

NUCLEAR ADVISORY COUNCIL MEETING
Oconee Nuclear Station
Operations Training Center – Annex Conference Room
May 21, 2018
12:45 pm – 2:45 pm

Rick Lee: Call to Order – Approval of Minutes & Update of NAC Activities

Attendees: Rick Lee, Scott Batson, Claude Cross, Carolyn Hudson, Musa Danjaji, Vincent Van Brunt, James Little

Note: Tom Young unable to attend because of legislative delegation meeting with DOE officials in Aiken County.

Rick Lee: Welcome Everybody. I want to especially thank Duke for hosting this meeting. This is a beautiful place up here. I never was able to get a job at such a location myself, but we had the good fortune to look at the plant earlier today and tour, very impressive. The efforts that Duke has undertaken to keep their facilities modern, well organized, and clean, and running smoothly is impressive. So again, thank you so much for doing so.

I would like to open up formally the meeting. We'll start out with...I need a motion to approve the minutes from our January meeting. All you have those in your packet. Are there any comments with regard to the meeting, to the minutes, other?

I have a motion from Mr. Little and a second from Dr. Van Brunt to approve. The motion carries.

The second item I would like to broach, the minutes from the October meeting, you have a copy in your packet. While reading them it was apparent that there had been a little translation from the tape difficulty on the topic of "manage to termination". That term that we have used in the past with regards to some of the DOE (Department of Energy) efforts at MOX (Mixed Oxide Fuel Fabrication Facility). Instead of being "managed to termination" it came out as "managed determination" and you'll find in the minutes that are highlighted in yellow, those places where that exists. Page 21, page 22, and a couple other locations, in those minutes, contain those notations. I would like to get the record corrected. It was "manage to termination" was the terminology we used. Having been the catcher of error, I will ask if there is anyone here that will make a motion that we correct the minutes from October.

We have a motion from Mr. Little, and a second from Captain Cross to correct the minutes. The motion carries.

I wanted to let the members know, that I felt it important to request that our membership be covered under General Liability Insurance by the State. We have not historically been covered by that type of coverage, but this is a crazy world that we live in and I thought it appropriate particularly in lite of the difficult topics we have to deal with from time to time. Sometimes opinions we have to express that differ from others views on topics. And so, there is insurance in place, I will get for you, a summary of coverages, so that each of you can have that for your records and be aware of what it provides.

I would like to see us use our webpage more and I would request that Gary...first of all, why don't introduce your guest.

Gary Anderson: I am leaving, and Jenny is going to be taking over.

Rick Lee: You've been exemplary in the service that you have provided to us, in spite the aggravation that I have been able to heap on you, you've always been a true gentleman on the phone, so thank you for your time with the council.

With regards to the website, I would like to get the report that the sub-committee did on MOX, posted.

Gary Anderson: It's there. It's in the October, uh...

Rick Lee: But should it be separated as a separate entry?

Gary Anderson: It's a separate entry, but I asked for it to be like MOX... but one is the letter and then the MOX, the other two entries, and I verified it's there.

Rick Lee: OK. Thank You.

Gary Anderson: It's actually not in October, it's in this month's, so it's on the webpage now, Sir.

Rick Lee: OK. Did you get the letter to the EPA that we sent?

Gary Anderson: Yes, sir. That's in October.

Rick Lee: OK. Did you get the response?

Gary Anderson: No.

Rick Lee: Let me send that around. This is the original letter. So, if you could you please get that posted so the public can look at it at their convenience?

I had occasion to meet with a group called Los Alamos Study Group, here in South Carolina. They are advocates from New Mexico. We had extensive talk with regards to MOX and pits and all the things that are happening at Savannah River right now. No action required, I just wanted you to know that I had had the conversation with them.

The folks representing from Barnwell, Ben Smith, will not be with us today. They had some business activity that came up and they don't have a large staff and did not have someone that could stand in.

Tom Young will not be with us today, he has been meeting this morning with the Department of Energy, who is doing a tour of various locations to talk with senior state officials, with regards to the changes and activities that are ongoing at Savannah River.

Sylleste Davis likewise will not be able to. She got caught up in a bunch of meetings, State business meetings. So be sure to keep good minutes to keep them informed, and I'll give them a call after to be sure that they are briefed on what we cover.

I had a call with the NNSA (National Nuclear Security Administration) last week. They gave a bit of a briefing on their position, the labor summary that they used for the pits decision, some discussion with regards to the MOX decision that they have made and the DoD (Department of Defense). Jim was with me during the call. I appreciate the courtesy of them taking the time to make the call. I can't honestly say that it was a terribly productive time, but at least it allowed me to understand more fully what their perspective was on the decisions that they are making.

The National Academy of Science, if you know, I met with those folks some time ago, it was my understanding that the National Academy was supposed to get a report out with regards to the viability of the DoD program, and they were going to get that out prior the decisions being made on DoD at Savannah River. Unfortunately, that report is not out. The Department of Energy moved ahead without their input. I'm surprised that they didn't give them time to finish their report, but that was their decision to make.

And finally, each of you have an expense report for your mileage and your princely salary for all the hours that you spend as a volunteer on this board. Which I think has recently doubled from zero to double zero.

Carolyn (Dr. Carolyn Hudson), welcome. Glad you could join us.

So those are my opening items...let's get into the agenda, Shelly Wilson.

Shelly Wilson: It's a pleasure to be here, thank you very much for the opportunity to join you today. I just have a few updates for you. One is related to the Barnwell disposal site litigation. Not sure how much you've been keeping track of that, but it's been in the courts for about 14 years. The key issue is a permit that DHEC issued, originally in 1971. In 2004, DHEC issued a renewal permit, and that permit was appealed by the Sierra Club. So, it's been in various stages of the court system. The Administrative Law Court affirmed everything in the DHEC permit, twice. So that's key, the early affirmations. It was appealed after that, and then the Court of Appeals, affirmed again the decision, except for some small parts. Basically, four sub-sections. The Court of Appeals, essentially did that twice. It has been appealed up to the South Carolina Supreme Court. On April 18, 2018, the Supreme Court heard some oral arguments by Chem- Nuclear, Sierra Club, and DHEC on that appeal and we are still waiting for a decision from the Supreme Court, but I would summarize all of that, as the courts, everyone, has largely affirmed the DHEC permit. The only thing at issue was about four sub-sections in the Court of Appeals, so this latest time before the Supreme Court, DHEC is asking for some finality, so that we can finally have a decision rather than keeping it in the courts, so we're waiting for that decision.

Related to Savannah River Site, I have some good news in the Soil and Groundwater Clean-up arena. The site has been cleaning up "D area", which has a lot of coal ash in it, for many years. DHEC oversees that through our regulatory authority, and the good news is that the site is almost done with D Area. It involves consolidating a lot of ash into a more central area and putting some capping over it to protect it into the future. So that is really good news to be almost finished with that D area clean up.

Related to high level waste, we still have some challenges. That's one of the big remaining challenges of all of the things we oversee Savannah River Site for at DHEC. I'm sure you are all aware that a lot of good work has been done in the past with the Vitrification Facility, and the small-scale pilot liquid waste salt facilities for treatment. Eight tanks have been closed. But the vitrification and the small-scale liquid treatment really isn't sufficient to work off the substantive volume remaining, so salt waste processing

facility was constructed, and there is also a new smaller scale tank closure cesium removal technology, that we got included in our dispute resolution agreement in 2016. So, we're really pleased to have that additional technology in place. The great news is that we have the vitrification facility, the salt waste processing facility (constructed but not yet operating), the small-scale pilot treatment (which is not operating at present), and the new Tank Closure Cesium Removal, or "TCCR", which is still being assembled and put in place. So, all those avenues are there, but right now none of them are operating, for various reasons. And the key thing for us in South Carolina is for that treatment to be done as fast as possible to get that risk worked off so the tanks can be closed. So, we're seeing the glimmer of hope in the future, but again, the challenge is, nothing is operating at present and so our dispute resolution agreement really pushes Department of Energy to treat as quickly as possible.

There are a host of different reasons why not all of them are operating, but we're certainly hopeful that Savannah River concludes the technical reasons and the logistic reasons for tying in the new SWPF facility. We've heard that there will probably be a delay in startup of the Salt Waste Processing facility, and we haven't heard any definition on how long that delay will be, so we are very curious and will be looking in to that. And DOE is still kind of considering it and trying to figure out exactly how long the delay will be for themselves. So that will be a key concern for us.

The other thing I would like to mention to you is that I was up in (Washington) DC last week. You've probably heard that the FY 2018 budget, and again I'm focusing on liquid waste, for the site was pretty good. The FY2019 budget it is really good. For Savannah River Site, if you look at all the individual sites, and you look at Hanford River Protection and Richland, separately, Savannah River is on top for FY19, and I don't ever remember that happening in the past, that Savannah River, as a site, had the highest administration budget request. I can hardly tell you how big that is and how huge that is for the site, because of course that translates to more liquid waste dollars, when all these systems get up and running, then they can go fast, which is what we want. When I was up in DC last week at the Environmental Management Advisory Board meeting we heard that report from Shari Davenport, who is the Acting Associate Principal Deputy Assistant Secretary for Corporate Services. The key thing that she said out of that briefing was, yes, the FY19 budget for Savannah River Site is high, which is great for us, but it's not being supported in Congress. So, while the budget is high for South Carolina, I'm certainly hoping that the support can be garnered to keep that number high for our State to work off and reduce that risk.

So, a lot of good things happening, because as I said there are lots of different treatment avenues in place or almost operating, but again we're focusing on encouraging the site to actually get past the current challenges and hurdles so that they are all, or as many as can work together, that they are all working to treat waste as quickly and expeditiously as possible.

Rick Lee: Any questions?

Rick Lee: The budget that you are referring to, is that the present budget for 19.

Shelly Wilson: Yes.

Rick Lee: Do you know where it is in the house? I know they were marking up their budget last week.

Shelly Wilson: That's true and they anticipate that they will get some additional Congressional marks in the May/June timeframe, but they are thinking that FY19, will be, that the budget will be concluded,

that there will probably still be a small continuing resolution for FY19. That's just their best guess as I heard it last week.

Rick Lee: All of the small systems that you outlined, you said they were all not operating right now. Can you give us examples of reasons why they're not running?

Shelly Wilson: The site is much better able to tell you the details, but one is a safety issue. Switching to a slightly different formula, there is a safety issue that has been going on for some time that they are trying to make sure that there is not a chance of explosion or safety (concern) there. Also, they were changing the piping. The piping that went to the pilot scale, they are changing the piping so that it can go to the SWPF (Salt Waste Processing Facility) and that took a little bit longer than anticipated. So, issues like that and then of course the TCCR, just recently got on site, so they are still assembling it and putting it together. There is an Isopar® carry over issue with the solvent, the small-scale process that they are still trying to get to the bottom of. A HEPA filtration issue that right now, the most recent small-scale operation, they were finding that they had to change out the HEPA filters, more often than they thought. So, a host of issues like that, and certainly the site can correct.

Thomas Johnson: Yes, I'll cover it when we present.

Rick Lee: Alright, anything else? Any questions? Hear nothing, thank you Shelly.

Thomas Johnson: Good afternoon, my name is Thomas Johnson. I am the Associate Deputy Manager for DOE (Department of Energy) at the Savannah River Site. I want to provide a general update for the site. I think I spoke to the Captain and also Dr. Van Brunt; I grew up in South Carolina, but I have to say I saw parts of South Carolina I had never seen when we were coming over here today. I had a daughter that graduated from the "other" University in South Carolina, nearby, but I won't mention. I'm a South Carolina graduate. But, anyway, we were able to make it here on time. Alright, for my update, it's been a pretty busy spring at Savannah River and we've had visits from most of the top leaders at DOE; we've had the Secretary of Energy, the Deputy Secretary, Undersecretary from Science, we've had the NNSA Administrator all at the site within the last five months or so, and in my many years with DOE, I'd have to say this is the first time I've seen that concentration of folks to visit the site in a short period of time. The good thing for us is that it's not during a time when there is a significant problem so that was also a good time for us to be able to show off some of the things that we're doing at the site, and we hope that when it comes time to have budget discussions, certainly within the Department, they'll have some memory of the favorable kinds of things that they saw at their visit to the site. We also have the new Assistant Secretary for Environmental Management is scheduled to visit us next week as well. I think that will kind of complete the high-level visits to the site and we can move on from there.

