes, and you will see in a photo how nobody is there.

So that is COL action items. And then permit conditions, we will get to those in a couple of

slides. Next slide, please.

I spoke to this a little bit, these are the eight COL action items. The ones that are directly resulting from the plant parameter envelope, in other words, we don't know what the reactor is, is 13.3-1, 2, 3, 4, 6, and 7. And then 5 deals with the proposed causeway and 8 deals with the reconciliation of the proposed ETE for the PSEG Site to reconcile it with the updated one.

So that was how we came about with the COL action items. It is information that we really won't know -- that they really won't know until the COL stage. And since we get another bite at the apple, the COL action items facilitated a future review. And again, we had the help of OGC in this regard. Next slide.

This is where it got a little interesting as well. But for Fukushima, the new emergency preparedness rule, and the emergency action level scheme, let me start with the emergency action level scheme at the bottom. This is just like Vogtle with respect to the first sub-bullet, PC 4 from a condition 4, which identifies NEI 07-01 as the NEI report that provides a nearly complete EAL scheme for the AP1000. It also provides a nearly complete EAL scheme for the ESBWR but it is applicable here as well.

In this case, since we have the plant parameter envelope, we didn't just have the permit condition identified in the AP1000. We needed to accommodate the other three designs. Now, the AP1000 and the ESBWR are advanced passive designs, which NEI 07-01 was specifically written for. The other designs are not. And so we have NEI 99-01, which was specifically written at an earlier time to accommodate light water reactors, which would include these. Hence, we have two permit conditions to accommodate whichever design they choose and then there will be a license condition. Here, it is a permit condition but then there will be a license condition in the COL application, just like Vogtle.

Let's see, let's do the middle on, the new emergency preparedness rule. The new rule has a stacking component to it, which provides a requirement to do a shift staffing analysis that investigates or analyzes any conflict that operational staff, on-site operational staff may have with responsibilities that they may also have in the emergency response organization. So, conflicting responsibility.

So, applicants, licensees, are required to do the staffing analysis. In this case, the staffing analysis is dependent upon the reactor that they pick.

In other words, depending upon if you have one unit or two units, the AP1000 they may have two units so there is going to be more staff but it is a staffing analysis that can't be done until the plant is being constructed. So, that is a future activity.

And so this permit condition will fold forward into the COL as a license condition.

And then at the top we have Fukushima Daiichi. The Near Term Task Force 9.3, Tier 1 recommendations. We talked about this a little earlier, which deals with the staffing assessment and is a communication assessment.

The staffing assessment, PC 1 is different from PC 3 in that PC 3 deals with conflicts for on-site staff, where PC 1 staffing assessment deals with an accident at a multi-unit site, multi-unit accident. So, it is a different perspective. And then we have a communication assessment.

Now, what all of these have in common is that NEI, Nuclear Energy Institute, has written reports specifically to address these issues. Again at the bottom, NEI 07-01 specifically provides an EAL scheme for AP1000 and ESBWR. The NEI 99-01 provides an EAL scheme for light water reactors, non-passive reactors.

Going up, the NEI 10-05 was written

specifically to respond how a staffing analysis, on-shift staffing analysis should be done to address possible conflicts in the responsibilities for on-site staffing.

And then NEI 12-01 was specifically written to address Near Term Task Force 9.3, which was transmitted to all the applicants, all licensees and applicable to the applicants as well as an RAI. The response was NEI developed NEI 12-01 as a methodology for actually performing the staffing assessment and communication assessments.

All of these NEI documents we have endorsed as acceptable means by which they can satisfy the requirements for Fukushima, the new EP rule and the emergency action levels. So, that gives us the confidence with respect to license conditions going forward into the COL. Next slide.

This is a minor issue. This was an item that popped up towards the tail end of the review where one of the aspects of the new EP rule was to, if you look at the bottom, was to extend the drill cycle duration from what existed as a six-year cycle to eight years and expanded it a little bit. And then also applied the eight-year cycle to hostile action-based drills once per cycle.

This had not yet been reflected in the ESP application. And we requested that they update the application, the emergency planning rule to reflect this and they did so by -- they didn't update the plan itself yet. They sent in a response to our RAI, showed us the changes they were going to make. We found it acceptable. We expect to see that in the next revision of the emergency plan. This was a very minor issue.

CHAIRMAN POWERS: When do you think your next --

MR. MALLON: March 31st.

CHAIRMAN POWERS: Oh, okay.

MR. MALLON: So the end of this month. Rev. 3 of the ESP application will go in and it has already been marked up to include this.

CHAIRMAN POWERS: Okay.

MR. MUSICO: Okay, and the conclusions. We found jointly with FEMA that the on-site and offsite emergency plans are adequate and there is reasonable assurance that they can be implemented.

There are two aspects of the review that both we and FEMA do. One aspect, we find that the plans are adequate. The second part, we find that there is reasonable assurance they could be implemented. It is kind of a two-pronged test.

And then the NRC makes the final conclusion that the completely integrated plans provide reasonable assurance, which we have here.

Understanding it is subject, this is an early site permit, it is subject to the permit conditions moving forward into the COL application, the COL action items being addressed and the ITAAC, the full ITAAC that are provided in the ESP application because they are required with a complete and integrated plan also would move forward into the COL application. And then move forward into the actual COL. Next slide.

That's it.

Yes, you had questions on ITAAC, Dr. Powers?

CHAIRMAN POWERS: We will get to that. I had other -- there was another intriguing aspect.

MR. MUSICO: We have some coming, yes.

CHAIRMAN POWERS: Complete and integrated plan. One, I noted that you have hospitals in the area that are reputed to be capable of handling irradiated personnel from your site. Can you tell me what does that mean a hospital can handle that? I mean I understand they have a receiving area separate from the ordinary emergency receiving area to handle an irradiated person. But then what?

MR. BURGIN: So, the plan for contaminated injured persons or potentially contaminated injured persons, every site has got to have at least one hospital designated and a backup.

The local hospital actually we helped design the new emergency room as an all hazards room. So, what they can do there is, obviously, look at the life-threatening injury first, if that is applicable and take care of that first, and then take care of the contamination, depending on the level.

So, they can decontaminate those individuals, if need be, at our designated hospital.

We also have additional hospitals that we could use over in Delaware, although they are not the designated hospital for us. But the Christiana Healthcare System also has two hospitals. So, we have additional support if needed through mutual aid from New Jersey to be able to take care of those situations and they actually do the same thing. Of course, we drill that on an annual basis with all those hospitals to make sure they are proficient.

CHAIRMAN POWERS: I mean that was just a major headache in the Chernobyl accident but now a hospital is -- I mean the doctors just are unprepared to handle a heavily contaminated individual. And I

also noticed that you have ambulance capable of transporting an irradiated individual. How irradiated?

Could you handle say the victims of SL1? I am showing my age.

(Laughter.)

MR. MALLON: I don't that we evaluated -- because you are talking about dose now. You are talking about contamination levels being high enough to causing --

CHAIRMAN POWERS: The individuals were what, 25 r per hour on contact. I mean, they were dosed. I mean, radioactive material had been blown into them. And they had a dose but you got a dose if you went up to them.

MR. MALLON: I don't know that we have evaluated that for our ambulance. Do you know?

MR. BURGIN: For our on-site ambulance, as well as our offsite ambulance. Offsite ambulances would not, typically because that is a little different situation that they may not be used to. Again, based on that scenario, you have got to look at not only the individual but also the threat to the crew that is going to be taking that person out.

CHAIRMAN POWERS: Right, it is the crew

that I am worried about.

MR. BURGIN: Usually you use a wrap and get them out to the hospital as quickly as possible. So, you would have to evaluate that based on the scene.

MEMBER RYAN: It is still a valid question. What do you use for a dose criteria to say we are not going to take him to the hospital because it puts too many of the personnel at risk and his likely does might be lethal anyway.

CHAIRMAN POWERS: Well, I think they actually address that. Say 75 rem life rescue dose limit and there is a 25 rem -- there is another one at 25 exemption. So, I mean I think they dealt with that. I just don't know what they can actually handle for a contaminated individual.

Because I mean it is the dose to the driver and the caretaker for the duration of the drive.

MR. BARSS: If I could add in, Dan Barss again. Looking globally at all of our emergency plans, I don't know if anyone has this ambulance prepared and ready. Usually they wrap the individual, they send a technician with him to the hospital set up with dosimetry and then they would be ready. I think it would be on an ad hoc basis, where you would start thinking wet blankets and things like that, and

analyzing. And of course then you have got to worry about the weight loading of the ambulance and that kind of thing.

That is why we have technical support center and a radiological support center that can help in plant emergencies.

CHAIRMAN POWERS: I bet there aren't two people in your technical support center that are ready to address that issue.

MR. BARSS: Well in our operational support center, that is where you do have rad engineers and those people could be called in to be available. So, I think the sites have the capability to do that. It is not something that we see them drill and practice but I believe that they have capability and could do that, if they need to because have a lot of these over time where they have components that they need to move and work on that have high dose rates.

MEMBER RYAN: There are places that have this sort of stuff, the REAC/TS Facility in Oak Ridge is one that practices exercises and does all sorts of stuff. And other facilities, many in the DOE complex I think that deal with this.

So, if it is an issue that you want to think about, I would get ahold of some of the folks at REAC/TS

and say what do you guys drill for credible scenarios involving a contaminated person. I mean contamination on a human being can be a pretty good dose rate under the right circumstances, both for the patient and the caregiver.

MR. BURGIN: And actually what we do is we have the REAC/TS number for our people on-site and for our people at the hospitals, so that they can call REAC/TS and say hey, what do I do.

MEMBER RYAN: Well, there you go. Well, that is a good start.

MR. BURGIN: And then the other piece is then through both states, you can contact possible DoD DCON help. But that is not something we would. We would get that from our states. But that is exactly why we have REAC/TS as a number within both of our organizations.

MEMBER RYAN: But do you drill in REAC/TS and do all those kinds of things?

MR. BURGIN: Actually, I just came back from REAC/TS.

MEMBER RYAN: Did you ?

MR. BURGIN: Yes, I just came back from REAC/TS two weeks' ago and toured their facilities. And we have an agreement that they would help us as

quickly as they could, based on that situation.

MEMBER RYAN: Well that is some great stuff. That is at least getting you the people that have the equipment and know all that stuff.

CHAIRMAN POWERS: And I am sure I want them to be distracted from their normal functions to handle this hypothetical situation when I have got expertise on tap.

MR. BURGIN: We do send our staffs from the hospitals down to REAC/TS and REAC/TS actually gives them that type of scenario. And we do that so that if they see something, even if it is not related to us, they know how to handle it. We figure that is another good neighbor type thing that we do. So, we do have key individuals from those hospitals who come to that training.

CHAIRMAN POWERS: When you think about updating you might want to bring up this stuff and brag on yourself a little bit. Lots of people throw bricks at you. Only you will brag on yourself.

MR. BARSS: I would add a point, too. Again, Dan Barss. The National Response Framework, if we get to an event that is declared, would be in place and through the NRC and then through FEMA, the full resources of the country would be available and they

will, too, provide support. It would have an SL1 type command of the individual.

CHAIRMAN POWERS: There is no doubt about that.

MR. CHOWDHURY: Another thing I would like to add in this regard is that I have been to several conferences where CDC, Center for Disease Control, promoting or at least providing information of their recent procedure development capabilities, et cetera for population monitoring, for large-scale population monitoring, be it an accident-related to any nuclear power plants or any other events, including dirty bombs and things like that.

They have developed, to my understanding a large capability that states an offsite organization or anybody even the power plants can tap into.

CHAIRMAN POWERS: Okay, now I would like to turn to the monitoring teams that you send down. Can you tell me more about that?

MR. MALLON: My ERO responsibility, I am a radiological support manager at the EOF, so I am the person who has the team running the dose assessment models as well as the field survey teams that are going out.

We typically drill two teams. We have

capabilities to send more than that. We have the equipment out at the EOF. It is an ANSI-qualified RP Tech in each vehicle and then the driver is typically also an engineer, technical person.

We coordinate with the State of New Jersey and the States of Delaware that would have their own monitoring teams out. We are looking to find the plume. We are looking to find the plume's centerline. Dose modeling in an event like this is, in order of magnitude --

CHAIRMAN POWERS: It is crude.

MR. MALLON: -- so you want to confirm is your dose model on or not. And real honest to goodness measurements, nothing beats that.

CHAIRMAN POWERS: What model are you using?

MR. MALLON: MIDAS.

CHAIRMAN POWERS: MIDA.

MR. MALLON: So, I was just in a drill last week and they gave me not unmonitored, there was a monitor on it but it wasn't the normal release pathway. They had it leaking out an ADV. And it is like, you know, a nice little complication. But that is how I like it.

That is how drills should be. Right? You

want the curve ball in the drill situations so that if it ever comes to pass, you have seen that before and you know how to do that.

CHAIRMAN POWERS: Your site is very flat. So, Gaussian plume models actually work fairly well for you.

MR. MALLON: The other day I was driving to the site and I was looking at the Hope pre-cooling tower and I was watching it go straight up and then made a 90 degree turn, and then as it went up higher, another 90 degree turn. Now, a lot of that is thermal in the height but the wind can get tricky. And certainly with the temperature differential between the land and the river, you can get some interesting meteorological conditions.

