

NUCLEAR ADVISORY COUNCIL MEETING

Gressette Building, Room #209

July, 2015

1:00 pm - 4:00 pm

Call to Order – Approval of Minutes Karen Patterson, Chair

Attendees: Steve Byrne, Claude Cross, James Little, Karen Patterson, Vincent Van Brunt, Carolyn Hudson
The minutes were approved as distributed.

Ms. Patterson noted that the Governor’s Nuclear Advisory Council (GNAC) is now the Nuclear Advisory Council (NAC) and part of the newly created Department of Administration (Administration). Ashlie Lancaster who was Director of the South Carolina Energy Office and is now with Administration will staff the NAC. Ms. Patterson then asked Ashlie to explain about the transition and the new NAC website.

Ashlie explained that the Restructuring Act of 2014 had dissolved the State Budget and Control Board, with some offices going to the Department of Administration, including the Nuclear Advisory Council. The new website can be located at www.admin.sc.gov and there is a link to the NAC. All historical meeting materials have been or are being transferred to the new website with the exception of audio files. Ashlie also provided that her email address is Ashlie.Lancaster@admin.sc.gov for any questions or concerns.

Update of NAC activities

Ms. Patterson noted that she and Captain Cross toured MOX last month and that she recently sat on a Nuclear Energy Panel for the South Carolina Chamber of Commerce’s Energy and the Environment Forum. She also did an Op Ed in *The State* newspaper entitled “Patterson: SRS ready to eliminate Cold War waste, if Congress will fund it,” attended a reception for DOE Secretary Moniz, and noted that there will be a national nuclear plant exercise for first responders during emergencies within the next two weeks entitled “Southern Exposure” that will be held at Robinson. She hopes to have a presentation on the results of this exercise at the January meeting.

Duke Energy Update Steve Nesbit, Director, Nuclear Policy and Support, Duke Energy
(slides available here <http://admin.sc.gov/node/1543>)

Questions from Council:

Mr. Byrne: You discussed challenges with equipment reliability. What about outage execution? Can you give a little detail on the challenges there?

Mr. Nesbit: With outages, you need to plan to work and work to plan. When you don’t execute and meet your schedules, that causes cost to go up as well. The issues typically are either that your plan didn’t work because it wasn’t adequate or something came up that you didn’t anticipate. We have a plan to deal with outages. The challenge is generally when emergent work comes up that you didn’t foresee, discovering items when you are doing maintenance, inspections, things of that nature. Over

the time period, though, you should be able to demonstrate good performance in that regard. So, we are continually challenged and will hopefully improve.

Mr. Byrne: Any issues with the workforce and filling positions?

Mr. Nesbit: We have ongoing issues in that area. I would say that we have not reached a point anywhere in our system where we have experienced a crisis. As most are aware, the nuclear industry has an aging workforce, how to cope with that and bring in experienced people and deal with retirements. We have had a program in place for well over a decade to hire in new folks and get them trained up and experienced and things of that nature so right now I'd say we're coping pretty well. The biggest challenge we've seen is not so much in having engineers but people who can work out in the plant, turning valves and maintaining equipment, things of that nature – the craft workers. As of today though and looking into the future, we think we can deal with this challenge.

Mr. Byrne: Steve, on this Southern Exposure exercise, do you know if Robinson intends to utilize their post-Fukushima flex equipment and whether or not the regional response center will be involved?

Mr. Nesbit: No, I don't. I don't know what the scenario is and that's a closely held secret. But I don't know if that's fair game yet or not – that's a good question.

Mr. Little: Any changes in lost time with injuries over this past year?

Mr. Nesbit: I don't have the safety stats right at my fingertips. I think overall we improved in 2014 over 2013 but I don't remember exactly.

Ms. Patterson: Just out of curiosity, who owns Catawba?

Mr. Nesbitt: The coops and municipal power agencies like PMPA, and NCMPA, and us.

Ms. Patterson: I forgot the newspaper article but can you shed some light on the Robinson reservoir? There's contamination from ash but is there also radioactive material?

Mr. Nesbit: A little bit. There was an article in *The State*. It's something that was done through permits in South Carolina years ago, way back when. We are monitoring the ponds and have seen no signs of the contamination moving around. That's really about the extent of my knowledge.

Ms. Patterson: I guess my question was, it inadvertently got in the pond right? The pond was not considered a disposal facility?

Mr. Nesbit: I think that at the time on-site disposal of low-level radioactive material was not uncommon.