Rick Lee: You had another group down there this morning, didn't you?

Thomas Johnson: Yes, we did. We had a group that was visiting today, and that was on the NNSA side. You've probably seen a lot of information, at least some information anyway, in the local papers, this is with respect to MOX, an opportunity for a plutonium pit production here at the site. This was something that came up very, at the end of last week. Kind of a, at least in my opinion, kind of a hastily put together tour and discussion with some folks at the state level. Their idea of communications and how things get rolled out is a little bit different than how we'd like to do things on the EM (Energy Management) side, but nevertheless, it's their process and how they rolled it out, so . . . anyway. . .

Rick Lee: You get to be here. . . We're glad to have you here.

Thomas Johnson: Rather be here than in Columbia dealing with that. But, anyway, I have a prepared statement on the EM side, our Department side with respect to MOX and plutonium pits. If you don't mind, it's very short so I'm going to read that to you:

The Savannah River site plays a key role in our National Security and the Department is committed to our enduring mission; our workforce is highly capable, experienced and adaptable to meet existing and expanding missions. We take great pride in our work to make the world safer. We welcome the opportunity to add pit production to our mission as one more way we can contribute to national security in our community, and the Department of Energy remains committed to meeting its obligations to the State of South Carolina, to securely process and remove plutonium from the State of South Carolina.

Thomas Johnson: So that's on the NNSA side, I represent EM so that's where I'm going to stop in plutonium pit production. In other news, we are picking back up on a multi-year campaign that we started last year to, it may not seem important to you guys, but it is to us on the site, to do some resurfacing of the roads and repair work on site. Many of the roads have not been touched in more than twenty years, and are showing some signs of wear, so last year, as well as this year, we've had some funds that we've been able to do some of the resurfacing work. Specifically, what we're doing this year is Road C, which is the main four-lane road that runs through the site from the Jackson Barricade and we're doing the culvert repair work and if things go as planned, we'll be able to do the actual resurfacing next fiscal year. What we're doing, or the way that we're doing this, we're able to utilize some of our overhead funds and by the rules, whatever work we start within a given fiscal year must be completed within that fiscal year so we're having to the work in some segments.

Rick Lee: You can't just commit the funds? I thought that was the way the DOD worked, they always waited until the last month to submit it.

James Little: No, it's a Cinderella clause.

Thomas Johnson: It works that way on the DOD side, but for us, because it's coming out of the overhead we have to complete it within that fiscal year. So, as we go through the fiscal year, and what impacts us is things like a continuing resolution where we didn't actually get a budget until March, so we weren't able, we had plans for the entire year, but when you have only six months to get the work done, you have to do a little bit of scaling back, so that impacted us a little bit. One of the other changing things that's happening to us is that we have now a new line in the budget for infrastructure so in the future we may be able to put things like road re-paving as part of the infrastructure. And that way, we'll have not only that fiscal year funds but whatever we need to actually get the work done. We're also starting work, planning to begin work in July to re-pave Road F. This is a two-lane road that serves several key facilities on the site such as H Canyon, Tank Farms and the Site Training Facility, the Defense Waste-Processing Facility, the new Salt Waste Processing Facility, and Salt Stone so basically what I'm pointing out to you is that the two main roads that are coming into the site, the culvert work on one side and actually re-paving on the other side the main barricades into the site. Just from a community perspective, in April, we hosted the Annual SRS Ultimate Turkey Hunt for Wounded Warriors and Mobility Impaired Hunters; this year, we had 29 hunters participate, and a total of 27 turkeys were harvested from the site, and we certainly go through the process of checking the turkeys before their release. This is very similar to what we do for the annual deer hunts; that's pretty popular on the site as well. Last, two weekends ago now, we hosted a fishing tournament for the same group. These are

great events that are put on in conjunction with the US Forest Service and the National Wild Turkey Federation, and we've gotten great feedback from the participants and the general community as a whole. I'd like to move on now to contract updates; we have three major acquisitions that are on-going for the site. We had this wonderful idea; this is part of my responsibility, that we were not going to allow these contracts to be stacked up. We had them sequenced so we would basically get them in place over about a two-and-a-half-year period. It was a great idea. Reality is it's not working that way. Liquid waste contract, if you remember, back last October we actually made an award on a liquid waste contract; that was protested and a portion of that was upheld by the GAO (Government Accountability Office) which required us to go back and do some additional work. We do have the revised proposals in hand now, and we're going through the evaluation process on it. And, because of that, with the existing contract, we're required to have a contract in place, so it required us to do an extension, which was another extension; we'd previously done another extension as well, that required us to an extension to the existing contract and this was for a ten-month period; that's going to take us up to March of 2019. We're doing the extension to try to balance it with the acquisition process, so we can get through it this time all the way to an award that sticks. We may be able to shorten the extension; we have the language in place that would shorten the extension, and hopefully we'll be able to move on with the new award this time. For the Management and Operations Contractor, by the way, if you have a question along the way, please feel free to ask. I'll answer; I won't make you hold it until I get to the very end. But, keep it to the topic that I'm on if you can. On the M&O acquisition, and this is for a new M&O contract or a follow-on to the current M&O contract that we have, it's not quite as far along as the Liquid Waste Contract. We are expecting to release the draft RFP very soon; we have had a number of discussions with headquarters as well as the individual groups within headquarters that will have to approve certain parts of the acquisition. We've gotten through those; we had discussions as recently as this past Friday; it looks like we now have all of the concerns have been answered and we just need the Secretary's signature, so we can move forward. Hopefully the draft RFP will be coming out very soon.

Rick Lee: Do you know how long that contract term will be yet?

Thomas Johnson: Well, until the Secretary signs it, I'm not going to say. But, most of the contracts as you've seen on the sites, they typically are five years with options to go up to another five years. Now we can do a few things on that first five-year period—sometimes it can be more, sometimes a little bit less but until the Secretary signs, I'm not going to say anything.

Rick Lee: I understand.

Thomas Johnson: We've also, and because of it, the current contract would have expired July 31, 2018; that was what was on the M&O; we have requested an extension on the M&O contract for twelve months to take us to July 31, 2019. And then the third major contract that we have is for the Para-Military Security Services on site; that contract, the current contract expires in the Fall of 2019; it's not nearly as complicated as the M&O Liquid Waste contract; it doesn't require the same levels of approval. You heard me say on the M&O, we've got to go all the way to the Secretary; we don't have to do that on the Para-Military Services contract, so that one right now is moving along pretty well, and we should have the draft RFP out on the street pretty soon. As I've commented to our folks, Para-Military was third in the sequence but at the rate that we're going, I hate to say it publicly, but at the rate that we're going, it may actually get awarded before some of these others. I hope that's not true and we're actually able to get the Liquid Waste awarded this time around.

Next topic was on payment in lieu of taxes, this was something that was really important to the local county communities; a good portion of their budget comes from the payments they receive from the site. This was an issue for much of 2018 but when we got our final budget there were funds there to actually pay the payment in lieu of taxes and I'm happy to say that we've gotten, we've at least received a request for payment from the counties and we've started making payments to each of the three counties. I think Allendale was the smallest of the three, and I think we may have paid them in full of their initial request. Payment in lieu of taxes may, could be an issue in 2019 as well, depending what Congress decides to do. It was a, when we submitted the 2018 request, we had it in, as we're going through all of the various markups from Congress, it was taken out, it was adjusted, but at the end of the day, they funded it at the level that we had requested.

Rick Lee: Just as a matter of curiosity if you can tell us. . .

Thomas Johnson: How much money is it?

Rick Lee: Roughly, ball park. . .

Thomas Johnson: It's approximately 6.5 million dollars between the three counties. Allendale being the smallest, I think Allendale was only order of about 89 thousand, Aiken County about 1.6 million, and 4., whatever the balance would be for Barnwell County.

Alright, Budgets FY 18, as we were going through the '18 budget process, we're going through '19 now, Shelley made mention of some things here. . . We had a request then as we went through the markup process it was not very favorable to the site as we're going through it. But, a considerable amount of time was spent working with Congressional staffers and at the end of the day, Congress passed a budget that was more favorable than the request we put in. We actually received about \$24 million dollars more than was in the President's request which was very pleasing to most of us on the site because as we were going through the markups, there were considerably less than the request. Now, for 2019, as Shelley mentioned, yes, the request is pretty significant, certainly supported within the department but we're starting, the Congress is now starting the markup process. It's starting in the House, and from what I've seen so far on the marks, they haven't been really favorable to the site, but at this point in the process, we don't give up hope. We continue to have discussions with them as needed and try to present our case as to why we should have the level of funding we requested.

Rick Lee: Do you get good support and help with the budget from our delegation? That may be a loaded question, so I apologize if it's not something you can address. You may not work with them, I don't know.

Thomas Johnson: Well, I do. Umm, what's the best way to put this? When we start the process, the South Carolina and Georgia Delegation doesn't seem to quite have the same level of influence as some of the other states may have but, to use 2018 as an example, once we get to the end of the process, we all were happy with the budget that we received. But, as we're going through the marks, I've been with DOE for quite a while, the marks are usually not favorable to us.

Rick Lee: Is that a seniority issue?

Thomas Johnson: I think it's partly a seniority issue and it also depends on which committee you happen to be sitting on. If you happen to sit on the Appropriations Committee, and you have a site in your state, remarkably, those sites do well.

Rick Lee: Thank you. I understand.

Dr. Vincent Van Brunt: On the other hand, is there anything we can help you with?

Thomas Johnson: I think the, at the end of the day, I think the process is working. There's just a little bit of excitement, unnecessary energy I think, throughout the process. Because you get the first marks, and those things come back, and they're considerably lower than what your requests are and you're having to go back through and re-justify to folks. Now, the kinds of things that we do is we also try to host the Congressional staffers periodically throughout the course of the year so that they can get out and see on the South Carolina side so they can get out and actually see the facilities in hopes that when they get in to the discussions, they can offer help in the fight, not just the Federal staff trying to present the case to the appropriate leaders. Alright, I'll try to speed this along a little more quickly.

Rick Lee: You have plenty of time. At your own pace.

Thomas Johnson: Okay. As far as progress, nuclear material aside, this is from H canyon operations. H Canyon is processing their high flex isotope reactor cores. This is material that came to the site from Oak Ridge. We're also processing material test reactor fuel; that's expected to resume this month. And, for the first time, H Canyon will have these two operations running at the same time, as well as receiving the target residue materials. From the plutonium down blend standpoint, we had a plan to down blend twenty-four (24) 3013's this fiscal year. To date, we've down blended ten (10). And that may be the, you know, as things are working [inaudible] in plutonium pit production, we may be looking at revising the number of down blends that we're going to do during the course of the year because we've got the other issue with the State of South Carolina as far as getting plutonium out of the State, and we're working with the NNSA on means to have that happen.

Rick Lee: That's the one ton minimum?

Thomas Johnson: One ton minimum, yes. And, down-blending at the rate we're doing right now with just the lines that we have, we couldn't get there, so we're working with the NNSA how to [inaudible] out of the state to meet the requirements.

Liquid waste, Shelly made mention, that facilities are not on-line at the moment. Shell, I'll have to check the precursor to the Southeast processing facilities were supposed to come on-line next week. . .

Shelly Wilson: Okay, well, that would be great.

Thomas Johnson: Supposed to have been last Thursday, I believe, I did not check it this morning before coming in.

Shelly Wilson: I hope so and I just haven't heard about it yet.