CHAIRMAN POWERS: Did you have a periodicity to the wind directions, just because of the water/land temperature differential?

MR. MALLON: Yes.

CHAIRMAN POWERS: But with all that marshland out there, maybe it isn't such a big differential.

MR. MALLON: No, we see it.

CHAIRMAN POWERS: Okay, well, things that attracted my interest in your documentation.

Now, ITAACs. Tell me more.

(Laughter.)

MR. MUSICO: Well, what would you like to know?

CHAIRMAN POWERS: Just about everything. Well, you have a list of ITAACs.

MR. MUSICO: Yes, sir.

CHAIRMAN POWERS: And these are tests and verifications. When you get to have something, this is what you have got.

MR. MUSICO: Yes, sir.

CHAIRMAN POWERS: And you have a set of acceptance criteria, of course.

MR. MUSICO: Yes.

CHAIRMAN POWERS: Okay, I have now exhausted my knowledge on this subject.

MR. MUSICO: Well, I knew even less when I first started with the Agency.

I characterize ITAACs as placeholders. And the way I explain it for EP purposes is that the application can use and identify ITAAC for those aspects for emergency preparedness that they cannot reasonably address prior to physical construction of the plant and those which are consistent with the generic ITAAC table in the standard review plan.

Because when we were developing that table, we modeled it after NUREG-0654, FEMA-REP-1, Rev. 1, the evaluation criteria in that as the individual pieces, the individual things that needed to be addressed.

And what it reflects is the maximum -- in the standard review plan, it reflects the maximum number of ITAAC that we envisioned might be necessary prior to physical construction of the plant. We put a caveat in the standard review plan that says -- it didn't say exactly this -- but it said yes, we are smart but we don't know everything. The licensee is the applicant. They are pretty smart, too. They may come up with additional ITAAC or fewer ITAAC. For Vogtle, for example, as a matter of fact I think was a result of the ACRS meeting in human factors, an additional ITAAC was determined to be needed for human factors in the TSC and EOF for a multi-unit site to identify certain displays to differentiate between them.

And I was in my cube and human factors people came to me and they said you know ACRS has a question. We don't know how we are going to address it. And so we came up with this ITAAC and it hit the spot. So, that was an example of additional ITAAC.

This application, though, they mention that they utilized SECY 05-0197, which also provided,

which actually provided the very first generic set of EP ITAAC, which I developed and that version of ITAAC was actually a minimum amount of ITAAC that I envisioned that you would have to have. I was primarily looking at an existing site. But then when I considered it further, when I was writing the standard review plan. I realized well, what about a greenfield site? They are going to need more ITAAC.

So, then I looked at a maximum set. So either one is applicable but it doesn't matter because you can have -- as long as they are consistent with standard review plan, Section 14.3.10 EPI ITAAC, they are consistent with the generic EP ITAAC, they can have more or fewer. And anything that differs, we would analyze on a case-by-case basis, such as we did for the human factors for Vogtle.

In this case, we have identified in the ITAAC Table 13.3-1 if you are asked how many ITAAC are there, it depends on how you count them. If you look at -- there is four columns. You have inspections, tests, analysis and acceptance criteria. You have got the third column is actually ITA inspections tests and analysis where it is kind of a general requirement on how they are going to do something. There are 22 of those.

But a better counting of it would the acceptance criteria column. That in fact is supposed to be the objective criteria that they have to meet. I look at it, I describe it as it has got to be objective. It doesn't have to be but it should be objective criteria, where I say you look at what they did, thumbs up or thumbs down if they meet it. It should be easily identifiable whether they have met the acceptance criteria or not. In that counting there are 81 specific acceptance criteria. So, that is how many ITAAC we have.

The ITAAC table is unique with regard to offsite, FEMA, in that there is only one ITAAC, just one ITAAC that deals with offsite emergency planning. And that is ITAAC 8.1.3, which deals with the first full scale exercise where there cannot be any offsite deficiencies.

So, if there are offsite deficiencies, then there would be a license condition, which I think the regulations were updated to actually parrot what we wrote in this ITAAC, in the generic ITAAC table, where they can go up to five percent power. Well, the reason it is written the way it was, and again, we have worked with OGC years ago was what I was trying to do was write the ITAAC for emergency planning for Part 52

to be consistent with the requirements under Part 50. And so that is why you see the five percent power. I wanted an equivalent capability of a licensee to go up to five percent power, no more, if there were offsite deficiencies. And that is the way Part 50 works currently.

There was a little glitch with respect to okay, what is that keyed off of. And I think Part 52 was keyed off of the exercise. I think that was it. I would have to go back and look at it. But it turned out that we have a five percent threshold or five percent maximum power that under Part 50 or Part 52 the applicant can operate if there are offsite problems.

And the regulatory and safety analysis that supports the five percent power, which was developed years ago as part of Part 50, that is history.

MR. BARSS: 10 CFR 50.47.d is the point that talks about the five percent. And what we did with the Part 52 was just narrowed that or added that in. So there is now a review that is 50.54(g)(g) as the criteria that was created that points back to that.

So, for either under the Part 50 operating license process or under the Part 52 COL process, that same provision exists for both.

MR. MUSICO: So, FEMA has a distinct role

in this process, including the exercise. What else?

MR. BARSS: Let me add in a word to the ITAAC process. I think that might help you because I think you are asking globally about the ITAACs.

Remember that ITAAC are something that licensee propose, we review, and then approve. Or, we can propose our own ITAAC and add them in there, if we feel it necessary.

The ITAAC, and I am not sure, I don't think OGC is here but hopefully I will get this right. But the ITAAC, if they are written in our safety evaluation, have no other bearing because that is not a licensing document. So, what they have done for the COLs that we have already issued is they have incorporated those ITAAC as part of the license. Once the ITAAC is completed, then they cease to exist because they have been accomplished completely.

Remember, too, that it is the licensee now, the COL licensee that has to perform the ITAAC and so they will report to us that it has been accomplished. And that is why there is only one that references to offsite because state and locals aren't required to do ITAACs. Only the applicant or the now licensee does them.

And there is a process that has been

developed, kind of an inspection process, that once they have completed their ITAAC, they submit to the NRC a statement the ITAAC was completed, that are all the reasons of why they met everything. And then we, through a review process, review them and determine whether not they were and then there is an actual Code of Federal Regulations letter is issued saying that we have reviewed, and approved, and accepted these.

ITAAC, generically, and there are hundreds of ITAACs or maybe even thousands, over a thousand for a specific --

MR. MUSICO: Well, it is a separate and complete document.

MR. BARSS: It is a separate document. Yes, it is a big number. They are done on a sampling basis as far as our inspection but there was a determination made some time ago that in one area we would inspect 100 percent of those ITAAC.

So, all the EP ITAAC 50(c) will be inspected and reviewed at the time.

MR. MUSICO: Thank you, Dan.

I think all of the security ITAAC are inspected as well 100 percent.

MR. BARSS: I believe that is true but I am not a security expert, so I won't make that

statement.

MR. MUSICO: I think there was a SECY that came down that identified that.

MR. MALLON: And required the licensee, the COLA holder is required to provide the NRC with a schedule in advance of when that ITAAC is scheduled to occur so that they can plan their inspection to be there.

MR. MUSICO: And there is a formal closure process that the NRC is going through right now with Vogtle. It is quite complicated. So, we are all learning.

CHAIRMAN POWERS: Well, especially in the area of communication, communication equipment, there is no way the licensee can anticipate today what will be available in 20 years when he starts, he asks for a COL. I mean, you just can't do it. It is physically impossible. I mean I noticed that in your emergency plan you call for a fax. When was the last time anybody used a fax? Can you find an operational fax? I had to the other day --

MR. MALLON: We just had our satellite phones at the EOF. They were there, you know, as part of Fukushima response.

CHAIRMAN POWERS: It will be -- I mean you

have no idea. I mean even if you started building a plant today, by the time you got to this stage in the area of communications, the iPhone of today will be looked upon as a dinosaur.

MR. MUSICO: Well along that line, as far as the evolution and advancement of communication capability, Dr. Powers, as you may recall, during the Vogtle hearings that we had as well as the ACRS meetings, that was a very rich area of discussion in regard to cell phones and other aspects of communications in regard to the TSC location for Vogtle.

CHAIRMAN POWERS: Yes.

MR. MUSICO: That was one of the driving forces behind extending the two-minute walking distance to the control room out to about ten minutes.

CHAIRMAN POWERS: And the issues of interference with cell phones, either inadvertent or deliberate is one that we have not come to grips with effectively. I mean, as a nation, we haven't come to grips with it yet.

MR. MUSICO: We have a few more finishing slides, if there are no more questions.

CHAIRMAN POWERS: Any other questions on this area?

MR. MUSICO: Okay, this is the high point coming up, by the way.

CHAIRMAN POWERS: I mean I love it. Is there a video or just pictures?

MR. MUSICO: Well, I didn't have the benefit of an airplane to take aerial shots like the applicant did. Of course, I would have done it if I had the money.

I am the photographer. This was taken May 6th and 7th of 2010. This is the entrance to the main road. You can help me. You might recognize --

MR. MALLON: Yes, this is in the town of Hancock's Bridge where you turn onto the access road. There is a couple more properties after this sign, less than five, maybe six at most. So, all the traffic at this point is going to the site.

MR. MUSICO: It is an excellent road. Next slide.

CHAIRMAN POWERS: Not from what we heard. He said it was a bunch of dump trucks. He hates this road. He drives it every day and he just can't stand it. He is consciously irritated by the time he is up to the front gate.

(Laughter.)

CHAIRMAN POWERS: He probably can't pass

a fitness for duty.

MR. MUSICO: Do you read back what I said?

MR. BARSS: Well you can see the waves in the road.

MR. MALLON: So, this is where it necks down to one lane in each direction with a center, so it is three lanes wide. The center no one drives in. And then as you start to get closer to the site.

And in the distance at the dome, you can see some signs here. And this is where the screening checkpoint is distant from the site. And this is where it opens up to two lanes for the incoming traffic.

MR. MUSICO: Okay, next slide.

MR. MALLON: And this is looking out across the wetlands. We are probably near the access road.

MR. MUSICO: Very near it, yes. In fact, we are probably --

CHAIRMAN POWERS: Mr. Mallon knows all the species for those in Latin.

MR. MUSICO: Okay, there is a test on the next one here. Can you spot the plant?

This is about eight or nine miles out west-ish of the plant and, as you can see, it is almost entirely marshland and meadowlands.

MEMBER CORRADINI: This is the Delaware side?

MR. MUSICO: No, this is New Jersey.

MEMBER CORRADINI: Oh, I thought you said west of the plant.

MR. MUSICO: I'm sorry, east, southeast.

And you see that little, this little thing? That is the cooling tower right there. So that shows there is not much in that direction. Next slide.

They have sirens. Many sirens. Next one.

CHAIRMAN POWERS: These are to scare the deer?

MR. MUSICO: Yes. And driving, I came across a sign. Next slide. It provides you with information regarding where to tune if you hear a siren. Next slide.

An intersection, I'm not exactly sure where this is. And then next slide. And another sign. It is basically the same sign, which is acceptable. It tells you where to go. And that's it.

MR. BURGIN: One interesting thing about the signs. They are at major intersections. They are located at five miles and ten miles. And they are actually reporting locations for law enforcement for

access control. So, they are also strategically placed as you enter.

MR. MUSICO: I think Prosanta has some closing remarks.

MR. CHOWDHURY: Yes, so we finished presenting those five chapters today. And in the next two slides, 41 and 42, I merely copied staff's -- summarized copied staff's findings, conclusions for 11.2 and 3, 17.5, 3.5.1.6, 15.03 and 13.3. You have heard those from the staff.

And here on slide 43, what we presented today with five permit conditions and 10 COL action items, eight for 13.3 and one for Chapter 3.5.1.6 and one for 11, to 11.3 combined.

Our next interaction with ACRS and I am working with the staff engineer Quynh to finalize the date for the May presentation and that will be on advanced SE with no open items for Chapters 2.1 and 2.2 combined and 2.3. Also, --

MR. NGUYEN: Tentatively, it is on Wednesday, May 21st. That is the tentative date.

MR. CHOWDHURY: Okay, tentative date May 21st, Wednesday.

CHAIRMAN POWERS: I can practically guarantee you that is going to change in that time.

MR. CHOWDHURY: Okay, the sooner we know, the better off we will be providing those.

And I have alerted the staff to mark the entire week, the week of the 19th right now that is what they have and they are available. So I will tell them about Wednesday in May and possibly Thursday.

I put a tentative date on final safety evaluation next interaction in January 2015 but as we have revised recently the schedule, it is up on the web, public website, right now. It says evaluation Phase B, C and D, which is D here at ACRS, last interaction.

We do not have a schedule right now. And once we finalize the schedule, we are expecting a letter from PSEG on hydrology and storm surge analysis. Once we get that letter, once we get their plan and we have a good handle of how much time we need, we will finalize the schedule right now. So, I put tentative in there and it is really not valid at this time. The schedule went up on the web this morning.