SCDHEC Shelly Wilson, Permitting and Federal Facilities Liaison, SC Department of Health & Environmental Control
(slides available here <http://admin.sc.gov/node/1543>)

Questions from Council:

Mr. Byrne: You talked about the active site in Washington. Does DHEC have any interaction with Washington State about practices that are working there that could be incorporated here?

Ms. Wilson: Yes we talk regularly with the state of Washington as well as all the other states that have DOE sites. We are also part of a federal task force organized by the National Governors' Association. We meet a couple of times a year and talk regularly and a lot of what we talk about is what are our lessons learned. So, we are definitely hearing from Washington and Idaho and other states having similar issues with DOE. But there are some key differences between our site and theirs. We are treating waste and they are still getting treatment online. We're actually closing tanks at SRS and they have yet to close any.

Ms. Patterson: I don't usually inject my personal opinion but I have a bee in my bonnet. And I think because y'all know that I write a lot and words are important, I think that, sometimes when we say environmental management, people who are not associated with the site have a different idea of what that means and I think that if we came up with a more forceful description of what we have left to do with the site which is cleaning up the cold war legacy waste or managing the legacy waste, we might get further in our funding process. I'm going to start saying that more often, and I hope people in this room would think about a better way to describe this to the public so they would understand why this is important not just to us but to them.

Radioactive Liquid Waste Update Jack Craig, Manager, DOE-SR

Mr. Craig noted that DWPF operations were suspended on April 6, 2015, to support a month long planned outage for implementing purge system modifications. DWPF remains down due to emergent issues with the existing flammability analysis which did not include higher than previously analyzed generation of flammable gases in the Chemical Processing Cell vessels. Safety analysis and calculations are under way to resolve the issue, and operations are expected to resume in mid-September 2015.

Year to date canister production shows 90 canisters poured and tested (3,967 total). FY15 goal is 156. This target will not be met but do expect to pour 10-15 canisters in September.

With regard to mercury, a higher than expected level of mercury has been detected in the tank waste salt streams at SRS. No mercury exposure to workers has occurred and additional worker protections are currently in place.

The liquid waste in the waste tanks at SRS contains mercury stemming from historical canyon operations. SRR closely monitors for mercury levels as part of liquid waste treatment and disposal operations to ensure the safety and health of workers, the public and the environment. Earlier this year, higher than expected levels of mercury were detected in the tank waste salt streams. While no disposal permit limits have been exceeded, mercury levels were higher than internal safety controls allow, resulting in SRR initiating a system-wide evaluation of mercury in February. Samples taken, analyzed by the Savannah River National Laboratory and an independent chemical laboratory, showed unexpected trace levels of an organic mercury compound, monomethyl mercury.

Based on the system-wide evaluation, SRR discovered that mercury is recycling back to the tank farm because mercury recovery in DWPF is not working efficiently. SRR is currently developing a long-term action plan to address overall mercury management and removal (scheduled for end of October).

Monomethyl mercury is a potential worker hazard if it comes in contact with the skin. While standard personnel protection clothing worn in radiological areas provides an adequate level of protection, workers were required to wear nitrile gloves for added protection while the evaluation and analysis were conducted. Use of nitrile gloves is no longer required. Based on work practices and results from prior medical testing of SRR employees, there is no indication of mercury exposure. However, voluntary medical testing was offered to workers.

With regard to Federal Facility Agreement Dispute Resolution, on April 27, 2015, representatives from SCDHEC, EPA Region IV, and DOE-SR reached a resolution pertaining to the closure date for Tank 12 by May 31, 2016. This is an 8 month extension to the previous closure date (9/30/15) in recognition of the technical challenges that occurred during the waste removal and cleaning of Tank 12. DOE also agreed to complete field activities in preparation of grouting Tank 12 by September 30, 2015. Furthermore, DOE agreed to pursue commercial sources for treatment of salt waste in an effort to accelerate and expedite tank closure through the issuance of a request for expressions of interest no later than July 31, 2015 which DOE accomplished on June 1, 2015. DOE is to report progress pertaining to the potential commercial treatment on October 15, 2015.

Tank closures are also continuing. Grouting of Tank 16 began on June 2, 2015. Closure of this tank is on schedule to complete in late August and will mark another historical accomplishment as Tank 16 will be the first tank in H Tank Farm to be closed, the first of eight tanks in contact with the water table, and is the only tank at SRS to have historically leaked past the primary and secondary containments to the environment. Progress continues to complete closure of Tank 12. The first of two public comment periods ended on June 24 with no major concerns being identified. Actual residual source term in Tank 12 from sample analysis is being completed to finalize the risk associated with closure to support a second public comment period in the October-November timeframe. Grouting of this tank is expected to start early next year.