Phil Breidenbach: Yeah, we made the first transfer this weekend.

Thomas Johnson: Okay. But some of these facilities were slated to be, were planned outages to do some repairs and updates at the facilities so it's not a complete surprise for us. Shelly made mention, this is on DWPF (Defense Waste Processing Facility), one of the things that were taking care of during this outage, and Phil may talk about it as well, was that we needed to do the tie-ins to the Salt Waste Processing Facility. And, we've been able to get that accomplished during part of this current outage. And, DWPF is expected to be back on-line, resume operations here by the end of this month.

Glass Waste Double-Stacking, this is a project to expand the storage space in the Glass Waste Storage building. It's moving forward, 238 cannisters have been double-stacked in an FY18, giving us a total of 440 to date. We're also modifying various positions in there; 285 of them have been modified, giving a total of 678. Salt Stone facility is operating. It has processed over 220,000 gallons of decontaminated salt in '18.

Next one I want to talk about is on the evaporator, to be clear this is on the 3-H evaporator. The evaporator last year, last calendar year, early part of this fiscal year, we've actually brought the 3-H evaporator back on-line, ran it for approximately 55 hours or so before discovering there was another leak, much smaller than the leak that was previously repaired. We've had some discussions with DHEC, planned and went through a good bit of analysis to see if we could safely operate the 3-H evaporator with the very small leak that exists, so we had some discussions with DHEC, the plan is to operate the facility with the smaller leak; we also have a procurement that's under way to bring in a new evaporator to replace in the facility.

On the Tank Closure Cesium Removal project, various modules have been received on site, and so we're going through the inspection and installation process, and we expect to have it operational by this fall. SWPF, you've probably seen, the Salt Waste Processing Facility, probably seen a few things on the news here recently, this is going through the commissioning phase; we're actually in the code commissioning phase for the facility right now, and we have had some issues here recently or the proper term, we're revising the risk with the facility. Things were on the risk register, but they are coming to fruition, and you may come across things like this, because as long as it takes to build some of these facilities, by the time you get to the period of actually beginning operations, some of the equipment doesn't perform as you initially thought that it would. In this particular case, we're having some issues with the valves in the new facilities. We've entered into some discussions with our contractor, Parsons with the plan on how to, how to, how many valves should be replaced, and those are on-going discussions. I don't have a revised schedule yet as to impact on the replacement of the valves, but the decision was that we were going to replace the valves. Now, not every one of them, there's some total of just over 700 valves within the facility, a smaller number specific to the type that we're having issues with a small number whether we replace them when they fail or go in and replace them all right now. [inaudible. . . static @49:30-50:00].

Rick Lee: So, I was under the impression that the facility was pretty much on budget and was operating on schedule and it's been a really good project. And then, I saw the article that came out with regard to the facility, and it seemed to be more negative than I would have expected.

Thomas Johnson: Here's the bottom line, by contract, we have a performance baseline that's in place and it says by January 31, 2021, the facility will have been through "hot" operations and be ready for use. The early finish date on the schedule was December of 2018. Having to go in and replace the valves, we're not going to make December 2018. January of 2021 is not in jeopardy but, when your contractor comes to you and you're having discussions and you're saying that, hey, I need to replace 450

valves in this facility, that's not a good conversation. I say, not a good conversation; it's good that you're having the conversation, but it's not great in that you've got 450 valves that you've told him "you're going to have to replace", and the impact it's going to have the schedule. So, we haven't done a modification to the contract yet, we're in initial negotiations with the contractor so I don't have a schedule, a revised schedule to provide just yet but what I do know is we're now looking at January 2021. Nor, we had enough contingency in the project to cover these kinds of risk, so we're not in jeopardy of breaking the anticipated budget for the project.

Scott Batson: Do you know about the schedule for replacement yet?

Thomas Johnson: No, part of the discussion was with the manufacturer on how many valves they have to produce and when we can get them to the site to begin replacement. When we first started the discussion, we got something like, "we can have", I know we've got the media person here, but if you'd kind of give me a little bit off of this particular one. . .

Media: I'll give it to you one time [laughter]

Thomas Johnson: Their schedule for producing these valves was not consistent with our needs. We're wanting to get them in, so we can get them replaced; their schedule was not. We had some discussions with them and they're a little bit closer to what our needs are.

Captain Cross: Are they a sole source production?

Thomas Johnson: No, they are not our sole source, but 300 or so valves that are in the facility are from the same manufacturer and we've made the decision we are not going to mix them or go to another supplier.

Scott Batson: Do we know anything more in terms of what the main failure was?

Dr. Van Brunt: That's the question. What's going on?

Thomas Johnson: So, this was really the electronic communications with the valve. We could not consistently identify whether, when these things failed, whether they failed open or failed closed, and that's not a risk that we want to carry with this facility and go into operations. And so, we said, okay, with the newer valves, that this company provides, we're not experiencing any of those problems, they are continued under continued support from the manufacturer. These ones that have failed, those valves are no longer being supported by the manufacturer.

Rick Lee: You have any interest in finding out what kind of valves there are in case you have some sitting in your plant?

Scott Batson: Obviously, if there are failures, yes, we want to know.

Captain Cross: Are these valves above ground?

Thomas Johnson: These are above ground.

Rick Lee: If you could share any information.

Thomas Johnson: Yes, I'll share the information.

Dr. Van Brunt: Are the valves located in places that would be accessible after startup?

Thomas Johnson: They're in locations that would be accessible after startup but for us the biggest concern was, when we start processing something through the facility other than water, . . .

Dr. Van Brunt: My gosh, I understand that, but the question is, you can usually tell whether something has failed to open or failed to close. And is it an issue associated with the actual specific valves as to which was chosen or, can you answer any, I mean, we'd like to know?

Rick Lee: It sounds like the electronic sensor is not accurately transmitting. That's what it strikes me as.

Thomas Johnson: It's not.

James Little: They want a positive indication of open or close, and you're not getting that.

Thomas Johnson: Alright, some other order, Shelly made mention of the ash cleanup project that is one of the larger environmental projects that we have on site. Right now, its field work is scheduled to be completed in September of 2018 which is well ahead of schedule. At the moment, we are placing the geo-synthetic cover over the top of the basins. That project is running ahead of schedule and under budget; we don't get to say that often. We're certainly proud of it. Also, on the salt water cleanup portion we have a fire-water storage tank for our area that used to be our administrative area for the site; it's also where the Savannah River National Laboratory is located. We're having to replace a fire water storage tank. That effort, the replacement effort has begun but we first noticed a leak back in June 2016; we did some repair work and when we got to the latter part of 2017, we realized that we'd be better served by replacing the tank. So, we started that effort. Subcontracts were awarded and the construction work on site has started.

Savannah River National Laboratory – Last year, you probably heard a lot in the newspaper talking about drones flying over the site. That had nothing to do with Savannah River National Laboratory but there's a tie that comes to them. Finally, we have been able to, at least we're not getting any or seeing any additional drones flying over the site. Now, I'm relating this to the Savannah River National Laboratory because here it is, we think, we have private citizens or whoever flying drones over the site. Well, we have adopted that a little bit. Through Savannah River National Laboratory (SRNL), we now utilizing, the site is now utilizing drones to do some of the inspections on the rooftops and things for our facilities. And so, from a publicity standpoint, it wasn't very good about a year ago, but the lab has now taken that idea and expanded upon it a bit so for some benefit to the site.

Rick Lee: It was my understanding that the DOE, most of the sites were classed as unavailable for drone operations. How'd you overcome that standard?

Thomas Johnson: Well, there are certain restrictions on the drones as to how far off of the ground they're supposed to be. And, when we're working with our security folks and we're putting a drone in the air and they know exactly where we are and what facility we are looking at, so basically when we're putting a drone in the air, we are going to notify the site operations center, so they know specifically that we have a drone that is in the air.

Rick Lee: You could be at the front of the line then for DOE sites. Well done.

Thomas Johnson: Alright, one of the other things that we are doing, this is on consolidating the F and H labs into SRNL space. These are two labs that we have booked basically in the F Canyon and chemical separations area. And we also have a map of each and we are now consolidating those into SRNL, and the other thing is that when the salt waste processing facility comes on board, it has analytical laboratories with in it as well. Basically, we're doing this to help reduce some of the cost as well as to modernize a little bit. Last main thing for me, this is on the Savannah River National Laboratory, this is on a safety pause that the lab is currently under. Now, we've not had any major issue, but we've had a number of issues over the last few months to crop up coming out of the lab which you saw in the in adherence to procedures. The lab, having a number of issues, ultimately decided that they wanted to take a safety pause to try and rectify the problem. With our belief being that given the number of minor, or relatively minor incidences that we were seeing, we didn't want to see that ultimately turn into something major there on site and thought that the contractor needed to put out a little better focus on the operations within its facilities. We're continuing to work with them; I know that the contractor has gotten some corporate reach-back efforts from other sites as well as their Board of Directors that has some specific expertise in the kinds of things that we were seeing to provide some assistance to them as to how they may develop the proper corrective actions as well as, on the department side, the frequency with which we're going to look at any revised procedures and revised efforts at the site that the SRNL was making in their processes. And that's it.

Rick Lee: Very good. A lot of good information. That was good detail. I appreciate you letting us have some questions as you went along.

Thomas Johnson: It's hard to hold them until the end; you've forgotten exactly what I said. I've figured over the years, if you ask them on the point that I'm on then we can get through it.

Rick Lee: Thank you. Any other questions? Mr. Johnson, thank you so much. I appreciate your time; thanks for coming.

Phil Briedenbach: I want to thank all of you for inviting me to come and talk to you today. My name is Phil Briedenbach, and I am relatively new at Savannah River Liquid Waste. In fact, I actually just got down there about a month ago. So, I've been on the job as the Chief Engineer for Savannah River Remediation for about a month. Before that, actually my career started at Savannah River, I worked for twenty years, but it was all on what is now considered the M&O side, so I managed the F Area facilities, the H Area facilities; I worked in Tritium facilities for a period of time. My last assignment for Savannah River was as the site ESH Manager. I left there about ten years ago, and I went to Idaho and worked at the Idaho National Lab on a couple of different projects up there. I then, about three years ago, was asked to become the General Manager for the WIPP re-start. So, I spent about three years at WIPP going through the resumption of work there, which we successfully completed. After that, I took about six months off and then ended up getting asked if I'd come back down here to work on the tank farm side, which is really exciting to me because, of all of the different jobs that I've done over the course of my career, I never did get to work on the liquid waste side, so this is really interesting to me.

So, I'm glad to be back at Savannah River. If we go to the second slide which I -- has kind of the names of the companies up there. The title is Savannah River Remediation Contract in Perspective. We started the contract in July in 2009; it was a six-year contract with a two-year option period and it then was intended to end in June of 2017. As you've heard, that contract has been extended until March of

2019. There's currently about 2,200 employees that are working on the liquid waste project. And our job really, if you think about it, is high hazard operations. We do high hazard operations which encompasses very complex engineering, procurement, and construction activities which I'm going to talk to you about and you've actually heard about from the first two speakers. And the goal is closing the waste tanks. And that's what we do. The partners there that we have AECOM is the lead integrating contractor, really responsible for operations and engineering as the primary areas but responsible for all of the activities that go on. Bechtel is one of the partners responsible for construction and design engineering. CH2M Hill, they're scope focuses in the area of tank closure, and then BWXT really focuses on environmental and regulatory work as part of this team, this limited liability company that we call SRR or Savannah River Remediation.