Let me see if I have anything -- no. That is all I have right now.

CHAIRMAN POWERS: Yes, I suspect that the May meeting will move around from his date.

MEMBER BLEY: That is the only open day that week, by the way.

CHAIRMAN POWERS: In whose book?

MEMBER BLEY: Open for some of us. For some of us.

CHAIRMAN POWERS: But we will get something scheduled as quickly as we can.

But it would be good to get through Chapter 2. That is the geology chapter, isn't it?

MR. CHOWDHURY: No, 2.1, 2.2 is geography, demography and met.

CHAIRMAN POWERS: Met data. That is what I meant, geography. So, that is pretty easy. Geography is usually a pretty easy chapter.

MR. MALLON: We don't have many hazards around the site. Obviously, Delaware River traffic is a hazard that I see.

CHAIRMAN POWERS: The traffic stuff, I mean in Grand Gulf they left out the Mississippi River. I am not sure exactly how they did that.

I mean usually it is the explosion hazard --

MR. MALLON: Sure.

CHAIRMAN POWERS: -- and how you calculate shock waves at the end of the site and things like that and getting the data on the frequency of explosive shipments. In your case, I suspect it is not so much

explosives as it is like propane or fuel, something like that going up the side.

I guess this is a little easier. The Mississippi River they have got dynamite going up and down.

MR. MALLON: We don't have any railroad hazards.

MR. CHOWDHURY: If you remember in the morning I showed you a date for geology, seismology, SE that August 2014. My goal is, or I have scheduled actually to provide you the complete SE by the 16th of August. That means one month in advance of the scheduled presentation.

CHAIRMAN POWERS: We might huddle a little bit and talk about this because we might be able -- it might be more efficient for us to do all those chapters, geography, met and hazards all in one go, rather than to break it up.

MR. CHOWDHURY: Okay, whatever suits you but the hydrology will be separate.

CHAIRMAN POWERS: Yes, hydrology is always problematic and it is probably not easier for this site because you have to worry about alternatives and things like that. And then you have to worry about what happens when you actually build something on the

site.

MR. MALLON: Have you thought about talking to Bill Hines about coming?

CHAIRMAN POWERS: Say it again.

MR. MALLON: Bill Hines, have you talked about, thought about bringing him in? He might be helpful with that.

CHAIRMAN POWERS: I think we have to look at the seismology analysis. This is not really a super-seismic site.

I mean Bill is always very helpful because he knows things that no normal person wants to carry around in his head about seismic things. I mean this is just not a super-seismic site.

I mean the nearest -- yes, you are like equidistant from the major earthquake centers.

MR. MALLON: You mean like Charlevoix or Charleston?

CHAIRMAN POWERS: Charleston, or up in Canada, or to the west. I mean the only -- the issue is --

MR. MALLON: We did feel the North Anna.

CHAIRMAN POWERS: The issues you really have are tsunami hazards from continental shelf collapses.

MR. MALLON: Really the hurricane. The tsunami did not exceed break. The river is about 11 feet below grade. And the tsunami did not break grade. And we moved it right to Cape Henlopen on the shelf.

CHAIRMAN POWERS: You are on the protected side. That's right. You are on the protected side. You dogs!

MR. MALLON: People in Delaware.

CHAIRMAN POWERS: Okay. Okay, so you guys are -- well, I mean I think what we can do is once we get the seismology, we look at it and if it looks complicated, then we can ask Bill to take a look at it. I mean, even if it doesn't look complicated, he knows what is going on in the community.

Okay, well, we will get some planning on this. We are done, I think. It has been delightful, guys. The presentations were very straightforward and the slides were beautiful.

MR. MALLON: Oh, I'm sorry. I have some ADAMS numbers for you. Mike Launi has an answer to the one question about the large and small aircraft.

MEMBER SKILLMAN: Yes, please. Thank you.

MR. LAUNI: This is Mike Launi. In the DOE standard, it has the definition which it gets from

Title 14 of the Code of Federal Regulations Part 135, for small aircraft, it is an aircraft that is less than 30 seats or less than 7,500 of payload. Large aircraft is then 30 seats or greater or 7,500 pounds or greater.

MEMBER SKILLMAN: Thank you.

CHAIRMAN POWERS: Before I close, I have to ask you if there are is anyone on the phone that would care to make a comment.

MS. TAURO: Yes, we do have. We would like to make -- hello?

CHAIRMAN POWERS: Yes, do you want to make a comment now? Speak now.

MS. TAURO: Oh, yes. Can you hear us?

CHAIRMAN POWERS: We can.

MS. TAURO: My name is Janet Tauro and I am the Board Chair of Clean Water Action New Jersey, formerly known as New Jersey Environmental Federation.

We are a group with 150,000 individual members and 75 member organizations. I also represent GRAMMES, Grandmothers Mothers and More for Energy Safety.

We were part of the coalition with Paul Gunter's organization that fought the relicensing of Oyster Creek.

First of all, are you going to limit the

public comment portion of this to ten minutes?

CHAIRMAN POWERS: I have it scheduled for ten minutes, but if you have pertinent comments that go beyond that, we will certainly listen to them.

MS. TAURO: Okay, because yes, we were going to object to the ten-minute limit on public commentary, considering the amount of time that we spent listening to testimonies. But I will try to be as succinct as possible.

First, we do agree with Paul Gunter's testimony concerning the co-location of multiple reactors at the site and, as demonstrated by Fukushima, we feel that this will only escalate the risk of a cascading series of catastrophic events. So, we feel that that is not a good plan.

We would like to alert you and remind you of information in an NRC report indicating that even a small fire in a fuel pool could leave 94,000 square miles -- 9,400 square miles uninhabitable from radioactive contamination and displace 4.1 million.

So, when you take that and you know that relates to Hope Creek, which is a Mark I boiling water reactor, the same as Fukushima, we agree that this is not suitable to build additional plants here.

And we also agree with him that the risk

is not so much planes avoiding the site but planes aiming for it that is unacceptable.

And we would also want to remind you of security lapses that have occurred at Salem, in particular Sharif Mobley, Sharif Mobley, who worked at the Salem plant and at other plants for four years as an outside contractor who was arrest as an Al-Qaeda operative in Yemen in 2010. Now, how much information did this individual share with his terrorist organization and other operatives? And for this reason alone, we feel that there should not be new plants considered at this site.

NRC really does not have waste confidence for the long-term disposal of nuclear waste. And already in New Jersey, we have tons of radioactive waste.

So, in our state, we are moving forward and we are moving towards a renewable energy future and we are working towards a goal of 80 percent renewables, wind, solar, and geothermal and a 30 percent energy reduction by 2050. So, we do not need a new nuke.

And finally, I would like to just kind of reference a statement by one of you gentlemen who referred to being able to sleep at night because you are enveloped in sort of statistical safety. Well, I

will tell you that I have met with former Prime Minister Naoto Kan and he felt that way, too. He felt enveloped before Fukushima. And then he had to bow. He described how he felt when he had to bow in shame and apologize in heartbreaking remorse in front of mothers and grandmothers who lost their loved ones and their homes. And he cautions the world that there is no one 100 percent guarantee against a nuclear accident or terrorist attack and because the effects are so catastrophic, is not a technology that should be expanded or really continued to be used. And that is a sentiment that we agree with wholeheartedly.

So, with due respect to your professions and to those of you in the room, there is not one of you that could give 100 percent guarantee that there would not be a catastrophic accident and what that would do to really you are talking about the northeast seaboard.

So, I thank you and we want to participate in these discussions further.

CHAIRMAN POWERS: Thank you. Are there other comments to be made?

MR. BROWN: Yes, my name is Jeff Brown. I am also a member of GRAMMES. I live in Brick, New Jersey. I have been involved in monitoring the Oyster

Creek. I moved here 11 years ago. We were part of a successful contention regarding the relicensing. That made it less dangerous regarding its rusty containment system.

Secondly, I have been going to emergency response meetings since I have been here. So there have been 11 annual meetings with the Department of Environmental Protection in New Jersey. Let me just say no one in the public believes that that wonderful plan will work. The first responders will react bravely perhaps -- the emergency response plan is somewhat different. Much faith is placed in these theoretical plans.

Thirdly, I was horrified to hear the discussion about the aircraft impact because you talked all your time about the question of whether you -- makes it worthwhile doing an assessment of radiological release. Let me say that the probability of terrorists attacking buildings successfully is three out of four. No one knew the probability of an Air Force trained psychologist going on a murderous shooting rampage, an Air Force personnel person.

We have 5130 flights out of McGuire Air Force Base regularly here. Who knows when somebody is going to take a notion to dump one of those into Salem?

I think that regardless of what the probability risk assessment says, you must require a study of the potential radiological release of this plant. Do not -- on that.

Also the ESP is fundamentally flawed and should be open to challenge right up until the design is selected. That you would give them a pass for 17 years on a decision you make now is ludicrous. Three Mile EMC is outdated. We know that from Fukushima. People were moved into contaminated zones because of what they thought their model told them.

Finally, your exclusionary language of using acronyms until it comes out your ears is offensive to those of us in the public who are listening. I was trying to find out what an ITAAC is. I can't find it on the NRC website as you are speaking. I would request, in future meetings, the first time you use an acronym, you please define it.

And finally, I would request that you put this in a webinar so that we, too, can see the slides, see the pretty pictures, and can get a better handle on what you are talking about. Thank you.

CHAIRMAN POWERS: Thank you, Mr. Brown. Any other speakers?

MS. DODGE: Yes, Paula Dodge. Can you

hear me?

CHAIRMAN POWERS: Yes, we can.

MS. DODGE: Okay. First I have a hospital question. We were told by emergency people over at our big hospital if they started bringing in people that were very contaminated, they would really have a problem. No matter how much they drilled for it, it would really be a problem.

Let me talk specifically -- you deal with. Specifically, I want to back up this idea that having multiple nuclear plants on one site sounds absolutely insane. Someone said there are no hazards around this site. How about the other nuclear plants?

I want to talk specifically of steam tube failures at older BWRs because the NRC inspection report not too long ago found that 1,567 had -- at Salem 2. Now, that is second only -- which had 2,000 wear indications. Now in all the other old, old BWRs, which they do continue to worry about, -- only had under a hundred. Most of them only had 20. At Indian Point, they actually did have a rupture that shut down the plant for months.

So another NRC committee report said we can't say definitely that a single tube rupture, a PSR, would not lead to a chain reaction and a real disastrous

event.

The other thing -- and knowing those things, I can't help thinking you know, moms tell their kids don't make a new mess until you clean up the old one. -- here wanting to build a new plant and they have got problems to consider at their Salem 2, including a tritium leak. I think they have got enough problems without making a new mess.

Now, let's see, you started out with this conversation about weeds. I remember you talking about weeds and then the whole -- it got to be down in the weeds. But we were with you. We knew what you were talking about. So, it became quite pedantic.

Then the other point I want to make, which despite the fact of how you all sound so competent, so intelligent, and how sure of yourself, that the Nuclear Regulatory people created a problem that you have no answers to.

And I would like to talk about high burnup fuel in relation to the Salem site. High burnup fuel is in all our plants now to some degree. The problem with high burnup fuel, as you may know, is that it is very radioactive, even on a basis of economy, now the NRC is admitting there is a gap in the knowledge of how we are ever going to move this stuff. It is going to

be a big --

EPRI is doing a 20-year study to try to see what happens -- that is 20 years away -- figure out how to handle high burnup fuel.

And I don't think they ever thought about it when they started using it. Uh-oh! Oops! And that oops factor is what makes us -- all the reassurances you are going to hand out, -- environmental report was done.

I would like to compliment the person in the room who keeps identifying himself. I am an older person. Sir, you are asking the right questions. I'm sorry -- one bit.

So, I will now end my comments by saying that some of you said we are all learning here. And I just want to say yes, we are learning but I don't see where you are learning. Because we had Fukushima. We know how -- multiple sites should not be. And I am just saying to PSEG and to this committee, the ACRS committee, learn the lessons. Don't -- and please, please consider the fact how much hot air goes up in the room about all your great plans. This is a bad, bad move.

I would like to thank you.

CHAIRMAN POWERS: Thank you. Any

additional comments?

I don't hear any. So, thank you very much. And I think we can, at this point, adjourn.

(Whereupon, at 2:51 p.m., the foregoing mater was adjourned.)