Slide 3 there talks about safety and this really is exciting when you work with high hazard operations you have to be focused on safety every single day because the things that can happen when you don't aren't acceptable. So, I talk a little bit about our industrial safety record; 8 million hours of safe work, that means since the last person actually received an injury that required them to miss work. And that's since the start of the contract, 8 million hours. Our construction record is even better than that. 29 almost 30 million hours, that's twenty years of doing heavy construction work without having a lost work-day case; that's almost unmatched. In fact, I've never seen it in the areas that I've been, I've never seen it, a record like that in construction. As a result of that, we've received the voluntary protection program Star of Excellence every year that we've been on the contract. It's the highest-level DOE award. It means that you have a safety program in place that's not only protecting your workers but it's at a level that they want you to go to other sites, other places, and share your safety program with; you have to do that in order to get that star of excellence. So that's what we've been doing. It's easy when you talk about safety to get kind of wrapped up in statistics and millions of hours. This next bullet, I'd like to try and bring that home. One of our mechanics named Bill Jones, five days before Christmas last year, had a heart attack. He went, he started to go into cardiac duress in one of our facilities in early morning hours that day. The people who were around him noticed it, they were all trained in first aid; they knew how to use AED's and where they were; they were able to give him first aid; the right calls were made and our drill program kicked in; the experience from that where we got medical, we got medical professionals there; they were able to get him to the hospital; they had to bring him back to life two or three times along the way. The bottom line is, if you were to ask Bill, and he's said this publicly, if you were to ask him, it was the safety culture that's in place at the Savannah River site with SRR that saved his life. It's a combination of the training, of the attention to safety, of the drill program, that's what really made a difference for him, and I think it's a great example.

So, what do we do? This next slide which is kind of a busy graphic, but it's really an important graphic and I'd like to talk you through it. It starts down there at the bottom left with H-Canyon and F-Canyon. That's where the waste comes from. And, you know, if there's nothing else that I've learned from this, I mentioned to you that I managed F-area and H-area earlier in my career and what I've discovered is that if you stay in the business long enough, sooner or later you end up cleaning up your own stuff. And, so that's what I'm doing now. So, it starts there, and those liquid wastes are created as a by-product of the operations that happen in those facilities. They were collected over the years in tanks, large tanks, 51 of those large tanks. Each of them, they're varying sizes, but you can think of them as each 1 million gallons basically. Large, very large, underground tanks. Eight of those, as mentioned, have been closed, okay, which is our goal; we've got 43 left to do. If you look at the tank in the center, it kind of graphically depicts, you can think about it in two waste forms that are in that tank. The bottom is sludge and sitting on top of that sludge is salt waste, essentially aqueous solutions that contain salts from the chemistry that goes on in the tank. You can also see the number of curies that are in the salt;

about half of the curies end up in the salt, but the salt represents about 90% of the waste. So, it's this aqueous solution; that solution is what ends up going to either ARP (Actinide Removal Process) and MCU (Modular Caustic Side Solvent Extraction Unit), those are the two process buildings where we handle that particular material and we strip out the radioactive components from that waste stream. So that the rest of that liquid waste stream goes to salt stone, gets mixed with concrete, and it ends up going into the salt disposal units. The radioactive components or the large majority of the radioactive material from that stream are stripped out at ARP and MCU ends up going into the DWPF (Defense Waste Processing Facility) and it's mixed with the sludge and with the glass and melted and ends up going down and creating these glass logs or glass containers, glass material that goes into stainless steel containers and is put in our Glass Waste Storage Building. It will end up going to a federal repository at some point in the future once one is ready. So basically, what you learn from this, there's really three products that we try to create. We try to put all the, as much as possible, greater than 95% of the radioactive materials go into the glass logs. A small portion of the radioactive material ends up going into the concrete, the salt stone, and the only other product we have is closed tanks. And that's the goal for this contract and for this work.

So, if that's what we're trying to do, how have we been doing? We've had a lot of accomplishments over the course of this contract. We've produced over 1,500 canisters of the glass canisters and 6 million pounds of material that go into this classified waste. That's our product. We've processed more than 6 million gallons of salt waste; that ends up going into the salt stone. 10.9 million gallons of low-level waste stabilized as salt stone. We've designed and built the first, what we're calling mega-volume, 32 million gallons, this is a large, essentially, a large tank if you will, where this salt stone material can go into and where it will end up residing. We've actually created that; this was a huge project for us, 120-million-dollar project. This one did come out 16 months ahead of our target schedule and 25 million dollars under target. I'll talk more about that project; it was a big success for us. Operationally, over the course of this contract, we've closed six high-level radioactive waste tanks. And so, there's been a lot of good that has been done so far on this contract.

On the next slide, we talk about, if you're going to create glass, you have to have a Melter; this is where you mix all this material and heat it up and actually pour the molten solution out of that Melter and into the containers. The Melter failed a little over a year ago, a little over a year ago, a year from last February. It had been in place and had been operating for fourteen years; that's a lot longer than its design life. It performed exceptionally well, and it ran for 14 years. That Melter poured more than 10.4 million pounds of glassified waste and was used to fill 2,678 canisters. But everything does come to an end. You can imagine the kind of environment it's in, over 1,000 degrees C (Celsius), molten glass, it ended up failing and we ended up having to replace it. That was really the main reason for the suspension of operations that had occurred. You can see a picture on Slide 7 of Melter 3 actually; it's the replacement Melter, that's what that device looks like. Melter 3 was installed last December, and we successfully poured 7 canisters at the end of 2017 going in to 2018. It was always planned and scheduled that we were going to do that replacement, prove that it worked, and then we were going to go back into outage to do some of the work that's already been described, the tie-ins to SWPF, and some of that work, some work associated with upgrading our facilities to prepare them to operate at the higher rate once SWPF comes online. So that's what we've been doing over the last year or so. It's kind of important; I've been listening to the conversation. There's really two new facilities that are being built- SWPF and the TCCR Facility that we've talked about. Those are new; they're not supposed to be online today, and they're in various processes of completion, so that they can come online. The rest of the facilities are down for maintenance activities, including this replacement of this complicated Melter and the upgrades that are necessary to allow those facilities to come online. So, that's what's going on

and we are, I'm proud to say, what we do intend to have everything back on line by the end of this month is where the target is and as I said before, the first transfer from the MCU to the DWPF took place is evidence that we're making progress.

Excellence in project management – I want to talk a little bit more about that Salt Stone Disposal unit on Slide 8 there. The SDU which is the Salt Stone Disposal Unit 6 received the DOE Environmental Management Project of the year in November of 2017 and then went on and received a higher-level award in March of 2018, the DOE Project Management Excellence Award, so this project has been recognized at the highest levels of DOE as being a great example of how projects are supposed to happen. We're using that experience to move into SDU 7 which is a project that is ongoing right now. We've just completed Phase 1 which is removing all the trailers; it's kind of the site prep for building SDU 7 moving the Storm Water and re-routing some of that, completed the team review of the general site prep design. Secretary of Energy, Rick Perry, broke ground on that SDU 7 in February so this is in the early stages of building the SDU with the idea that once we get the SWPF, the Salt Waste Processing Facility, online, the through-put is going to increase dramatically; we're going to create a lot more salt stone and so we're preparing so that we have a place for all of that concrete of that grout to go. And so, that's what that's all about, and work will continue on SDU's 8 through 12 which will be necessary for us to close all the tanks.

As we've said, operationally we've closed six tanks, and those tanks are listed there as part of this contract. There were two tanks that were closed in 1997, 43 tanks to go and, although it's great that we've got done with eight, that's good, that's exciting, however, you got to want to do it faster, right? And that's really what all of these new projects are about, putting in the infrastructure and the processes so that we can speed this process up and work through those last 43 tanks. One of those processes is the Salt Waste Processing Facility, SWPF. SRR is not responsible for that project; Parsons is the contractor who is building the SWPF for DOE. But, we are responsible for interfacing with SWPF, so they have to receive the waste, so we have to have lines in place to be able to send it to them. We have to take the waste after they process it, we have to run it through DWPF for salt stone, so we have to have the lines in place to allow that to happen, and so a lot of work we're doing, and going on, is preparing for bringing SWPF to go online. Another example of the work that we have to do for them is our nuclear safety basis. Our nuclear safety basis, which are kind of the documents, the higher tier safety documents that we established that kind of give the bounds of operation; they form the technical basis for why we can operate, using the procedures that we operate; those all have to link well to SWPF and have to be compatible so that the whole system can operate together. And there's a lot of work in that area also in preparing for SWPF to come back online. We expect once we get it online a significant increase in through-put on the order of a factor of 5-10 increase in the processing rates.

The other project that I wanted to highlight today Tank Closure Cesium Removal (TCCR) or "Ticker" process. This is technology that's never been used in DOE for this purpose before. It's an ionic exchange process; it uses a material called Crystalline Silicotitanate and because we don't like to pronounce that, we call it CST. It uses that material; this material is really cool. If you put a liquid over that material, if you process it through that, it has an affinity for cesium which is in a radioactive material, it will essentially absorb the cesium out of that stream. And so, we're going to use that property of that material and build a system around it that flows the salt solutions through those ion exchange columns; it will absorb the cesium and coming out the other end will be liquid that meets all of the requirements to go straight to salt stone. It's a great process and we're really excited about what it's going to do. The system is now being installed; you can see some pictures there that are probably all from about 2 or 3 weeks ago; the system is actually installed now. All of the pieces of it are installed right next to the tank

that it's going to actually process material from and very near the tank that it's going to put the new clean materials into its physically installed. Over this summer, we will begin testing, component testing that is required to bring this online, and we expect it to be online by the end of this year processing waste. So, it's really a new technology and I'm here to tell you, and since it's never been done before, we are managing the risk every day like we should, and we do this right. But we are excited about the possibility and I'm confident that we're going to be able to make this work.

James Little: Where is the CST material right now?

Phil Briedenbach: The CST as of right now it will go to a pad and it will be stored. But, the important thing about what we do is that the philosophy is that solid is better than liquid, right? That when a material is in its liquid form, it's more of a hazard to the environment and therefore we want to convert it into solid. We do that by converting it to salt stone, grout, that's a solid; glass, that's a solid; putting the cesium on the ion exchange media, that will be a solid also. And then we'll work to get that to the proper place for disposal as we go forward.

Dr. Danjaji: Are you minimizing its mobility?

Phil Briedenbach: Yes, mobility is very low once it's in the solid. Yeah, it'll stay there. So, Ready For the Future is the last slide there. We are doing a lot of things to try to prepare for a step change in this mission to close the remaining tanks, which is our goal. We're preparing, we're working to make the system more robust, you know, put the right pieces in place so that we can do this work in a timely manner. SRR continues to operate effectively and ensure that the liquid waste mission is accomplished. I've talked a lot about the safety and the way that we try to do the mission. In high hazard nuclear work, how you do the work matters every bit as much as what gets accomplished. You have to do it in the right way or bad things can happen. And, even with these ongoing contract extensions, we're working hard to innovate, put new systems in place to prepare us for the future.

Rick Lee: Fascinating. I look forward to it.

Capt. Cross: When you get all this piping open and when you're hooking up, are you doing any checks on the piping? Some of the piping has been there for 50 years. What kind of pipe you got there on the ground?

Phil Briedenbach: Couple comments; certainly, when you do those changes, when you're making those modifications, you're putting in new jumpers, you're tying in to existing piping, so we look to see, is it what we expect? But we have a lot of systems in place that monitor the corrosion rates in tanks, in pipes, and leak detection to make sure we would know if there's any problem. So yes, the answer to your question is, yes, we look, we verify that it's as we expected and so far, we haven't found any surprises.

Capt. Cross: How many generation before the tanks are closed?

Phil Briedenbach: That's the whole point. I don't know that I can give you . . .

Capt. Cross: Is there a goal for that?

Phil Briedenbach: The goal in my mind is to try to do it soon. Sooner rather than later. I don't have an answer to your question on what the plan is. You might have, does the system plan actually show when all tanks get closed?

Thomas Johnson: Well, it's going to kind of depend on new acquisition.

Phil Briedenbach: It's contracts, they all have appropriations.

Larry Ling: There's the FFA (Federal Facility Agreement) that we have with DHEC that requires the non-compliant tanks to be closed by 2022 and then the Salt Treatment Plant takes us out to 2028 to have all waste processed. And then the tanks become subsequent to 2028.