PSEG Early Site Permit
Advisory Committee on Reactor Safeguards Subcommittee Meeting

March 19, 2014

PSEG
Power LLC

Early Site Permit – Overview

Jamie Mallon
ESP Manager

PSEG Power LLC

Early Site Permit Application

PSEG Power LLC and PSEG Nuclear LLC are applicants

Reactor technology has not been selected

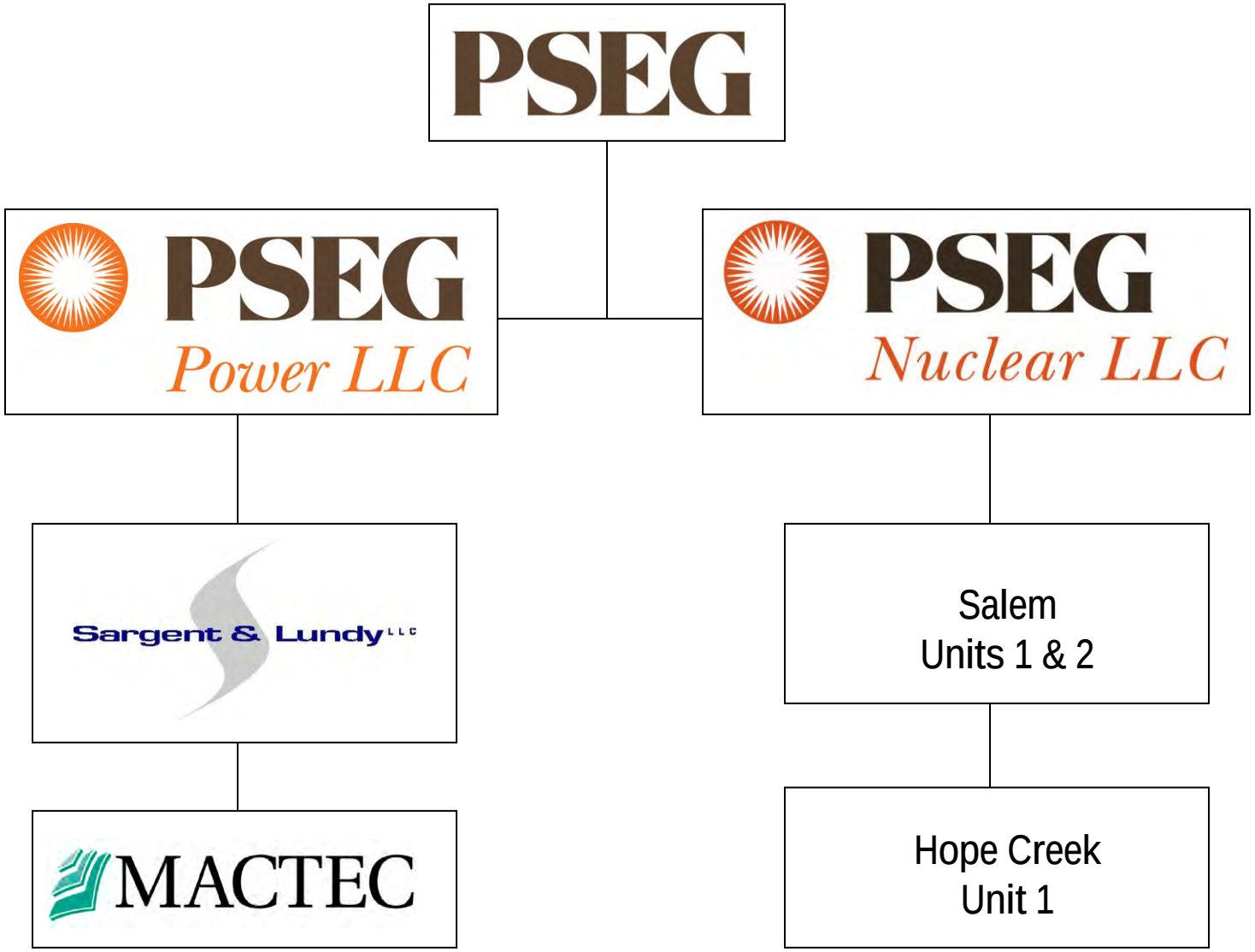
Application includes:

- Site Safety Analysis Report to address impacts of the environment on the plant, including hurricanes and earthquakes
- Emergency Plan – consistent with existing plants
- Environmental Report

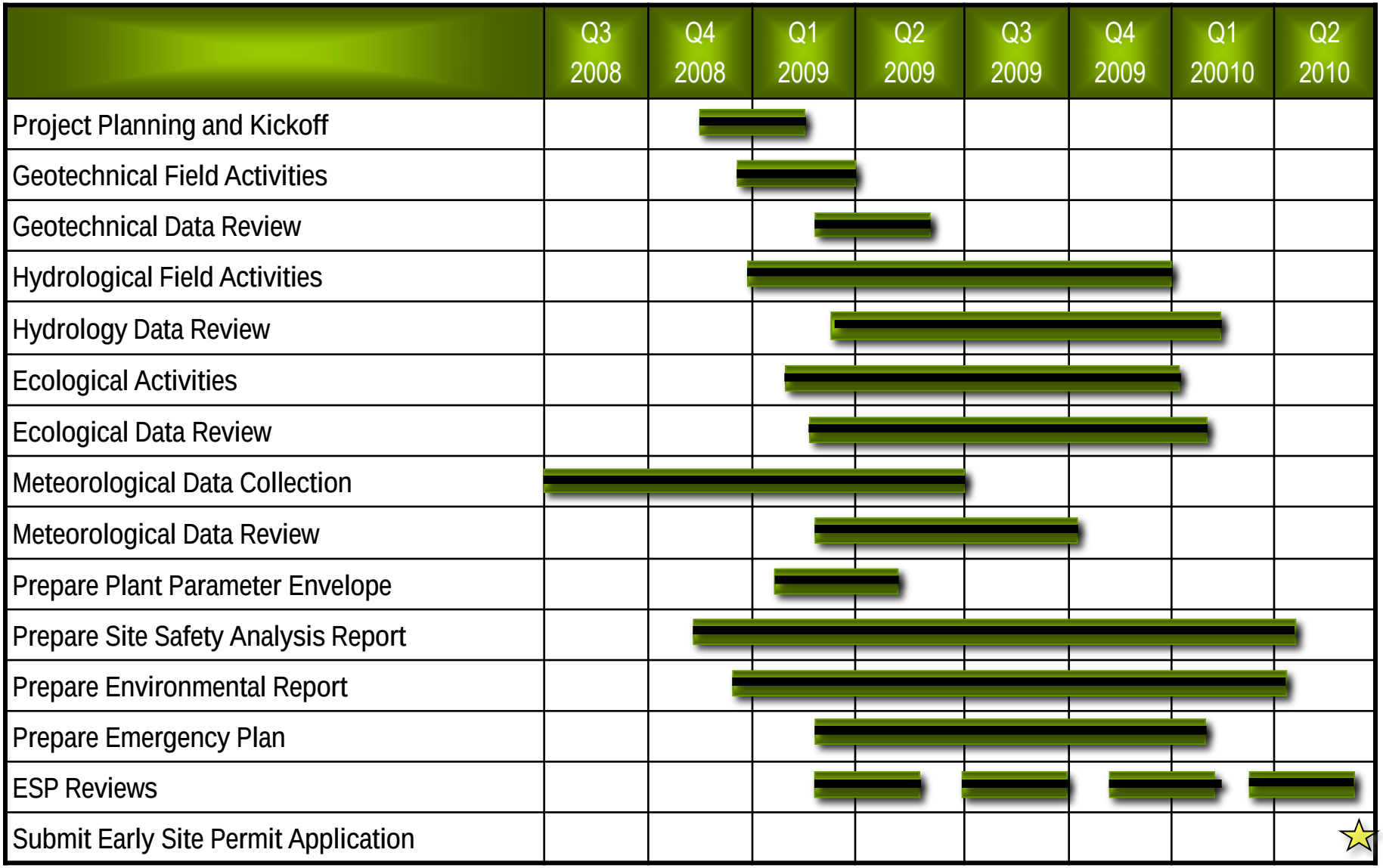
ESPA based on a "plant parameter envelope" (PPE)

- Assumes single large unit or two smaller units
- Impacts address footprints and other parameters such as water use
- Up to 2200 MWe for the two unit plant [Westinghouse AP-1000]

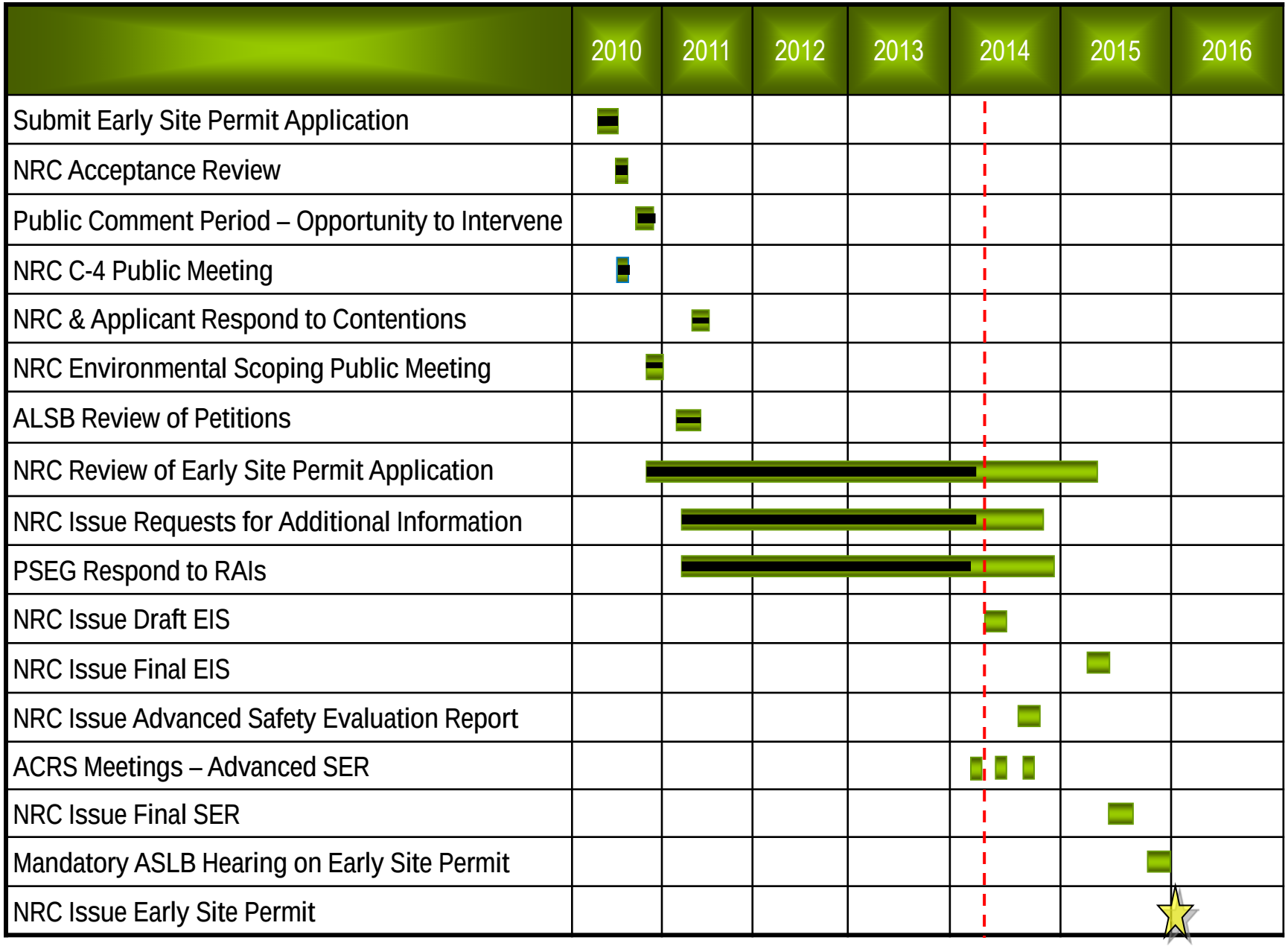
PSEG Early Site Permit Organization



Early Site Permit Application – Submitted May 25th 2010



ESP Project Update - Licensing Process



NRC Site Safety Visits

Pre-application Subsurface Investigation	January 2009
PPE Development	March 2009
Hazards Analysis	December 2009
Post-application ESPA Overview	June 2010
Hydrology Audit	February 2011
Quality Assurance	June 2011
Geotechnical Audit	September 2011
Seismic Analysis	Sept./Dec. 2012
Flood Re-analysis	July/Sept. 2013
Hydrology Audit	February 2014

Site Location

Existing 734 acre PSEG property located on southern part of Artificial Island

- 15 miles south of Delaware Memorial Bridge
- 18 miles south of Wilmington, Delaware
- 30 miles southwest of Philadelphia, Pennsylvania
- 7-1/2 miles southwest of Salem, New Jersey

Currently three operating nuclear reactors on Artificial Island

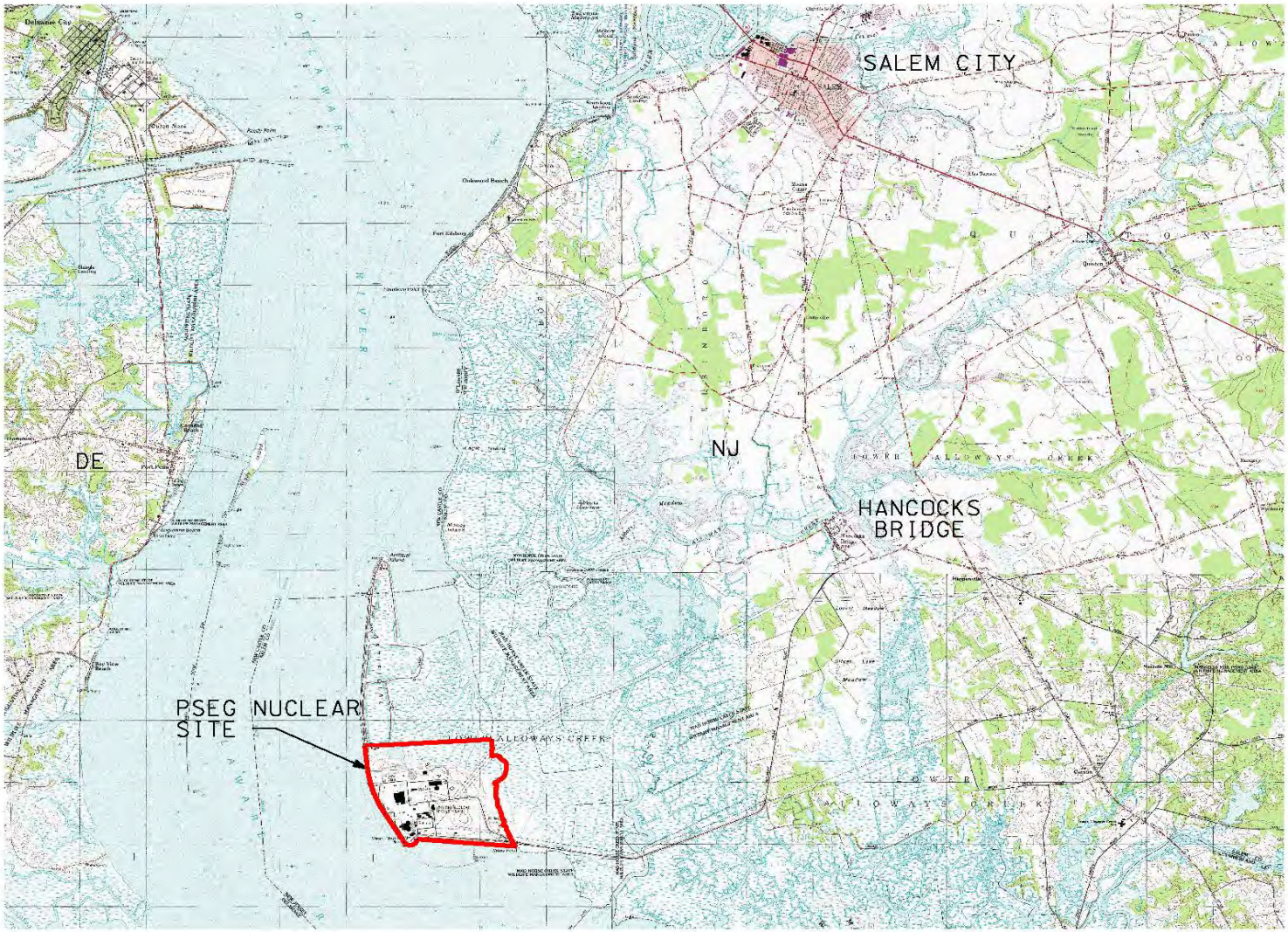
- Salem Units 1 and 2 - Westinghouse PWRs - 3459 MWt each
- Hope Creek Unit 1 – GE BWR - 3840 MWt

PSEG is in negotiation with U.S. Army Corps of Engineers (USACE) to acquire an additional 85 acres immediately north of Hope Creek Generating Station (HCGS)

PSEG ESP SITE AND REGIONAL VICINITY (NJ, DE, PA AND MD)

PSEG Power LLC

Current PSEG Site And Local Vicinity



PSEG NUCLEAR SITE

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PSEG Site

PSEG Power LLC

PSEG Site

PSEG Power LLC

ESP Application Development

Regulatory guidance to prepare the application

- 10 CFR Part 52 – Subpart A
- RG 1.206 - Combined License Applications for Nuclear Power Plants (LWR Edition)
- NUREG – 0800 - Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition
- RS-002 – Processing Applications for Early Site Permits

Studies and processes

- Site Studies and Investigation Programs
- Conceptual Design and Analysis
- Plant Parameter Envelope

Plant Parameter Envelope Development

Follow the Part 52 process as designed

Reactor technology designs not yet mature

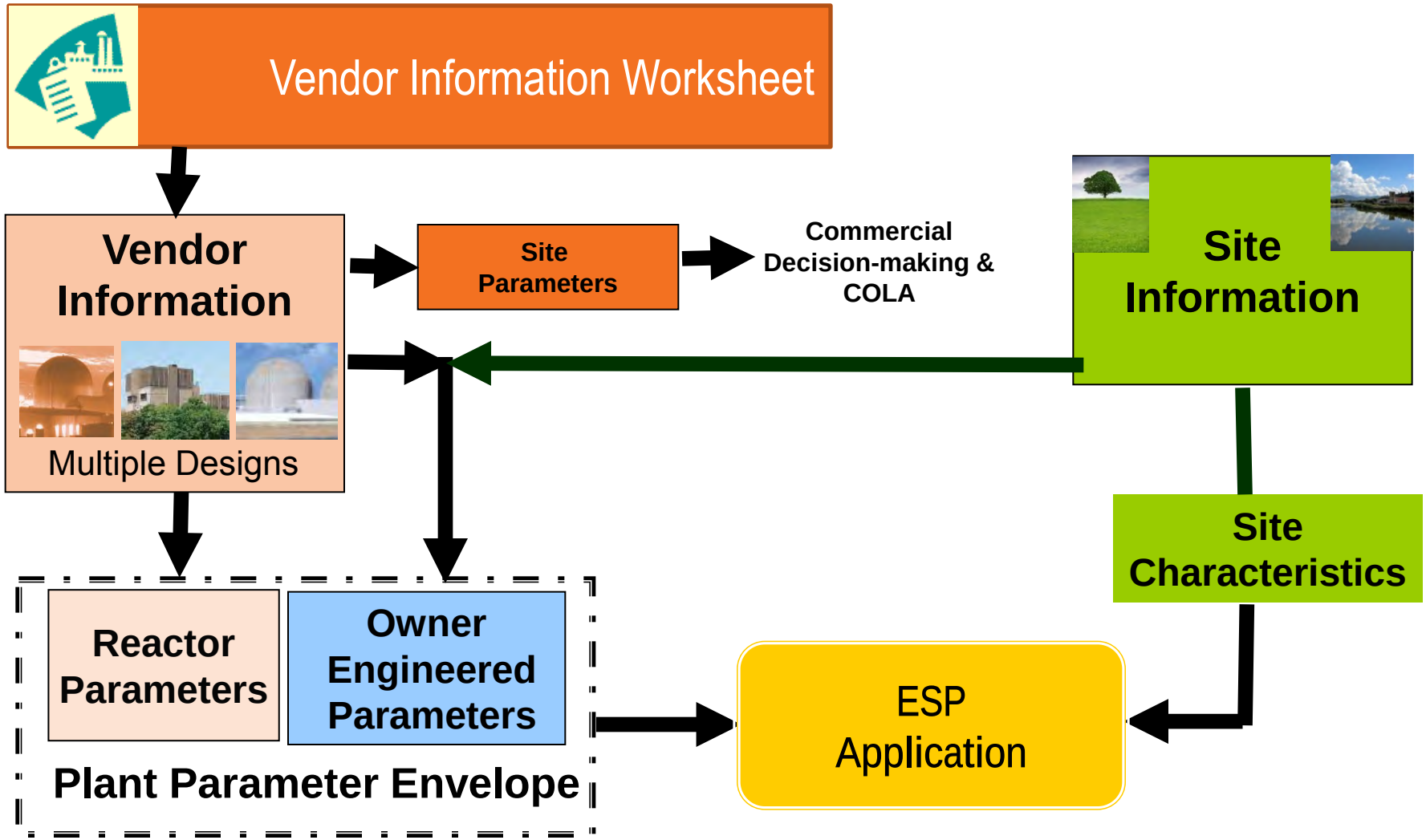
- Regulatory risk exists until Design Certification reviews are complete
- Technology and commercial risks exist until detailed designs are more complete

Bounding values for parameters that define facility's interaction with the environment

Reactor technology designs considered:

- Single Unit ABWR
- Single Unit U.S. EPR
- Single Unit US-APWR
- Dual Unit AP1000

Plant Parameter Development Approach



Plant Parameter Development Approach (Cont.)

PPE Table (SSAR Section 1.3)

- Reactor Parameters
  - Radiological Effluents
  - Chemical Emissions
- Owner Engineered Parameters
  - Site Layout Acreages
  - Normal Plant Heat Sink

Sample Format

PPE Item		Design Parameter	Definition
1	**Structure**		
1.1	**Building Characteristics**		
1.1.1	Height	234 ft.	The height from finished grade to the top of the tallest power block structure, excluding cooling towers.
1.1.2	Foundation Embedment	39 ft. to 84.3 ft.	The depth from finished grade to the bottom of the basemat for the most deeply embedded power block structure.

PSEG Power LLC

Plant Parameter Development Approach (Cont.)

Parameter Categories

- Structure
- Normal Plant and Ultimate Heat Sink
- Potable/Sanitary/Demineralized/Fire Protection Water System
- Miscellaneous Drain (Discharge)
- Unit Vent/Airborne Effluent Release Point
- Solid and Liquid Radwaste System
- Auxiliary Boiler System
- Onsite/Offsite Electrical Power System
- Standby Power System
- Plant Characteristics
- Construction
- Miscellaneous Parameters

Application Organization

Part 1 – Administrative Information

Part 2 - Site Safety Analysis Report

- Chapter 1 – Introduction and General Description
- Chapter 2 – Site Characteristics and Site Parameters
- Chapter 3 – Aircraft Hazards
- Chapter 11 – Radioactive Waste Management
- Chapter 13 – Emergency Planning
- Chapter 15 – Transient and Accident Analysis
- Chapter 17 – Quality Assurance

Part 3 – Environmental Report

Part 4 – LWA – Not Used

Part 5 – Emergency Plan

Part 6 – SUNSI Information – Not Used

Chapter 11 – Sections 11.2 and 11.3
Radioactive Waste Management

Liquid Radioactive Releases (11.2.3)

Bounding annual release developed for the site (Ci/yr)

- Annual releases for each technology reviewed
- Maximum activity for each isotope used in bounding release
- Releases from existing plants added to the new unit releases

Liquid effluent concentrations based on minimum blowdown rate

- Cooling water blowdown rate is 45 cfs (20,000 gpm)
- Near field dilution factor of 20 in Delaware River
- Results: < 1% of 10 CFR 20 Effluent Concentration Limit

Liquid pathway doses

- Calculated using LADTAP-II computer code
- Results: Maximally Exposed Individual (per unit)
  - Total Body: 0.0157 mrem (Appendix I limit: 3 mrem)
  - Maximum Organ: (GI-LLI): 0.177 mrem (Appendix I limit: 10 mrem)
- Results: Collective Annual Dose within 50 miles (per unit)
  - Total Body: 45.5 person-rem

Gaseous Radioactive Releases (11.3.3)

Bounding annual release developed for the site (Ci/yr)

- Annual releases for each technology reviewed
- Maximum activity for each isotope used in bounding release
- Releases from existing plants added to the new unit releases

Gaseous effluent concentrations based on site boundary

- Atmospheric relative concentration (χ/Q): 1.0E-5 sec/m^3
- Results: approx. 60% of 10 CFR 20 Effluent Concentration Limit

Gaseous pathway doses

- Calculated using GASPAR-II computer code
- Results: Maximally Exposed Individual (per unit)
  - Gamma Radiation: 6.10 mrad (Appendix I limit: 10 mrad)
  - Beta Radiation: 11.0 mrad (Appendix I limit: 20 mrad)
  - Limiting Organ (Child thyroid): 7.22 mrem (Appendix I limit: 15 mrem)
- Results: Collective Annual Dose within 50 miles (per unit)
  - Total Body: 20.4 person-rem

Chapter 17 – Section 17.5
Quality Assurance

PSEG Power LLC

Quality Assurance (17.5)

ESP QA Program developed using NEI 06-14A template which is endorsed by the NRC in an SER dated July 13, 2010

ESP safety-related design activities performed under Sargent & Lundy approved 10 CFR 50 Appendix B QA program

Geosciences, Demographic and Hydrological investigation and analyses activities performed under MACTEC (AMEC) 10 CFR 50 Appendix B program

Chapter 3 – Section 3.5.1.6
Aircraft Hazards

PSEG Power LLC

Aircraft Hazards (3.5.1.6)

Crash probabilities calculated using methodology in DOE-STD-3014-96

- Non-airport crash impact frequency evaluation
- CONUS Average values are used
- Effective plant area

NUREG-0800, Section 3.5.1.6:

"10 CFR 100.10, 10 CFR 100.20, 10 CFR 100.21, 10 CFR 52.17 and 10 CFR 52.79 requirements are met if the probability of aircraft accidents resulting in radiological consequences greater than the 10 CFR Part 100 exposure guidelines is less than an order of magnitude of 10^{-7} per year"

Aircraft Hazards (3.5.1.6) (Cont.)