Dr. Van Brunt: I can't leave the meeting without asking about joyous Tank 48. Where are we with Tank 48?

Phil Briedenbach: Okay, so I'm going to use the 1-month card; I know there are issues with Tank 48, I do not know the SR strategy or what the DOE strategy is to deal with that.

Larry Ling: Well, we have the tetraphenylborate (TPB) still in the organics; we're monitoring it and working with the Department; we decided to just focus on getting the other tanks closed. Certainly, we could use that tank space, but it's safe the way it is, and I think we're using funding to get closed tanks.

Dr. Van Brunt: Okay, to be determined at a later date.

Phil Briedenbach: Everyone would agree though, you know, if we're able to accelerate and close 42, and focus hard on one last tank, that would be a big, and that's really what the presentation is really about. We're working hard and trying to work through these tanks as quickly as we can.

Rick Lee: Anything more? Thank you, great presentation. Alright, next up to bat, Mr. Batson. Do you have a presentation or a representative that we're going to torture with a presentation?

Scott Batson: I do. I appreciate the opportunity to give the information on Duke's operation subsequent course overall and also speak a little bit. I'll do that just in terms of use plans for subsequent, and so Rounette Nader out of our corporate office is going to provide the update.

Rounette Nader: Thank you. I am Rounette Nader; like Mr. Johnson, I was born and raised in South Carolina, in Monck's Corner, South Carolina, to be exact, so when I graduated from the University of South Carolina, and headed up here to Oconee to interview for a job, I saw areas of the state that I had never seen before either but I fell in love with them. Just my drive up here, if you came up from Seneca, looks very similar to our ride across the dam this morning. It's just beautiful, the lake and the mountains, so I came to work here in Oconee in Engineering and have been with Duke for almost 26 years now. So, I'm pleased today to speak with you; I am the Director of License Renewal and Decommissioning Facility. The last update the Council received from Duke was actually in July of 2016 and I gave that update in Columbia. Steve Nesbitt was unavailable that day so on that day, we spoke a lot about the industry status of decommissioning. So, I'm pleased today to be speaking on a more optimistic topic related to the nuclear industry.

So, a little bit on Duke Energy's Fleet Performance overview, and then information on subsequent license renewal, the regulatory process, industry status and Duke's status. As a reminder, the Duke Energy Fleet consists of 11 units at 6 operating sites, 3 in North Carolina, and 3 in South Carolina. Oconee, Catawba and Robinson, in South Carolina, with a total capacity of over 10,000 Megawatts. We operate Catawba, but we do not own 100% of Catawba. The other plants, we do own 100%.

One way we measure performance is, quantitatively, is through a series of key performance indicators. And so, we have a lot of key performance indicators, but we roll these up into the top 7 that you see here, 6, I think we've gone down to 6 now, in the areas of safety, reliability, and efficiency. So, this is a similar slide I used two years ago to talk about how Duke Energy stands with relation to the rest of the industry and we compare ourselves against other large fleets, nuclear fleets, so there are 8 large fleets in the country. When I first started doing this work, many years ago, there were 11 and so we're down to 8, with consolidation within the industry. So, in 2016, I told you that Duke was the #1. By the way we do this measurement, we were #1 in 2014 and 2015; we have continued to be #1 in 2016 and 2017. And that is our goal, is to be the best fleet in the industry. You can see that these KPI's we call them (key performance indicators) are in the area of safety, that's personal, radiological and nuclear safety, reliability, and efficiency, in terms of total operating cost which a dollar per megawatt hour. Now, this isn't to say we were #1 in every one of these; in fact, we weren't #1 in many of these, but when you add them all together, and do a comparison of the total, we were #1. So, some performance stats, since it's been two years since you've been given an update on Duke's Nuclear programs, I was going to give you a little bit of information about 2016 and 2017. So, in 2016, we achieved our Fleet Record Annual Capacity Factor of 95.72%. That's the highest capacity factor Duke has ever achieved for the fleet. We're very, very proud of that. Catawba implemented a small up rate on Unit 1, that's where we actually got about 20 additional megawatts electric out of the plant through more accurate feedwater flow instrumentation, which feeds our reactor power population. And, in 2016, Oconee completed, in the spring, completed its shortest ever refueling outage in 23 days, and then turned around and surpassed that in the fall with a 22-day outage. So, when I came to work here in 1992, outages were, I think 76 days was the first outage that I experienced so we've really come a long way in outage execution. In 2017, we had another really good capacity factor; we had a really good year in generation; it was not as good as 2016, but it was second only to 2016 at 95.64%. So, that was our 90th year exceeding 90%, 25th year exceeding the industry average. And then I have some highlights from individual stations. Last time I told you that Brunswick had completed a dual unit run of 315 days and we surpassed that in 2017, so both units ran for 357 days continuously with no reactor trips. Harris Nuclear Plant set a generation record in 2017; we also had three really good refueling outages in 2017 that ended continuous runs, meaning they ran from the previous refueling outage to that refueling outage. These numbers depend on, Brunswick is a 24-month cycle plant, McGuire is an 18-month cycle plant so that's why the numbers look so different there, but they did run from one refueling outage to another. And then Oconee Unit 2 recently transitioned from 18-month to 24-month refueling frequency so it experienced a new fleet record of continuous breaker-to-breaker run of 716 days. So, that's very good to run from one refueling outage to another and not have any forced outages in between. Catawba also set a generation record in 2017, and Robinson, we're really proud of this record too, and it may look a little bit dwarfed after the statistic that was just given with Savannah River remediation, but Robinson has worked 957 days without a reportable injury, and that was up until last Thursday which is when I put this slide together, and I'm always reluctant to put these numbers up here because I feel like I'm going to jinx them. But they have done a phenomenal job with safety at Robinson and across the fleet.

So, we had some really good experience and really good fleet performance the last couple of years, but I will say that we do not rest on our laurels being number 1 in the country and having all these superlatives, we do, we consider these accomplishments, and we do celebrate these successes but we also know that just about everything on this sheet can be improved on. So, with the exception of the continuous runs going from one outage to another, everything else on this sheet we know can be improved on and so are constantly looking for ways to improve performance through corporate oversight, intrusive oversight, and through innovativeness and ideas on ways to improve performance. Any questions on performance?

Just wanted to give some bullets here too on the fact that our employees are really active in the communities in which we operate, very active on all kinds of drives, holiday drives, at school supply drives, food drives, blood drives, and then we have a really active group of young people, core, that we've hired in the last, probably less than ten years, and these young people are so pro-active and have so much energy and they are part of this group called North American Young Generation Nuclear, NAYGN, and so this group, NAYGN did this, but I will say that our Duke Energy Representatives definitely were leading this effort, but they wrote this book called *Marie's Electric Adventure*, and I was hoping to have a copy today to pass around but we didn't have any copies on hand. You can go onto Amazon and find it, just type, search for *Marie's Electric Adventure*, and it's a children's book that explains nuclear energy to elementary aged children. So, these young people in our organization and in other nuclear energy organizations across the country actually got this book published, and won an NEI, Nuclear Energy Institute, top innovative practice award. We just found out a couple of weeks ago that they won that award for this book. Very pleased.

So, turning the topic to subsequent license renewal, and you may hear people refer to it as second license renewal. Subsequent is the term that the Nuclear Regulatory Commission uses so we try to stay true to that subsequent license renewal. Fortunately, it's the same acronym no matter which one you say, it's SLR. We love acronyms in nuclear, so we get to use SLR regardless. But, license renewal is governed by 10 CFR 54, and that rule was written back in the mid-90's, early to mid-90's. And, when the industry started looking at the subsequent license renewal, the NRC staff made a recommendation to the Commissioners to revise the rule for subsequent license renewal. So, I was actually, earlier in my career, I worked on license renewal as the lead mechanical engineer for Oconee and the McGuire and Catawba plants license renewal processes. So, I was involved in when the rule was written the first time, we intentionally made sure that the rule was written that it did not limit you to just one renewed license; it's written that you can receive a twenty-year renewed license. So, when the staff made this recommendation to the Commissioners, the industry, tried again, we stepped up and said "you know, we really don't feel like this rule needs to be revised. This rule was written generically, for not just one license renewal", so the Commissioners did rule that the regulation should remain intact. So, the rule itself is not changed; the same rule that applied for the 89 plants that have gotten licenses for the first time applies for subsequent license renewal. Now, what the Commissioners did tell the staff was to update guidance, and they have done that, and these two documents are kind of the Bibles for subsequent license renewal if you will, and they provide the first, the generic aging lessons learned for subsequent license renewal provides information as it's titled on the aging effects and the programs to put in place to manage those aging effects, and then the second is a standard review plan which is a pretty standard document the NRC will issue for large licensing actions that just says "here's how we're going to go about reviewing these applications." So, it gives you a good template for putting together your application.

This may be a little bit hard to read, but I'll just, you don't necessarily have to see the words, I'll walk you through it. This is the process for subsequent license renewal; it starts with the green. Everything's color-coded, so that helps. So, you submit a license renewal application to the Nuclear Regulatory Commission, and when it is accepted by the Nuclear Regulatory Commission, it goes down two paths; there's a safety review that reviews the technical side of license renewal which focuses on aging management programs for the plant, and then there's an environmental review because an environmental report has to be provided with the application as well. So, the safety review is that kind of light green that goes up and around that way, so the safety review process goes through and they issue a safety evaluation report. And then the yellow indicates where there's public involvement, so, actually, backing up, when you make a submittal, the first thing is there's a license renewal process and an environmental scoping meeting. Those meetings are held near the sites, so the public can get involved at that point. And then the environmental review is kind of the blue-gray- process and so, that process, the NRC issues a draft supplemental generic environmental impact statement, and there's another opportunity for public involvement when that document is issued, there's a meeting there in the yellow, that's the yellow down at the bottom. And then a final supplemental generic environmental impact statement is issued. So, you've got the safety and environmental paths going parallel and the safety side also goes to the Advisory Committee on Reactor Safeguards which is an advisory committee that reports directly to the NRC Commissioners, so they advise the Commissioners on many topics, one being major licensing actions and license renewals. And so, if the ACRS, or Advisory Committee on Reactor Safeguards, provides their recommendation and the final supplement to the GEIS (Generic Environmental Impact Statement) is issued and then there's an opportunity for a hearing. If there's been contentions that are filed, and they're admitted, so that's the hearings here in the, just kind of right of center with the dash-lines going to it. There may not be hearings if there are no contentions admitted then you don't have to go through the hearing phase. But if contentions are admitted then you go through the hearing phase, and then the orange is the NRC decision on the application. Any questions on the process?

Capt. Cross: Still twenty years, right?

Rounette Nader: Yes, it's twenty years, a twenty-year renewal.

Rick Lee: So, how long does the process usually take? Is there a particular time?

Rounette Nader: So, the NRC has committed to an 18-month review time. Plus, there's a sufficiency review that's done up front; it's about two months, it's 60 days. So, when they receive the application, they do a very high-level review to be sure that all the information that is supposed to be included is included, and that there's enough information there to actually go forward with their review. So, two months for that, 18 months for the whole review.

Rick Lee: Has anybody actually received an SLR?

Rounette Nader: No. I'll talk a little bit about status. There's also technical progress going on. The Department of Energy, as well as the Electric Power Research Institute (EPRI) and the Nuclear industry are doing some research projects, just looking into technical issues. All that research is done but the plants can be safely operated for eighty years. There haven't been, there's nothing that's come up that appears to be a generic issue. And the reason the plants are able to operate or be operated for eighty years is because of the continued safe operation that we have. We're continuously upgrading and replacing parts; I mean, you guys saw today during your tour how much work like Scott mentioned on

the bus, just how much effort we've put into things like Fukushima and other equipment replacements and then obviously rigorous NRC oversight, and then we have an extensive operating experience program.