Large Aircraft Crash Probability

- For all four technologies the crash probability was less than 10^{-7}

Small Aircraft Crash CDF

- The small aircraft crash probabilities exceeded 10^{-7}
- Vendors performed Core Damage Frequency (CDF) calculation for small aircraft crash
- All four technologies had CDF less than 10^{-7}

Meet the NUREG-0800, Section 3.5.1.6 acceptance criteria of less than 10^{-7}

Chapter 15
Transient and Accident Analyses

Transient and Accident Analysis (15.0)

Design Basis Accidents

- Each technology design basis accidents evaluated in DCD
- The DCD consequence of each accident is within regulatory limits
- Site specific consequences are determined by the relative atmospheric dispersion (χ/Q) values applicable to the site

PSEG Site Specific χ/Q Values

- Calculated using the PAVAN computer code and 3 years of met data
- Exclusion Area Boundary (EAB) is located 600 m from release point to ensure the site specific χ/Q value is smaller than the bounding technology value
- Low Population Zone (LPZ) outer boundary is 8045 m (5 miles) – same as existing units

Methodology and results

- Site specific χ/Q values compared to each technology
- Site specific χ/Q values are all smaller, indicating the DCD consequences are bounding for the PSEG site
- Each dose result for each technology is scaled by the ratio of the site specific χ/Q values to the DCD χ/Q values – site specific doses are all within regulatory limits

Chapter 13 – Section 13.3
Emergency Planning

PSEG Power LLC

Emergency Planning (13.3)

Regulatory Approach

- 52.17(b)(1) – identify significant impediments to emergency planning
  - Propose major features
  - Propose complete and integrated emergency plan
- 52.17(b)(2)(ii) – complete and integrated plan
  - NUREG 0654/FEMA-REP-1
- 52.17(b)(3) – EP ITAAC
  - SECY-05-197
- 52.17(b)(4) – State and local certifications

PSEG Site ESPA contains a complete and integrated emergency plan

Emergency Planning (13.3) (Cont.)

Emergency Plan Approach

- Stand-alone plan based on operating units' E-Plans
- ESP Emergency Plan is separate from operating unit plans
- Performed new evacuation time estimate study
- State emergency plans for NJ, DE, MD and PA submitted
- Provided updated certification letters and memoranda of understanding
- Emergency Facility details deferred to COL application
  - TSC, OSC, EOF locations
  - Communication systems power supplies
- Revised Emergency Plan to implement revised EP rules regarding drill cycle duration and drill frequencies

Emergency Planning (13.3) (Cont.)

10-MILE EMERGENCY PLANNING ZONE

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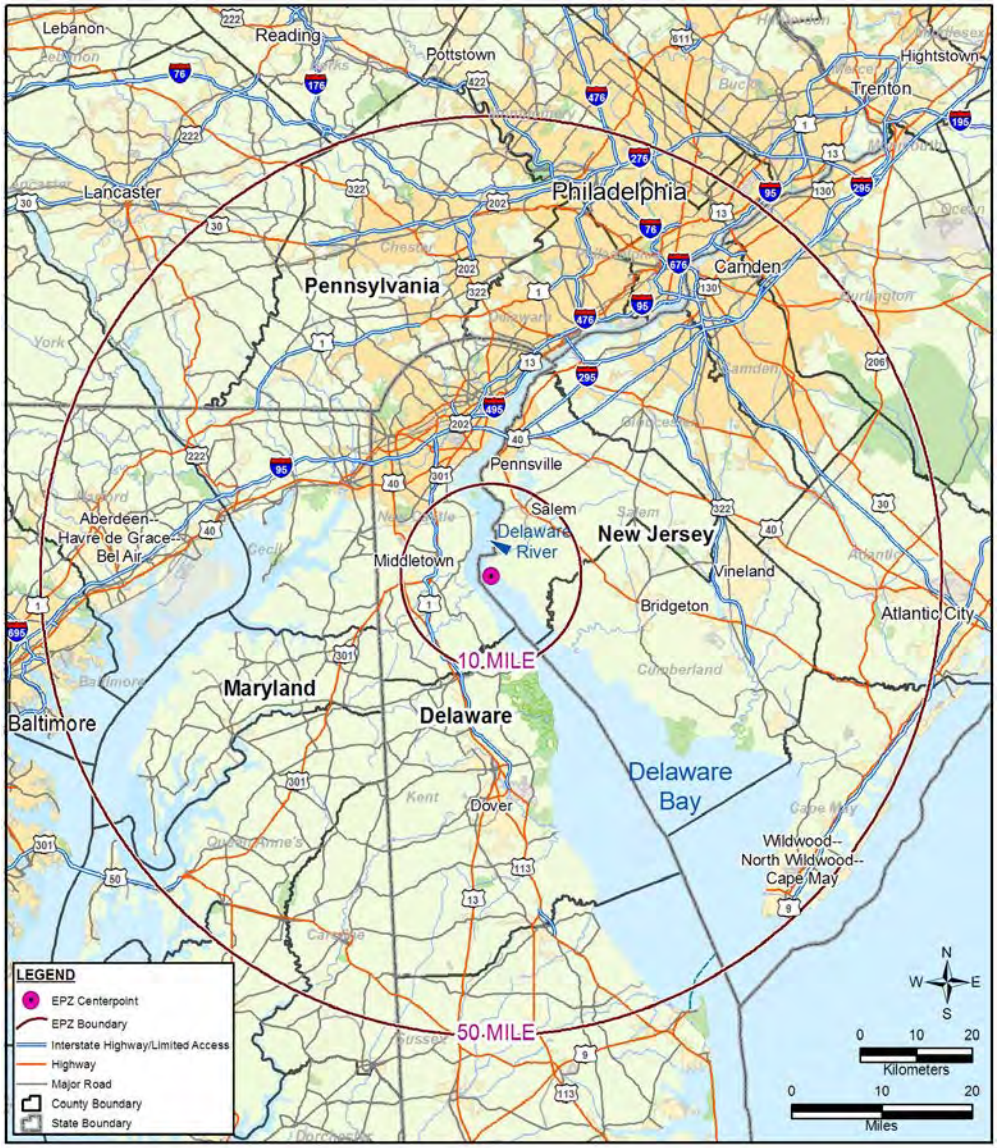
Emergency Planning (13.3) (Cont.)

50-MILE EMERGENCY PLANNING ZONE



PSEG Power LLC

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Presentation to the ACRS Subcommittee

Safety Review of the PSEG Site Early Site Permit Application

Presented by

Prosanta Chowdhury, Project Manager

NRO/DNRL/LB1

March 19, 2014

Purpose

- Brief the Subcommittee on the status of the staff's safety review of the PSEG Site early site permit (ESP) application
- Support the Subcommittee's review of the application and subsequent interim letter from the ACRS to the Commission
- Address the Subcommittee's questions

Meeting Agenda

- PSEG Site ESP Project Overview
- Schedule Milestones
- Safety Evaluation (SE) Organization
- Key Review Areas*
  - Radioactive Effluent Release, Quality Assurance, Aircraft Hazards, Radiological Consequences of Design Basis Accidents (DBAs), Emergency Planning
- Advanced Safety Evaluation (ASE) **with no Open Items** Conclusions
- Presentation Conclusion
- Discussion / Questions

**Note:* *All Figures in the staff's presentations have been reproduced from the SSAR*

Project Overview

Plant Parameter Envelope (PPE)

- PSEG used the following reactor designs to develop the Plant Parameter Envelope (PPE):
  - Single Unit U.S. Evolutionary Power Reactor (U.S. EPR)
  - Single Unit Advanced Boiling Water Reactor (ABWR)
  - Single Unit U.S. Advanced Pressurized Water Rx (US-APWR)
  - Dual Unit Advanced Passive 1000 (AP1000)
- New plant may also be a different design that falls within the following PPE information range:
  - 4614 MWt (single unit) or 6830 MWt (dual unit)
  - Approx. 2200 MWe net electrical power maximum

Completed Milestones

- Received PSEG Site ESP Application - 5/25/2010
- Acceptance Review Completed - 8/4/2010
- Inspections / Site Audits:
  - Emergency Planning - 5/2010
  - Hydrology - 2/2011, 2/2014
  - Quality Assurance - 5, 6/2011
  - Geology - 9/2011
  - Meteorology - 5/2012
- RAIs issued – 9/2013
- Advanced SE (ASE) with no Open Items (OIs) Issued – 11/2013 & 01/2014 (Geology & Hydrology ASEs pending)

Remaining Milestones

- ASE with no OIs to be Issued:
  - Geology – 8/2014
  - Hydrology – TBD

- ACRS Subcommittee Meeting on:
  - “Meteorology” & “Geography & Demography” – 5/2014
  - “Geology” – 9/2014
  - “Hydrology” – TBD

Principal Contributors

- Radiological Effluent Release Dose Consequences from Normal Operation: Stephen Williams, Zachary Gran
- Quality Assurance: Andrea Keim
- Aircraft Hazards: Seshagiri “Rao” Tammara
- Transient and Accident Analysis: Seshagiri “Rao” Tammara
- Emergency Planning: Bruce Musico
  - Support from FEMA and SNL

PSEG Site ESP Application

- Proposed ESP Site located in Lower Alloways Creek Township, Salem County, NJ (30 miles southwest of Philadelphia, PA, 7.5 miles southwest of Salem, NJ)
- Adjacent to and north of Hope Creek Generating Station (HCGS)
- ESP applicants: PSEG Power, LLC and PSEG Nuclear, LLC (PSEG)
- ESP Application for a single- or a dual-unit reactors

PSEG Site ESP Application

- PSEG developed Plant Parameter Envelope (PPE) using 1-Unit U.S. EPR, 1-Unit ABWR. 1-Unit US-APWR, and 2-Unit Passive AP1000
- PSEG requests permit approval for 20-year term
- PSEG does not seek approval for limited work authorization (LWA) activities
- PSEG seeks approval for complete and integrated emergency plans with ITAAC as part of ESP

Key Review Areas

Chapter 11 (11.2 & 11.3) - Doses from Routine Liquid and Gaseous Effluent Releases (ASE ADAMS Accession No. ML103090395)

- Staff performed the following review and analysis:
  - Confirmed liquid and gaseous effluent releases
  - Confirmed appropriate exposure pathways
  - Confirmed the use of appropriate liquid dilution, and atmospheric dispersion/deposition
  - Confirmed the radioactive liquid effluent source term for use in conceptual models concerning migration pathways of radioactive liquid effluent
  - Verified Applicant's calculated doses using NRC recommended models
  - Performed an independent dose assessment for liquid pathways showing the applicants doses to be conservative

Key Review Areas

Chapter 11 (11.2 & 11.3) (cont'd)

- Doses from Routine Liquid and Gaseous Effluent Releases and Comparison to Regulatory Criteria

Regulation	Type of Effluent	Pathway	Organ	Regulatory Limit (mrem/yr per unit)	Applicant SSAR (mrem/yr per unit)	NRC SER (mrem/yr per unit)
10 CFR 50, Appendix I	Liquid	all	total body	3	0.0157	0.0157
		all	any organ	10	0.177	0.177
	Gaseous	all	total body	5	4.6	4.6
		all	skin	15	12.2	12.2
	Iodine & Particulate	all	any organ	15	7.22	7.23
	Gaseous	γ air dose	n/a	10 mrad	6.1 mrad	6.1 mrad
		β air dose	n/a	20 mrad	11 mrad	11 mrad
40 CFR 190	all	all	total body	25 per site	2.94 (5 units)	2.94 (5 units)
	all	all	thyroid	75 per site	6.86 (5 units)	6.86 (5 units)
	all	all	other organs	25 per site	3.97 (5 units)	3.97 (5 units)

Key Review Areas

Chapter 11 (11.2 & 11.3) (cont'd)

- **COL Action Item 11-1**:
  - Consistent with all submitted ESP applications;
  - Site specific details on how the new facility will control, monitor, and maintain radioactive gaseous and liquid effluents are not available at the ESP stage;
  - Action Item: A COL applicant will need to (i) perform radiological effluent dose calculations based upon site specific information; (ii) reference the site ESP and the associated radiological effluent doses; (iii) verify that the site specific effluent dose calculations are bound by the ESP calculated effluent doses; (iv) provide and justify any specific details in the effluent dose calculations concerning differences in reactor design, source terms, and effluent flow rates; (vi) provide detailed information on the solid waste management system used to process radioactive gaseous and liquid effluents to reflect plant and site-specific COL design considerations.

Key Review Areas

Chapter 11 (11.2 & 11.3) (cont'd)

- The staff finds that:
  - the applicant provided information adequate to provide reasonable assurance that it will control, monitor, and maintain radioactive gaseous and liquid effluents from the ESP site (10 CFR Part 20, Appendix B, Table 2);
  - the applicant will maintain radioactive gaseous and liquid effluents at levels consistent with the effluent design objectives (10 CFR Part 50, Appendix I, Sections II.A, II.B, and II.C);
  - under the requirements of 10 CFR 20.1301 (e), the applicant demonstrated compliance with the environmental radiation standards of the EPA (40 CFR Part 190).
- COL Action Item 11-1 must be addressed.

Key Review Areas

Chapter 17 (17.5): ESP Quality Assurance Measures (ASE ADAMS Accession No. ML103090665)

- Verify that the ESP application included within the scope of its QA program activities that would affect the capability of systems, structures, and components (SSCs) important to safety:
  - Verified that the applicant adequately applied the guidance in Section 17.5 and the QAP to demonstrate the integrity and reliability of data that were obtained during ESP activities;
  - Verified that the applicant utilized and followed NEI 06-14A, "Quality Assurance Program Description (QAPD)," as template for the QAP;
- **Inspection** in June 2011:
  - Review of (i) QAP/plans/implementing procedures of the applicant and major contractors, and (ii) data collection, analyses, and evaluation methodologies, including site characterization;
  - **Notice of Violation** (Report No. 05200043/2011-201), severity level IV issued; related to personnel performing safety-related receipt inspections;
  - **NOV response** (August 2011) satisfactory.

Key Review Areas

Chapter 17 (17.5): ESP Quality Assurance Measures (cont'd)

- The staff finds that the applicant's QAPD –
  - provides adequate guidance to describe the authority and responsibility of management and supervisory personnel, performance and verification personnel, and self-assessment personnel;
  - gives adequate guidance to provide for organizations and persons to perform verification and self-assessment functions with the authority and independence to conduct their activities without undue influence from those directly responsible for costs and schedules;
  - provides adequate guidance to apply the QAPD to activities and items that are important to safety;
  - provides adequate guidance for establishing controls that when properly implemented comply with the requirements of 10 CFR Part 52, 10 CFR Part 50, Appendix B, 10 CFR Part 21, 10 CFR 50.55(e), with the acceptance criteria contained in SRP Section 17.5 and with the commitments to applicable regulatory guidance.

Key Review Areas

Chapter 3 (3.5.1.6) Aircraft Hazards *(ASE ADAMS Accession No. ML103090381)*

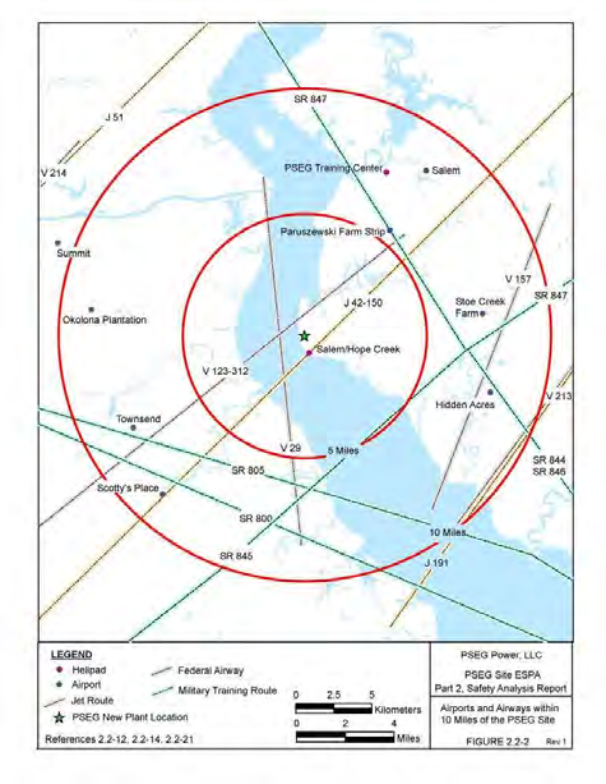
- For the site suitability, the plant design should consider that any of the aircraft accidents is not a design basis event (where the aircraft accident could lead to radiological consequences in excess of the exposure guidelines of 10 CFR 50.34(a)(1) with a probability of occurrence greater than an order of magnitude of 10^{-7} per year)
  - Federal airways, holding patterns, or approach patterns should be at least 2 statute miles away
  - Military installations or any airspace usage (e.g., bombing ranges) should be at least 20 miles from site
  - All airports should be at least 5 miles from site
  - All airports should have projected operations less than:
    - $500d^2$ for airports at distance (d) between 5 and 10 miles
    - $1000d^2$ for airports at distance (d) outside of 10 miles

Key Review Areas

Chapter 3 (3.5.1.6) Aircraft Hazards (cont'd)

Staff reviewed the applicant addressed information pertaining to site-specific aircraft analysis (aircraft hazards)

- Staff identified and requested the applicant for additional information on six military training routes within close proximity of the site.
- The applicant calculated aircraft crash probability for three airways (V123-312, V29 and J42-150) and six military training routes, for each of the four reactor designs considered. The results show-
  - <u>for each of the reactor designs</u>, the large aircraft crash probability is smaller than the acceptable criterion of 1 x 10^{-7} per year, **<u>but the small aircraft crash probability exceeded</u>** this criterion.



Key Review Areas

Chapter 3 (3.5.1.6) Aircraft Hazards (cont'd)

- Staff performed an independent confirmatory probability calculation using the highest of most recent 5-year FAA Flight data within 5 miles of the site using conservative crash rates, and determined the probability to be about 2×10^{-5} per year, which is also greater than the criterion of 1×10^{-7} per year.

- The applicant used the respective design specific conditional core damage probability (CCDP), and multiplied with the aircraft crash probability to determine and demonstrate that the core damage frequency (CDF) is lower than the acceptable criterion of 1×10^{-7} per year. The staff considers this approach reasonable and acceptable.

Key Review Areas

Chapter 3 (3.5.1.6) Aircraft Hazards (cont'd)

- However, there is a potential for selection of different design technology for COL, and owing to required PRA evaluation of aircraft crash design basis accident (DBA) at COL stage, the staff proposed **COL Action Item 3.5.1.6-1** to address CDF evaluation:
  - Action Item: A COL applicant referencing this early site permit (ESP), should evaluate and demonstrate compliance with the design-basis aircraft accident probability acceptance criterion of 1×10^{-7} per year or less, in accordance with the probabilistic risk assessment (PRA) guidance provided in NUREG-0800, Chapter 19 ("Probabilistic Risk Assessment and Severe Accident Evaluation for New Reactors"), and should provide the determined core damage frequency (CDF) based on the design selected.

Key Review Areas

Chapter 3 (3.5.1.6) Aircraft Hazards (cont'd)

- The staff independently verified the applicant's assessment of aircraft hazards at the PSEG Site, and finds that -
  - the estimated probability of an accident having the potential for radiological consequences in excess of the exposure criteria contained in 10 CFR Part 100 is less than an order of magnitude of 10^{-7} per year;
  - aircraft hazards do not present an undue risk to the safe operation of nuclear units at the PSEG Site, and finds the PSEG Site acceptable for one or two nuclear units as proposed;
  - the PSEG Site meets the relevant requirements related to aircraft hazards of 10 CFR Part 52 and 10 CFR Part 100 for compliance with respect to determining the acceptability of the site.
- COL Action Item 3.5.1.6-1 must be addressed.

Key Review Areas

Chapter 15 (15.0.3) – Transient and Accident Analyses
(ASE ADAMS Accession No. ML103090654)

- ESP application Chapter 15, "Transient and Accident Analyses," with respect to radiological consequences of postulated design basis accidents (DBAs) related to the proposed PSEG Site;

- 10 CFR Part 100 and 10 CFR 50.34(a)(1) siting requirements and 10 CFR 52.17(a)(1)(ix) ESP requirements
  - Description and safety assessment of the site against the radiological consequence evaluation factors (siting criteria)

Key Review Areas

Chapter 15 (15.0.3) – Transient and Accident Analyses (cont'd)

- The fission product release to the environment is the PPE for this analysis;
- Environmental releases for several different designs, with several DBA scenarios for each, are documented in the ESP application as PPE values;
- The fission product releases are determined to be not unreasonable for the purposes of site analysis or postulated from considerations of possible accidental events for nuclear power reactors.

Key Review Areas

Chapter 15 (15.0.3) – Transient and Accident Analyses (cont'd)

- Broad spectrum of representative postulated DBAs used in PPE to determine bounding radiological consequences.
- Used DBA analyses for LWR technologies that are either certified and/or currently being reviewed for certification.
- Based on NUREG-0800 Chapter 15.0.3, RG 1.183 guidance used for LWR DBA dose analysis.
- Doses are evaluated at EAB and outer boundary of LPZ against radiological siting criteria in 10 CFR 52.17(a)(1)(ix) and 10 CFR 50.34(a)(1).

Key Review Areas

Chapter 15 (15.0.3) – Transient and Accident Analyses (cont'd)

- The dose to an individual located on the EAB or the outer boundary of LPZ is calculated based on the amount of activity released to the environment, atmospheric dispersion during transport from release point to dose point, breathing rate of the individual at dose point location and activity-to-dose conversion factor.
- The short-term atmospheric dispersion factor (X/Q) is the only site-specific parameter that is required to determine dose to individual at that location.
- Design Control Documents (DCDs) analyses have used assumed site parameter X/Qs that are representative to show that the design should be able to meet regulatory dose criteria at most sites.

Key Review Areas

Chapter 15 (15.0.3) – Transient and Accident Analyses (cont'd)

To show compliance with the radiological siting criteria -

- The site-specific DBA doses at the EAB and LPZ for each reactor design are obtained by multiplying the relevant DCD DBA dose results by the ratio of the PSEG site characteristic X/Qs to the design's site parameter X/Qs for each time period.

- Site-specific doses for each DBA for each assessed reactor design are compared to the applicable acceptance criteria in RG 1.183 and NUREG-0800.

Note: The PSEG site characteristic X/Q values are calculated using site meteorological data and RG 1.145 methodology. Reviewed in Chapter 2.

Key Review Areas

Chapter 15 (15.0.3) – Transient and Accident Analyses (cont'd)

- The **ESP applicant calculated** site-specific doses for a variety of LWR designs and a variety of postulated DBAs.
- Doses for the spectrum of transient and accidents for each reactor technology considered meet the dose acceptance criteria specified in RG 1.183 and NUREG-0800 for LWR DBAs.
- Based on the review of methodology and data presented, **the staff considers** the applicant approach reasonable and acceptable in meeting the DBA radiological consequence requirements of 10 CFR 52.17(a)(1)(ix), 10 CFR Part 100 and 10 CFR 50.34(a)(1).

Key Review Areas

Chapter 13 (13.3) Emergency Planning (ADAMS Accession No. ML14045A260)

- Complete and Integrated Emergency Plan
  - Onsite & Offsite Emergency Plans
  - New EP Regulations/Enhancements (76 FR 72560, 11/23/11)
    - Staffing levels (conflicting duties)
  - Fukushima Dai-ichi, NTTF Recommendation 9.3
    - Staffing levels (multi-unit event)
    - Communication systems & equipment (power during prolonged station blackout)
  - Evacuation Time Estimate (ETE), 10-mile EPZ
  - Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)
  - Plant Parameter Envelope (PPE)

Key Review Areas

Chapter 13 (13.3) Emergency Planning (cont'd)

Application Requirements

- Early Site Permit (ESP) Application
  - Identify significant impediment to the development of Emergency Plans
  - Describe contacts & arrangements made with Federal/State/local governmental agencies
  - Major Features of Emergency Plans
  - Complete & Integrated Emergency Plans
  - Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)

Key review Areas

Chapter 13 (13.3) Emergency Planning (cont'd)

Review Standards

- Nuclear Regulatory Commission (NRC)
  - 10 CFR Part 52, Subpart A, "Early Site Permits"
  - 10 CFR 50.47 & Appendix E to Part 50
  - NUREG-0654/FEMA-REP-1, Rev. 1
  - NUREG-0800, Standard Review Plan (SRP)
    - Sections 13.3, Emergency Planning
    - Section 14.3.10, Emergency Planning ITAAC
- Federal Emergency Management Agency (FEMA)
  - FEMA Headquarters and Regions II & III Offices
  - 44 CFR Part 350 and REP program guidance
  - NUREG-0654/FEMA-REP-1, Rev. 1

Key Review Areas

Chapter 13 (13.3) Emergency Planning (cont'd)