So, status. So, the first subsequent license renewal application was submitted in January. Next there is Turkey Point. And I should have put it on the slide, but it was accepted by the NRC for sufficiency a couple of weeks ago, late April I believe it was. So, it has been accepted which was a victory for the industry that the first application would be accepted. And so, future submittals that have been publicly announced Exelon for its Peach Bottom boiling water reactor, Pennsylvania, and Dominion's two sites Surry and North Anna in Virginia. And they are expected, two are expected this year, and then when Dominion finishes Surry, they'll move on to North Anna and submit that in 2020 is their expectation.

So, what does subsequent license renewal mean for the industry? This is a pictorial again; you're not going to be able to see the words at the top, but I'll explain them. So, as I mentioned, 89 of the approximately 100 reactors in the US have been re-licensed once, the first time, so the blue curve shows that the 100 gigawatts of capacity that those approximate 100 reactors provide for the US. Beginning in around 2030, those licenses will begin to expire. So, between about 2032 and 2050, where that blue line trails off, that's where the current licenses would expire. So, what subsequent license renewal really does for the nuclear industry in the US is provide an additional 20 years so that 100 gigawatts capacity and allows the time for new technologies, either nuclear technologies or other technologies, that can provide clean power for the country. The yellow arrow is intended to represent the new technologies that we could potentially see; we don't really, we don't have a good feel for what those technologies are today but there are some that are in progress, small modular reactors, advanced reactors, but by 2032, nothing's going to be mature enough to really take the place of the 22% of capacity that the nuclear industry provides for the US. Sixty percent of the clean energy is provided by nuclear in the US. So, this is the view for subsequent license renewal is to bridge that gap.

So, turning to Duke Energy, and this graph is done the opposite way, I should have done it the same way as the other one except that it counts up instead of counts down, but again, this is the table from the first slide that shows the Duke Energy Nuclear Fleet, and the graph shows the megawatts or the capacity that would go off-line for Duke if the plants do not go through subsequent license renewal then in 2030 is when Robinson's license expires, so that's the first little area and then Oconee is 2033 and 34, and Brunswick is 2034 and 36, and so forth and so on until it shows 8,830 megawatts because it accounts for just Duke's ownership share of Catawba. So, pretty close to 9,000 megawatts of capacity would go off-line by 2046.

So, I want to talk a little bit about, Duke Energy has recently issued a 2017 climate report to shareholders and it talks about Duke's commitment to the environment, and so we have a current plan to achieve a 40% reduction in CO2 emissions by 2030, as compared to 2010 levels and in this climate report also talks about an analysis we've done on the 2 degree policy which is globally, if you were to try to keep global temperatures less than 2 degrees Celsius above pre-industrial levels, what would that look like? And so, we've determined that Duke Energy's contribution to that 2-degree cap, 2 degrees Celsius cap would be a 72% reduction in CO2 emissions by 2050. So, one way, one pathway to getting to these reductions would be to pursue subsequent license renewal for the nuclear plants because, as I showed on the graph before, those almost 9,000 megawatts of capacity, by 2050, they'll be gone. Between 2030 and 2046, they'll be gone. So, the pie-chart just shows existing 2017, the kind of light blue there on the right is the existing nuclear and so one potential pathway in 2050 would be to have nuclear still there, it shows 31% but that's not a reduction in nuclear, it's just a difference in the others

and their contribution. Coal is gone, and you see hydro and solar is significantly increased, and then it also shows a new load following zero emitting resource which we don't know exactly what that might be today but, we're hopeful.

And just a little bit of information about Duke's commitment to customers and community. Just a few statistics here. I mean, nuclear power does provide over 50% of our customer's electricity in the Carolinas. It's about 56%, so nuclear is a critical component in our generation portfolio, so for 45 years plus, actually, it has served our customers well and contributes to fuel diversity. And then, in the communities, we provide good jobs, about 6,300 jobs, plus additional contract workers during re-fueling outages. Partnership opportunities, I mentioned earlier some of the partnership opportunities that we're involved with. And then, the tax bases. In South Carolina, Duke paid about \$130 million to \$140 million payroll and property taxes.

Rick Lee: In York County, I think you were paying about a third of the total property tax base.

Rounette Nader: That sounds about right. I think Oconee is very close.

James Little: And Catawba. Rick and I are York county. We appreciate your contribution. Yes, it's a big contribution to our quality of life. And the school system.

Rounette Nader: And very much the same here in Oconee County, and even some of the more, even in Wake County, North Carolina where our Harris Plant is, it's a significant contribution. That's a more urban county than a lot of the other counties we operate in; I was surprised even here how much the contribution is in those counties.

So, Duke Energy's subsequent renewal processes and status. So, I was going to preface this by saying that Duke Energy has not a public announcement on pursuing license renewal, any subsequent license renewal for any of its plants, and I'm not here today to tell you that we are going forward with subsequent renewal for any of our plants. But, I will tell you that we are evaluating it; we have a team in place. We're looking at the technical basis, we're participating in industry working groups; we meet with the NRC when they have public meetings; we're interfacing with the other applicants. I mentioned Turkey Point, that's made their submittal; we did a peer review. The NRC suggests, highly suggests, that you have a peer review of your application before you send it in. So, we participated in that peer review, as well as the Peach Bottom peer review that hasn't been submitted yet. And we're performing economic analyses. So, we are active. One of my young civil engineers just took the vice-chair position in the civil engineering working group, so I'm very proud of him for doing that. So, we're definitely active in the subsequent license renewal industry groups, and we do believe that all the plants are good candidates. So, we feel like pursuing it will provide us the opportunity to operate these plants up to 80 years if it makes sense and so, that is where we stand today. And, more to come.

Rick Lee: Very interesting and impressive and those charts, I know you're not announcing anything, but I don't know what the alternative is, other than darkness. So, are there any questions? Jim, anything? (No). So, what is the practical limit to extending the life of a reactor? I've heard stories of networking issues and so forth. Where is the, from an engineering perspective, the weak spot in that has to be addressed when you do re-licensing?

Rounette Nader: So, so many of the components can be replaced if need be, right? Probably the reactor vessel embrittlement, internal embrittlement in the vessel but certainly, 80 years is not limiting

for that. A lot of plants have done those analyses and it shows 100, 120 years, so we don't feel like there's any reason to feel like we're limited, but that would be the component that definitely. . .

Scott Batson: The units that are looked at from a reactor vessel internal standpoint metallurgy, cabling, and concrete break down and obviously cabling would be replaced as well, but that would significantly change the scope of the licensing effort, and the aging concrete, according to where it's used, what it's exposed to, there's ongoing studies for that as well.

Rick Lee: From a containment vessel or turban stands, or, where?

Scott Batson: I would say both. One, on the tour today, when you just look at the containment buildings. Those buildings themselves, but then internal to the containments in the primary and secondary shield walls, metallurgy, according to what the loads are. But at this point in time, there's nothing that would preclude pursuing the subject.

Rick Lee: So, there's really very little costs associated compared to the value of the unit, relatively small costs associated with the re-licensing, so the rate-payers are beneficiaries of this as well.

Rounette Nader: Correct.

Scott Batson: I'll not get into specifics, but the payback in terms of the expense associated with going through the re-licensing. For all of these would be less than one fuel cycle?

Rick Lee: Is there a time frame during which you'll make your decisions?

Rounette Nader: More to come. It's hard to say; I don't want to say right now. Is there a time-from when we'll make a decision?

Scott Batson: I would anticipate that we would be in a position to have further communications on that next year.

Rick Lee: Alright. We'll look forward to hearing from you. Any other questions or comments? Hearing none, thank you very much. Good job. Next item, we're going to try to get into a little bit of a MOX update or Savannah River update. There's so many things going on right now, and I have to apologize in advance because I came with a thumb-drive as well, so I've got some handouts to, for the members, let me pass four of these down. A lot of this stuff is newspaper articles and announcements that have come out. I didn't know if everybody had all this stuff or not, but you do now, and we'll try to get these things posted, Gary, on-line.

Gary Anderson: Yes sir.

Rick Lee: So, one of them has a bunch of notes in it . . . I have to get some groceries on the way home and things like that. This is not the one, here we go. Okay, so the first one that I had in the pile there is the announcement from the Secretary of Energy regarding the MOX, of the certification regarding MOX and its cancellation. And, I thought I would just highlight a couple of comments in there. It says that the Department is committed to removing Plutonium from South Carolina which is a big issue for us. It says they're committed to a sustainable future for the Savannah River site; presumably, the other announcements with regards to pit production fall into that vain of long-term commitments. It certifies

that there's an alternative for carrying out the plutonium disposition, and that it's dilute and dispose which we're all familiar with, I believe. And that's, according to him, it's half or less, than the cost of completing the MOX facility and the dispositioning of all of the plutonium. And they have two numbers in there which you might find interesting down there at the bottom. It says that the D&D (Dilute & Dispose) life cycle cost is 20 billion dollars and the cost for MOX life cycle is 50 billion dollars. So, I'm not sure how they came up with the numbers; I told you I had a call last week with NNSA folks; they promised "just as soon as I hang up I'll have the cost analysis in your hands." Did you receive one?

James Little: No, I'm still waiting.

Rick Lee: I'm still waiting as well, so I don't know what these numbers actually represent. But, the 50 billion dollars is quite a sizable number and if you just look what they're saying the cost of MOX to construct is, that's about 17 billion, you wind up with 32 billion dollars and if that's all for operating the plant for 15 years to take care of the plutonium, I don't know how they came up with a number like that. So, I'm looking forward to seeing the paperwork on this to see if it's believable. You know, during this whole process, the openness on the part of the NNSA has been lacking and I hope that whatever happens going forward at Savannah River that they're more open than they have been historically with the people of South Carolina.

So, the next one I have, has to do with the announcement with regards to pits and you'll see in the second paragraph, the NNSA recommends an alternative to re-purpose the MOX facility and produce 50 war reserve plutonium pits while producing 30 at Los Alamos. We kept asking the questions about when this would actually happen, and it would appear that full production wouldn't occur until about 2030 I think. And, forgive me if I'm off on some of these numbers, I do the best I can to juggle all that stuff but there's a huge volume of material on these subjects but that, in my mind, it'd be great to have the long-term mission, there's no question about it, South Carolina would love it but having seen the history of the way administrations change policy in the federal government. There is in my mind some risk because there's three administrations that will be in place between now and 2030, and I can't predict, nor can anybody, either who will be there, nor what their policy will be with regards to Pit production or D&D or any of the issues that we've been wrestling with.

The next item is a little thing that was sent out to the NNSA with regard to process and what their decision was on pits and there's some useful information in it. Then finally, the nuclear weapons council certification having to do with Pit production is your third document and appreciate Ms. Lord's commitment, she said on the last page to working collaboratively with the committee and the NNSA to continue to examine ways to further reduce risks and take advantage of opportunities. I don't know if she'll be around in 2030 when all this stuff is supposed to be going on; there's a lot of people who change positions, but I hope that she's able to do that and to deliver on what she's committed to. The next one is an article from the Weapons Complex; it talks about the NNSA cost report that was leaked and you know how Washington is, but I guess Congressman Simpson and the House Appropriations Committee will have their first opportunity to look at this during the 2019 Budget Markup in consideration for funding for 2019 and so, to complicate matters further, I'm going to give you the next item in which the first cut in the House of Representatives is contained no money for pits and no money for D&D. So, I don't know what's going to happen; it's in the hands of people far wiser than I. So, we've gone from active projects, to certified, to shut-down projects, to commitments for new work to come to Savannah River, to no funding in Congress in the course of the documents which I've handed you, all of which came out in about two weeks. So, I don't know what the betting line is on all of this but it's kind of ugly. The other thing I would to ask the Council and those in this room and with one or two notable

exceptions in the press, one in the room today, it doesn't appear to me that the press spends much time actually looking at the information with regards to these topics. They tend to simply accept it seems what comes out of Washington as the Bible and truth. And, I've had several occasions to contact writers to point out errors in their reports; they've generally been very courteous in receipt of that and have done retractions on the items that were in error. But I can't read everything, and I think it's incumbent upon us if you're looking at some of these trade rags, if we see issues to point these out to the writers; they can't know everything, but some of the errors are of such significance that you wonder what they have been reading, and so I gave you this one here, I'm not going to name the writer of this article because my purpose is not to embarrass anybody, but the purpose is to point out how important it is to read these things and to know enough detail to be able determine whether it's correct or not. If you look on the second page, the third paragraph, and what's in here is "with MOX being discontinued, the National Nuclear Security Administration is proposing installing pits to store plutonium waste." Now, I don't know whether this is a pit for a quart or what kind of hole they're digging in the ground, but this is a colossal error.

James Little: It was an AP article.

Rick Lee: Like I said, I'm not trying to embarrass the writer but this is another example here of having accepted not only the types of misinformation in the article but they've got the old "17-billion-dollar budget to complete MOX" as well and very little has been done to actually look into that budget number by many, many members of the press. It's simply been accepted because the NNSA has said that is how much it will cost.

So, that brings me to the slides that I have here and, again, I can't put my thumb drive in, so we'll do it the old-fashioned way. I'll run through a few of these items. First, I want to make sure, and I'm sure that the two members that were with me for our inspection down at Savannah River at the MOX facility would agree, we're not wed to any method for disposition of plutonium whether it's MOX or whether it's D&D or whether it's some other form of treatment of the plutonium; whatever the ultimate solution is, I just want candor and truthful exchange of information more than anything else so that people can make good, sound, public policy decisions on what should or shouldn't be done. So, my wife was talking to me about all the hours I spend doing this stuff the other day, and I told her I was just the lamb led to the slaughter when they asked me to take this position as chair and in the future, she would be my screener for any requests that came from the Governor with regards to volunteering for something.

So, I keep slides for myself cause there's so much information and it changes, and I try to stay on top of it, so these are some I have for myself, and during our last, during the meeting when Bob Raines was with us, and he provided the information, when he told me that there was no managed determination policy at that project, I reflected on that, and I looked at my minutes from the meeting, I talked to my fellow members who were there, and it was so crystal clear that what he was telling me was not exactly correct, that I felt compelled to investigate some of these other issues and items that he discussed. So, this is my best effort at it, if there are errors in it, I'm open to correction, or update. So, if you go to the first, next page, MOX project cost and schedule, you'll see the page after that, estimate to complete the MOX project. I wanted to hit on a couple of these items, and I've tried to put it into a table so that you can look at the numbers. The DOE estimate is \$17.2 billion, the contractor's \$9.9 billion with a difference of \$7.3 billion. And, if anything, in my life in construction and government service on different types of projects, to have a spread between what the contractor is proposing and what the government is proposing of such enormous size, something is wrong. Something is wrong, and that both parties, the contractor and the government have their own perspectives on what they do or don't want to do going

forward, so somewhere in the middle in there is where you would find the truth. And that's the reason that we advocated in our review of the project that we felt that true re-baselining by a truly independent party looking at the cost of MOX to complete, pipe by pipe, mile by mile, was the most appropriate way to come up with a real number and to provide that to Congress so that they can make solid public policy decisions on what to do, to proceed or not to proceed.

So, there are a number of key items that the NNSA adds to the budget and if you look down through there, escalation from inflation, 4%; that adds 5 billion dollars to the cost of the project. Obsolescence, they added 500 million dollars for obsolescence and I would say that the NNSA told us, Bob Raines told us was that 4% was the number they're using for all projects. That is what we were told. The obsolescence, there's no real guidelines in the GAO (Government Accountability Office) for assessing an obsolescence number. And, you know, this project only has to operate for 15 years after it's built, and the current budget for the operating years contains within it nearly 300 million dollars for capital improvements and addressing obsolescence. That's in the operating budget. Now I'll show you that in just a minute. So, it's a mystery to me why we added 500 million for that. Risk, again they up the risk factor from 85% to 95% which exceeds the GAO standards. Level of effort, these are additional costs caused by the extension of time associated with completing the project, and there's some other miscellaneous items in there.

If you look at the next page, you'll get to see some of the 2012 Corps of Engineers estimate versus the contractor estimate, and the reason I provide this to you is that when you equalize the estimates, they're really not that far apart. I'm not going to dwell on this and read all this material to you. Next page, has a history or estimating, has a history of the estimating on the NNSA side and from the MOX contractor side, and this highlights my question of who really knows what it'll cost, with numbers all over the scope. Both parties have their own positions. Both parties, if I was doing it, I would be providing information supporting my position to the max. So, next page, I highlight that there have been many organizations that have requested a bottoms-up real, re-baselining cost estimate: Senate Armed Services Committee, the law signed by the President, the House of Representatives, the Governor of South Carolina, the South Carolina Delegation. CBI/Areva, the contractor, "please do an estimate, we'll stand by and accept whatever that number turns out to be." But the NNSA would have said, would assert that they have completed a cost re-baselining but it's unfortunate that their perspective on re-baselining doesn't match what these other organizations because the other organizations in general would not say that that is what has occurred.

Next page, the NNSA mandated a 4% inflation rate to be used on this project, and it affects the cost and schedule for the work. Bob Raines, when he testified in front of us, promised that he would provide to us all of the inflation information that they had so that we could have a look at it; it never came. So, I saw him up at the Forestall Building and I said, "Bob, where's the information? I'd like to have a look at it." "Oh, send me an email." So, I sent him an email and I'm looking, I don't have it still. So, in order for me to understand the 4%, I had to do my own research. So, on the next page you'll see it has, remember the 4% is the number that they're using for every project, except it looks like, at UPF (Uranium Processing Facility) which is a project that's quite large, it's up at Oak Ridge, that they're using 2.1% as part of that to calculate inflation and how it affects the cost of the project for UPF. Now UPF has, I think 2025 it's scheduled for completion and it has a budget to complete which is probably not too dissimilar from finishing MOX. So, I don't understand why if 2.1% is the number they're using up there, why wouldn't that be appropriate for MOX? If you were to take the, just one or two more slides and I'll show you exactly how this plays out and how it affects the overall cost projections. If you were to take

UPF and restrict its annual funding and use a 4% inflation rate, instead of finishing in 2025, it could well finish in 2038. By the change of those two numbers.

So, on the next slide, this one, you'll see that the 4% inflation rate that they're using, in addition to adding nearly 5 billion dollars, extends the project by 13 and a half years. Just that one number. The confidence rate extends it by 2 years, the obsolescence by a year and a half, the level of effort extension is two years, so the NNSA in its estimate said that we're going to cap the annual contribution by Congress to 350 million dollars a year. That's how you come up with these numbers, 350 million dollars a year, every year, you have two years, it can cover 700 million dollars in these additional costs. So, I have some discussion about each of these items in here, for example, obsolescence. The government is insisting, the NNSA is insisting that they should put 500 million dollars in obsolescence into the project's cost estimate, and that's because it's extended 31 years, they say we're going to add 31 years to the life of the construction effort, the belief being that there would be such a dramatic impact on equipment and electronics that, well, we need to add 500 million dollars to cover that sort of replacement or cost. But, one of the things we did today on the tour was I was asking questions about analog and digital replacement on nuclear power plants, and it's very common for systems to last 20-25 years and the type of equipment that might reflect obsolescence on this project won't be purchased for some time. So, I don't understand some of these items and how they can be supported and justified; I've never been able to get anybody to explain it to me from the NNSA so I'd be happy to hear it, but the 4% inflation rate was what Bob said was "what counted for the project, that was the correct number," so I did some research into the labor agreements that are for craft employees down there, and the next slide provides to you the 10-20-year labor inflation rate on MOX, and that is for each of the different crafts that are used at the project.

So, beginning in 1997 for the journeymen and 2007 for many of the other craft, and these are the actual changes, cumulative changes, for each of those craft categories. So, on the next slide you'll see that the labor loaded it by craft category at the site to see, you know you may have a rate that's up for laborers and maybe it's not so high for pipe-fitters but if you average all that out based on the numbers of people working at the site, you're looking at a 2% inflation rate for labor over this time period that I've just described to you. So, I don't understand where the 4% comes from. What Bob Raines and his model say is that every year for the next 31 years, the inflation rate in the United States is 4%. So, I have my doubts, that's what they're telling us. You look at the next slide, you'll see the Consumer Price Index over the last 28 years and the Consumer Price Index Inflation Rate has been 2.47%. Again, I'm still looking for the 4. If labor is only moving up at the site at 2%, it means that the materials, when you do a little rough scale of estimating, it means that the materials have got to move up at almost 9% every year for 31 years to hit the number that the DOE is insisting is correct. So, the combination, and go to the next slide right here, the combination of these two things, this is a slide provided by the NNSA in one of their reports, you'll see that the revenue for the project is capped at about 350 Million dollars a year. And you begin to see the effect of the 4% on that money because that large huge blue section is the value that disappears because of inflation. So, as the project moves along, every year, there's less and less money to do work or to pay wages which extends the project out for 31 years. And, in so doing, it causes the obsolescence money to be added and causes an additional overhead cost to be added. All of the additional costing for the project is based on the fact that, their belief that Congress will not fund the project properly and keep it at 350 million dollars a year and that the project will incur a 4% inflation rate for 31 years. If this was my first rodeo, I might believe that, but I'm challenged, honestly, to accept that as the real number. So, the best way to get the project done, to get the budget back down towards where the contractor has estimated, is to fund it properly every year and use a realistic inflation rate, and many, many of these costs disappear.

The next slide I have just gives you an indication on the top graph where you can see where the delta is between a 2% and a 4% rate. The contractor was instructed to use 2.3%; the second graph is one, which I think is a pretty legitimate issue for the NNSA to be honest, having to do with the amount of work that is being done per dollar that's being spent. So, if you're spending a lot of your time completing work packages, that's not work that actually pours concrete or does pipe placement.

James Little: Productive work.

Rick Lee: Productive work. And I think that there's probably a legitimate argument that could be made on that issue but, you know, we can't tell without a real baseline. So, the one other slide is actual operating costs for the plant, so I got this information from France and you notice the bottom brown box on the bottom right corner, 191 million and change, those are Euros, and I converted it over so that we have 237 million dollars a year is what they're spending to operate their plant with about 1000 people, and actually it's less efficient than what MOX would be in that it's separated into two completely separate facilities. The box at the top, you'll see that the MOX services in 2008 did an estimate of what the cost would be here in the states, and they had 294 million dollars. The NNSA did their own independent estimate and study of it and they came up with \$365 million. So, in DOE space, those are pretty close and they're probably not unreasonable because the regulatory environment here is more severe perhaps than it is in France. But now, when I'm hearing some numbers associated with the final life cycle cost estimate for the MOX project of 50 million dollars, I'm really going to be interested to see how that number was created and where those costs lie because this is what the annual cost projection was for the facility.

Next page, just some WIPP (Waste Isolation Pilot Plant) obstacles; you know, the plan is to move the plutonium through a dilute and dispose process out to WIPP and I just listed a few bullets here so that you can be familiar with some of the topics that would have to be addressed. One interesting one, and I won't talk about all of these, but one interesting one is that the DOE is going to try to change the method by which they measure the volume of material that's deposited at WIPP. If you have a barrel and inside you have a container with some plutonium. . .

James Little: It's the waste volume versus the volume of container and the waste.

Rick Lee: Yes. That's an interesting approach; the problem is you're still going to find the volume for the barrel, and according to what the GAO said, WIPP is fully sold out, it's committed. And so, there's going to have to be some kind of expansion of some type and the costs associated with that, the Land Withdrawal Act changes that would be required in the engineering of all those things, I'm looking forward to hearing all those answers that the NNSA has on those questions as well.