FEMA Review

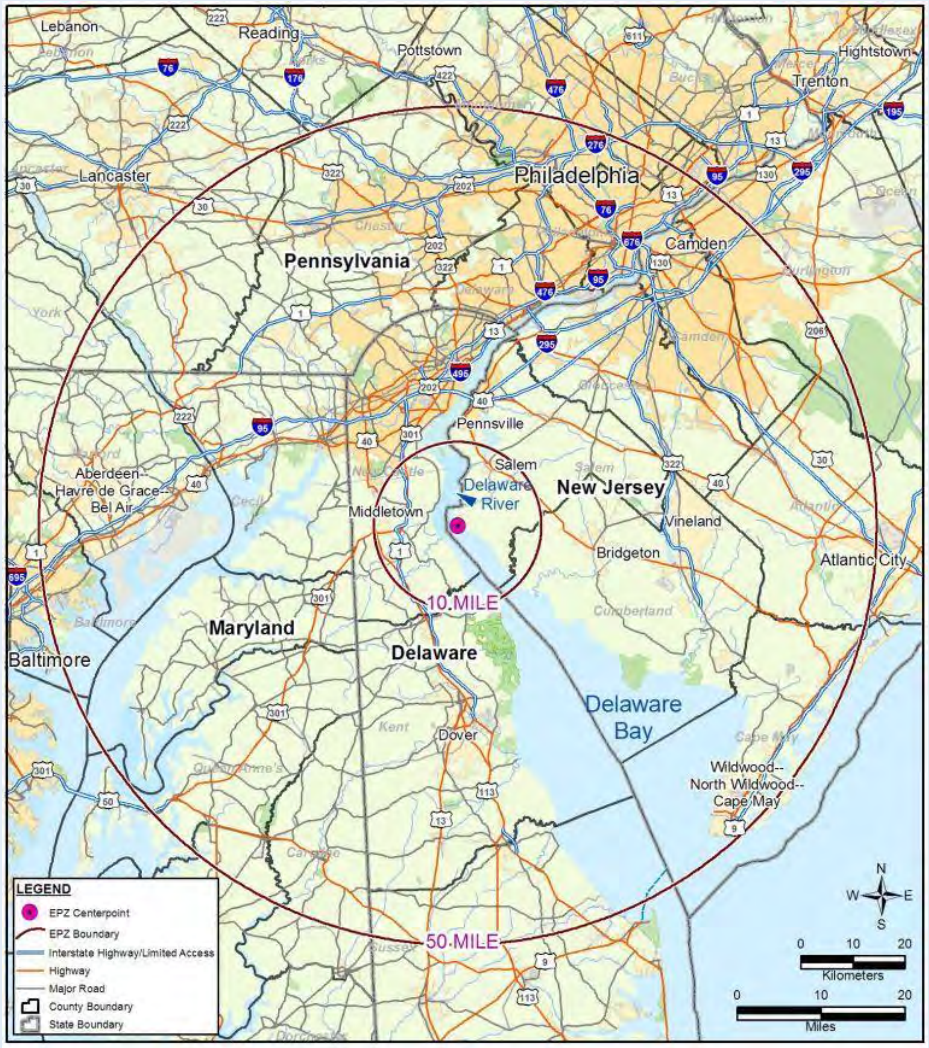
- Offsite State/Local Jurisdictions
  - State of New Jersey
    - Salem County
    - Cumberland County
  - State of Delaware
    - New Castle County
    - Kent County
  - State of Maryland
  - Commonwealth of Pennsylvania

Key Review Areas

Key Review Areas

Key Review Areas

Key Review Areas



Key Review Areas

Chapter 13 (13.3) Emergency Planning (cont'd)

COL Action Items vs. Permit Conditions

- COL Action Items
  - Identify and track information that must be "addressed" at the COL stage. An applicant may depart from or omit these information requirements provided that it identifies and justifies the departure or omission in the FSAR, and the departure or omission is consistent with NRC regulations.
  - Reactor Design (PPE), Proposed Causeway, Updated ETE
- Permit Conditions
  - An ESP is granted "subject" to permit conditions, which must be met before issuance of a COL or included as conditions of a COL.

Key Review Areas

Chapter 13 (13.3) Emergency Planning (cont'd)

8 COL Action Items

- 13.3-1, LOAs/MOUs (reactor)
- 13.3-2, Communication/Data Links (reactor)
- 13.3-3, OSC Location (US-APWR)
- 13.3-4, Radiation Monitor Systems (reactor)
- 13.3-5, Proposed Causeway/ETE Update
- 13.3-6, US-APWR (decontamination facility)
- 13.3-7, Atmos. Transport Method (reactor)
- 13.3-8, ETE Update (Salem/Hope Creek)

Key Review Areas

Chapter 13 (13.3) Emergency Planning (cont'd)

5 Permit Conditions

- Fukushima Dai-ichi (NTTF 9.3, Tier 1)
  - PC 1, Staffing Assessment (NEI 12-01)
  - PC 2, Communications Assessm't (NEI 12-01)
- New Emergency Preparedness Rule
  - PC 3, On-Shift Staffing Analysis (NEI 10-05)
- Emergency Action Level (EAL) Scheme
  - PC 4, AP1000 (NEI 07-01)
  - PC 5, U.S.EPR/ABWR/US-APWR (NEI 99-01)

Key Review Areas

Chapter 13 (13.3) Emergency Planning (cont'd)

1 Confirmatory Item

- Confirmatory Item 13.3-1
  - Addresses PSEG's implementation approach for the new EP Rule/Enhancements
  - PSEG committed to revise Section 15 ("Exercises and Drills") of the Emergency Plan to:
    - change the drill cycle duration from 6 years to 8 years, and
    - add a requirement to conduct a hostile action based (HAB) drill once during each 8-year drill cycle

Key Review Areas

Chapter 13 (13.3) Emergency Planning (cont'd)

- The staff finds that -
  - onsite & offsite emergency plans are adequate;
  - there is reasonable assurance that these plans can be implemented, and adequate protective measures can and will be taken in the event of a radiological emergency at the new PSEG Site reactor unit(s);
  - the reasonable assurance is subject to resolution of the Permit Conditions, and meeting of the ITAAC;
- The COL Action Items must be addressed.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Presentation to the ACRS Subcommittee

Safety Conclusions from the Review of the PSEG Site Early Site Permit Application

Presented by

Prosanta Chowdhury, Project Manager

NRO/DNRL/LB1

March 19, 2014

SER Conclusions

- ASER defers general regulatory conclusion regarding site safety and suitability to FSER in Phase D
- Some Conclusions from individual sections:
  - Demonstrated that radiological effluent release limits associated with normal operation from the type of facility proposed to be located at the site can be met for any individual located offsite (10 CFR 100.21(c)(1)) (**Ch. 11.2&11.3**)
  - Applicant has provided appropriate quality assurance measures equivalent to those in 10 CFR Part 50 Appendix B (**Ch. 17.5**)
  - Subject to the COL Action Item, aircraft hazards do not present an undue risk to the safe operation of nuclear units at the PSEG Site, and that the PSEG Site meets the relevant requirements related to aircraft hazards of 10 CFR Part 52 and 10 CFR Part 100 (**Ch. 3.5.1.6**)

SER Conclusions

- Some Conclusions from individual sections (cont'd):
  - Radiological dose consequences of postulated accidents meet the criteria set forth in 10 CFR 50.34(a)(1) for the type of facility proposed to be located at the site (10 CFR 100.21(c)(2)) (**Ch. 15.0.3**)
  - Subject to the COL Action Items, Permit Conditions, and ITAAC, onsite & offsite emergency plans are adequate. There is reasonable assurance that these plans can be implemented, and adequate protective measures can and will be taken in the event of a radiological emergency at the new PSEG Site reactor unit(s) (**Ch. 13.3**)

Presentation Conclusion

- ASE with no Open Items on Chapters 3, 11, 15, 17, and 13.3 Issued on 11/2013 & 1/2014:
  - 5 Permit Conditions (Ch. 13.3)
  - 10 COL Action Items (Chs. 3, 11, 13.3)
- Next Interaction with ACRS - 5/2014 on ASE for Chapters 2.1 & 2.2, and 2.3
- Next Interaction with ACRS - 1/2015 on FSER (tentative)

Key Review Areas

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March 18, 2014

Dr. Dana Powers
Subcommittee on Regulatory Policy and Practices
Advisory Committee on Reactor Safeguards
United States Nuclear Regulatory Commission
Washington, DC 20555
By email: Quynh Nguyen@nrc.gov

Dr. Powers:

Beyond Nuclear offers the following comments opposing the granting of an Early Site Permit (ESP) as proposed by Public Service Electric & Gas (PSEG) for one or two additional nuclear power generators at the Artificial Island site in Salem County, New Jersey.

The PSEG has submitted an application to the US Nuclear Regulatory Commission (NRC) to environmentally qualify the siting of one or two new nuclear power plants on an existing reactor site adjacent to the Hope Creek Generating Station (HCGS), a General Electric Mark I boiling water reactor and the Salem Generating Station, Units 1 and 2 (SGS), two Westinghouse pressurized water reactors collocated in Lower Alloways Creek Township, Salem County, New Jersey (NJ).

Beyond Nuclear takes this opportunity to focus on the significant and undue public health, safety and environmental risks arising out of the collocation of multiple reactor units of uncertain and dubious designs in the post-Fukushima world. Specifically, Beyond Nuclear contends that the Site Safety Analysis Report (SSAR) and the Safety Evaluation do not adequately address the associated radiological risks and hazards arising being collocated adjacent to the operational GE Mark I boiling water reactor at Hope Creek nuclear generating station and additionally to the Salem nuclear power station Units 1 and 2.

PSEG submitted its ESP application to the NRC on May 25, 2010 less than one year before the Fukushima Daiichi nuclear accident which significantly damaged four GE Mark I boiling water reactors similar to the Hope Creek unit.

Critical safety systems, structures and components of the Hope Creek boiling water reactor are essentially identical in design and construction and similarly flawed and vulnerable to failure as those at the Fukushima Daiichi nuclear power station. Fukushima Daiichi, Tokyo Electric Power Company's six-unit reactor site experienced a prolonged Station Black Out accident on March 11, 2011. As a result of the failure to restore reactor cooling, there were three simultaneous severe reactor accidents that demonstrated a 100% failure rate of the already notorious GE pressure suppression containment system. This demonstrated component failure has resulted in significant widespread radioactive contamination of land and resources into the distant future, ongoing uncontrolled radioactive releases into the currents of the Pacific Ocean. In

Japan, the catastrophe has resulted in massive and likely permanent population relocation and the associated economic dislocation. Many more Japanese cities and communities currently live, work and recreate in areas radioactively contaminated many times greater than the UNSCEAR level recommended for evacuation.

The proposed collocation of two additional reactors adjacent to a GE Mark I boiling water reactor raises unresolved environmental concerns that are not currently addressed in the PSEG application.

For example, as is now evidenced by severe accident experience, nuclear plants with multiple reactors that experience severe accidents present extreme challenges with potential severe and widespread environmental consequences. In its June 2011 report to the International Atomic Energy Agency, the Nuclear and Industrial Safety Agency of Japan (NISA) stated that: *"The accident occurred at more than one reactor at the same time, and the resources needed for accident response had to be dispersed. Moreover, as two reactors shared the facilities, the physical distance between the reactors was small ... The development of an accident occurring at one reactor affected the emergency responses at nearby reactors."*

Furthermore, all US emergency planning zones, including the new reactor construction being proposed for collocation with Hope Creek and Salem, are based upon a 10-mile radius for the Emergency Planning Zone. Fukushima, a light water reactor, has now demonstrated that radiological contamination can extend well beyond current limitations.

The NRC has acknowledged that current regulations and procedures do not fully account for events and accidents affecting multiple units on a single site. As an example, according to the NRC, emergency planning regulations are based on single-unit events with regard to requirements for emergency operations staffing, facilities and dose projection capability. The Fukushima catastrophe has now dramatically demonstrated multiple severe accidents can simultaneously occur at multi-unit sites. However, NRC's guidance for probabilistic risk assessment, an analysis tool used in many regulatory applications, does not require the consideration of multiple-unit events.

The current Safety Evaluation and the Site Safety Analysis Report are therefore unacceptably insufficient and do not adequately address these and other unresolved safety and environmental impacts.

Sincerely,

Paul Gunter, Director
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Public Comments

“we dont want any more nuke plants anywhere in nj. we saw what happened with fukaishima. we dont want any more of that in this congested state of almost 9 million people.” – Jean Public

“As a NJ resident, I strongly oppose any such construction in my state.” – Mark Kneece

“Nuclear power is not required nor necessary for the following reasons; 1. the sun our star is a nuclear reactor. It is 93 million miles away, a safe distance, its power can be captured with solar and wind. 2. nuclear waste are still are problem. 3. potential accidents or natural disasters. 4. nuclear detracts from renewal energy advancement for the nation taking funding and delaying the renewable clean energy future. 5. Needing water for a coolant we are polluting our water sources and changing their normal properties through heating the water and injuring indigenous species of remaining wildlife.

Since the Atomic Bombs used on Japan in 1945 and other harmful tests and experiments on service men, we try to hide the dark sinister side of nuclear power by promoting its "peaceful application". It is not peaceful in that it inflicts mental and physical stress on the population. It is time to end the spread of this form of energy.” - Nick Homyak

“I am a resident of NJ and I strongly believe that we don't need more nuclear reactors in our state! Please consider renewable energy sources.” - Katerina Pemberton

“It is crazy to even think about doing this. NRC has not done its job to protect us in the past, I am sure you will not do it this time either.. NJ has more people living per square mile then any other state in the country and not enough checks and balances on this industry or any other industry for that matter. DONT EVEN THINK ABOUT IT” - J.J. Mistretta

- “PSEG has refused to upgrade two of its existing nuclear plants on that site. They do not meet modern environmental standards. If PSEG can't take care of its existing plants, why should it be allowed to build new ones?

  I guess we have learned little from Fukushima!

- NJ does not want and does not need a new atomic generating station. NJ is moving toward a more sustainable energy future, with a target goal of 80% renewable electric supply and a 30% reduction in total use by 2050. We are advancing new State legislation.

- Tons of nuclear waste is already sitting at the Salem site (and across this country) with no permanent disposal solution in sight. The NRC should not approve the creation of any more radioactive waste without a proven solution in operation.” - Ann Kelly