The next chart is just for giggles, I thought you'd like to see where New Mexico will rank as the stockpiles of plutonium in the world; they would be 3rd in the world once the tonnage that's being MOXable plutonium is carried out to their site. Finally, there's some comments here from Bill Richardson, who doesn't think a whole lot of the WIPP option with regard to the disposition of products that are supposed to be MOXED, he said "WIPP's environmental impact statement is based upon its radioactive inventory; even after 1000 years, the added MOX plutonium would still cause WIPP to exceed its EIS (Environmental Impact Statement) curie basis by 430%." That doesn't have any regulatory value; I just thought you might like to see what the guy who was the head of the Department of Energy, and the former governor of New Mexico, had to say about the plan.

And then, last but not least is the chart that I provided to you, the manage to termination issue. I looked at some of the CPARS (Contractor Performance Assessment Reporting System) ratings that were given to the contractor, and please, don't misunderstand, the contractor is not without their warts; it's hard to have a project like that without them, but the MOX CPARS ratings, changed over the course of time and in '09 exceeds, exceeds, exceeds through 2011, and then they began to decline. The NNSA initial rating on CPARS which is the second chart, first line, you can see when the policy change occurred regarding terminating MOX that the ratings for the contractor have gone down pretty much steadily ever since. Same people, same project, same materials, just a different philosophy perhaps on scoring. So, I give you this information; I hope you'll find it interesting and have an opportunity to look at it. If there's any comments or questions, I would be glad to address them.

Dr. Carolyn Hudson: Thank you, that was really informative.

Rick Lee: Well, the model that's being used for the cost to complete is really, is a very effective model what I think was the goal, but it's difficult to get into the nuts of bolts of it to really understand it and spend a lot of time with it. But once you capped the annual revenue, and you accept the 4%, you guarantee that the project's long-term schedule will move way out.

Dr. Van Brunt: We're supposed to provide some advice to the Governor; supposed to come up with, I mean, as we digest this, along with everything else, is the Governor looking for something in the near future from us?

Rick Lee: I don't think so. I think that things have moved well along; he has been working very, let me just tell you, I know personally, that he has been working very diligently to try to get a good decision on the subject down at Savannah River; there's a meeting today that Tom (Young) is in; there's a meeting I think this afternoon. He's been, as I understand it, in contact with the President, he's been meeting with the Under-Defense Secretary, he's been meeting with many, many people advocating for a decision on MOX that is favorable to good business practices in South Carolina. I can't elaborate a whole lot more because I don't really know much more but it's occupied a great deal of his time, and he's got staff members working on it.

Dr. Danjaji: What if the costs, the \$49 or \$50 billion we're talking about, don't add up? What do we do?

Rick Lee: Well, we've got to see it first to know. I mean, if they make the case, if it's a legitimate case that's in the numbers, that's the numbers. But I want to see how it's built up. I mean, if they've assessed a high inflation rate, if they have continued the same process here that we saw on the cost to complete the construction, then I might argue with them about whether or not it's a fair way to assess it. But, I want to make sure, and I think all South Carolinians do, that the D&D and the MOX project are all assessed in the same manner and that all the legitimate costs are compared. You know, one of the questions I asked is, "Where does the 5 billion dollars in capital costs associate with the construction of the MOX to date, where does that go if you terminate MOX?" "Is that a cost that should be incurred for D&D? Is that a cost that should be added to...?"

James Little: Is it part of the plutonium disposition program itself and you're adding it to that?

Rick Lee: Yeah, I don't know, so I want to see the numbers. Once we see that stuff, then we can do . . .

James Little: I guess the impression you're left with, you don't have a lot of detail or an apples-to-apples comparison, that you begin to suspect this kind of rush to judgment; it was like, oh, we're going to go dilute & dispose and the Administrator, we were told this, that she hadn't made up her mind, she had visited MOX March 9, made this decision and the waiver was signed just recently, but she hadn't made up her mind. And, being told that, also recognizing that in her written testimony for her confirmation hearing, she said then she preferred dilute and dispose. So, you're being told one thing and you know it's not true, so and then it's apples-to-apples comparison quite frankly, looking like the numbers are rigged but let's say we go to dilute and dispose, where's the rigor and discipline going to be applied to that program if they're claiming this didn't happen rigorously? So, are you going to apply 4% to the D&D process? You know, you don't have land withdrawal act at WIPP yet. There's all these unidentified risks. The HEPA kinds of considerations. Wait a minute, you're saying it's half the cost of MOX, but you don't have an estimate to compare it. It doesn't have the same level of detail. This has been working for 12 years, there's a little bit more definitive numbers on MOX than there is on D&D. That's the situation I think you're in. Is this ever going to really happen? And, oh, here's pits, we're going to bring pits to Savannah River.

Rick Lee: I mean, if you look at the presentation that was made by Mr. Johnson today, with the level of detail and disclosure of information that we had here today, if we could get the same kind of disclosures, same kind of discussion, amicable, open communication with the NNSA, maybe all of the questions would be answered, I can't say one way or the other. But, I hope beyond hope that whatever's going to happen with D&D, and whatever's going to happen with pits, that there's full disclosure and that everybody who has a vested interest in it has an opportunity to know the numbers, and they may not agree with the outcome but at least you feel like you had full disclosure, full information. That's as incendiary as I'm going to be.

James Little: Skeptical.

Rick Lee: Any other comments or questions? Hearing none, Tom? We missed you at the last meeting.

Tom Clements: I'm Tom Clements with Savannah River Site Watch and have been coming regularly to the last phase of these for the past ten years. And I came earlier when I was living in Atlanta and South Carolina. I've got prepared comments I want to submit for the record, and I did come primarily to hear your comments about the MOX situation. First, I am writing a blog for the International Panel on Fissile Materials which is just kind of an overview of what's happening. It's got links in it to the National Defense Authorization Act to the Energy and Water language about what is being required; it's got a link, and I didn't quite understand, the cost study on Dilute and Dispose is out there. This is linked on Savannah River Site Watch; this is the unredacted copy so I'm not going to give it to you, but the redacted copy is out there. There is supposed to be a report, a validated cost of the MOX project, I am not aware if that is out there or not. What I see happening right now with, once the waiver was submitted on May 10th is that that kicked off the 30-day period after which construction funding could be halted. I've been no fan of the MOX project, as the members know. That waiver was only issued because both the Appropriations Committees, Armed Services committees, the Office of Management and Budget, and DOE itself had agreed with this method of approach. The Appropriations Committees were not on the same page until the Omnibus Spending bill was passed on March 21st of this year. That put everybody together. I met with OMB about how the Trump Administration came to support termination of MOX. I think the problem is laden with problems you didn't even get into Mr. Lee about construction, and re-work. I communicate with workers on an every-other-day basis about what's going on out there, and what I understand right now is they are not installing components anymore.

They're cleaning duct work and pipes and hangers. One worker commented to me this morning he really couldn't see much difference between that and the work that had gone on previously. I think the project has been grossly mismanaged; that needs to be discussed. I think there are re-work problems that they don't even know the extent of them, and there are certain contractors that held responsibility for that. There's no investigation as far as I know into the extent of the re-work and that needs to be done, at least when the project is being put to bed. So, I'm not happy with the way this has gone at all; I think it's another black mark on the nuclear industry, particularly with the loss of the VC Summer project. I have been advocating that the workers, whatever happens, do not be treated as shabbily as the VC Summer workers who were basically given a half an hour to get off the site, and they were ushered to the exit. I do not think that's what's going to happen because if you read the dilute and dispose cost report, they are going to take, and I do not understand this, until 2023 to close the project down. The budget request from February of this year says 2021. The cost report in it has 1 billion dollars that's going to be spent on termination. I have no idea what that money is going to go to beyond cataloguing all the equipment and components and storing them or disposing of them, finishing the roof on the MOX plant, and closing the temporary construction openings which appear to me, in the photographs I've seen, to still be open. So, I think the workers are going to have, and they know what's going on, obviously; they're going to be given adequate warning about it before their jobs are terminated. So, I'm going to leave it at that on the MOX issue, and I'll give you this written comment, and I would add, I was at the first National Academy of Sciences presentation on the options of plutonium disposition. 1995-- It was a huge mistake not to pursue the immobilization option where the plutonium would have been immobilized in high level waste; DOE terminated that in 2002. Big mistake. And it was the MOX backers that I think that got that decision to be made. I've got a comment in here at the end of it and I think the, I think I as a member of the public, had a responsibility to ask hard questions about the MOX project all along the way. I've done that, and I try to base everything on facts that I have access to. I do not think that the Nuclear Advisory Council has asked the hard questions about the MOX project, particularly as it started to fall apart. I appreciate what you just presented now; I'm not sure what the use of that might be, except to record some information that's helpful. This Council did not push NNSA, DOE when we knew there were big problems with the project. And I must say the same thing happened with VC Summer. I expect more of you guys, I really do. I think you've accepted what the contractors have told you, and just left it at that. I attended many, many meetings where the MOX issue and VC Summer came up with Mr. Byrnes, who is no longer with SCE&G. I think you need to raise the bar on the standards you're applying to questioning and you really applied some of that to NNSA. I hardly get anything from NNSA; they operate in a black box, but I didn't get less from the contractors. I think it may be in their contract not to communicate. It's unfortunate what has happened with this and I think that it's an example of what secrecy can cause and, you know, there's no web site I can go to, to find information about this project. There's a heck of a lot more on SRSwatch.org, including a link to the report than NNSA provides. I could not find this anywhere; I mean, it's absolutely stunning, so I want you to push on all of these projects and ask hard questions. I'm going to leave it at that; I'll give you my handout. Yeah, go find a report on www.SRSWatch.org on the right side. And ask for the validated cost report on the MOX project, but in my opinion, it's happening. The 30-day period is going to be up on June 10th. The contractor, according to the report, the contractor, just in closing has 90 days to come up with a termination plan, then it will take some time to implement the termination plan, and I'm kind of guessing that it's going to be the end of the fiscal year, they're going to spend the money. What it takes to shut down the building, if it's that billion dollars to prepare it for pits or whatever, I don't know. I appreciate, you mentioned, that the energy and water markup, they did not accept that we're going to build a new pit plant at this point. There's 15,000 pits stored out in Pantex; DOE has not documented that they need a new pit plant. It may be a ploy to try to say, we're going to bring some other jobs while we terminate MOX; I think you're right to be skeptical if the

pit plant is going to come to Savannah River plant, or if they're going to build a new capacity at Los Alamos. But, harder questions need to be asked by this body early on, and I think you didn't quite do that well enough. I'll leave it at that. Thank you. Thanks very much for allowing me.

Rick Lee: Thank you Tom. I would say, I think that the requirement for the pits is coming from Strat-Com, isn't it? I think that's what I heard.

Tom Clements: They have produced some documentation, but it's for the inter-operable warhead that has been claimed the Navy needs; the Navy has said it doesn't even need the warhead. Those are the new pits, not for pits to go into old weapons, so I don't think that the need question has been answered. That's why the Energy and Water is very skeptical about the need for the project; maybe it's going to, you know, as the process unfolds on Capitol Hill, there'll be more justification, and I think the language, I read the language, but I think they're going to be asking for that. I haven't seen documents from the Pentagon about the nuclear posture review; I think it implies there's some need, but as far as what Congress is going to be funding, they're very skeptical.

Rick Lee: I appreciate your input. Is there anybody else for public comment? We'd be glad to hear from you. Hearing none, Dr. Danjaji, where are we going to meet next time?

Dr. Danjaji: South Carolina State University

Rick Lee: I think that's a great idea. SC State University. You know, that's the only school in South Carolina that has a Nuclear Engineering program. I've never been there, and I think we do what we do; it would probably be appropriate to honor them as well, to go visit them. So, he's going to set up a program for us. We're talking about late September, early October; we'll have to make sure those students are back, and that they've had time to actually open the books. So, we'll work on an agenda; if any of you have a special desire. If you'd like to interview a couple of the students, or talk to them about job opportunities, or anything along those lines, let me know, will you, so we can be sure to get it on the agenda. Delisa, anything? Thank you all for coming. We'll call this meeting to a close.

End of meeting 2:43:29.