The construction of the disposal cell for SDU6 is complete with the exception of the final pre-stressing and shotcrete application. This should be completed by the end of September. The balance of plant (infrastructure needed to connect and operate with the Saltstone Disposal Facility) work scope is proceeding with the fabrication of electrical instrumentation skid, pipe supports and thermocouples. Water tightness testing should begin this October. Project is 55% complete on schedule to finish May 2017.

Questions from Council:

Dr. Van Brunt: I'm curious about the mercury contamination. Any possible second phase issues with large tank accumulation?

Mr. Craig: For clarity we have not had mercury contamination issues in SDU. And the other part is that mercury has been known to be in the system for a long time. It's part of the process of separation of spent fuel over in the canyon. We've known that mercury in total is in there. In 2014 we did some really extensive testing and kind of a search for the mercury in DWPF – where is it and where is it holding up. We did not find what we expected. What we have found is mercury in a slightly different

form than elemental. We first identified that in feed tank 50. We took the appropriate action. We stopped work and started looking throughout the whole liquid waste system to see where it may be generated and where it may be converted from its elemental form into these organics. That series of tests and sampling are still going on. We have now since cleared for example the saltstone activity to begin processing that decontaminated salt solution back through the processing facility.

Dr. Van Brunt: The original piloting in DWPF had a separate mercury phase. Has any of that technology been looked at recently?

Mr. Craig: If you are referring to the system we actually had installed in DWPF, we found, and this was about 10-15 years ago, that it wasn't functioning as efficiently as anticipated so that system was shut down. So the studies going on now are looking at how we go back into those points whether it be the evaporator or wherever else it may be to identify better ways to extract that mercury from the system. So we will be looking at all those options that have been out there before and at various points in the system where we could apply them or is there some other technology we should bring in. So what's happening is it's staying in the system so as we do experience success in reducing the amount of sludge we have in tanks there's some really concentrated mercury kind of floating around the system and we need to pull that out. I think there was an estimate made that we need to extract over the lifetime of the liquid waste program about 55 gallons annually to keep up with the program.

Dr. Van Brunt: Any condensation in the evaporators?

Mr. Craig: We do get mercury extracted through the evaporator process, and that was where back in January we identified more mercury coming out of the evaporator process than we had originally expected. When we identified that, DOE actually wrote a letter to SRS and asked for a more holistic review than just DWPF to see where it's gathering, where it may be converting and the like.

Ms. Patterson: So you don't actually pull it out of the DWPF, you recycle it back into the system?

Mr. Craig: Correct.

Ms. Patterson: So we have now overwhelmed the capacity?

Mr. Craig: It is more than we expected and that's exactly what these studies are about.

Ms. Patterson: Can you tell us what options you're looking at?

Mr. Craig: We are still working with experts to determine which options to examine which is why we've had most of our systems down. Now we're just trying to work back through the system to see what's the best approach.

Ms. Patterson: Are you thinking of adding a mechanical or chemical process?

Mr. Craig: Honestly, I simply don't know yet.

Dr. Van Brunt: How much discharge has there been going out of the evaporators? Do you know?

Mr. Craig: About a liter every six weeks. And at the one incident in January about 4-6 liters at one time.

Dr. Van Brunt: Do you have sufficient large tanks?

Mr. Craig: There will be a tank to collect the grouting material that's on-site. We have three smaller tanks. This is preparation for starting up the salt waste processing facility. We'll have a larger output of the material to go into grout and this is part of the overall plan for disposal.

Mr. Byrne: Can you talk a little about hiring. Are there advantages or challenges to hiring for this facility as a closure site?

Mr. Craig: I wouldn't characterize it as a closure site but I think it has the same challenges that those sites have. The location of this facility may be a little more attractive but, across the Department in the nuclear work, we have the same challenges. We have the same issues the commercial industry has with retirements and a lack of drivers for new people coming into the industry. We don't have a huge pipeline to choose from but we are looking at all recruiting options.

Ms. Patterson: You talked a little bit about the FY16 budget. Can you speak to tie-in work for SWPF and DWPF and if there is enough money to keep SWPF on schedule?

Mr. Craig: There are multiple activities that have to be done after construction to tie into the liquid waste system but there are budget challenges here. What's funded for the SWPF is the actual construction. In FY16 there was about \$60M added to the SWPF budget. The challenge is that if construction gets done early, we may not be ready to accept tie-in due to budget constraints.

Ms. Patterson: So how do we, the public, get the appropriators to understand that this is one system and to realize we can't fund one part without the other? How do we do that? I'm willing to do whatever we need to do to make that point clear.

Mr. Craig: I don't know if I have a silver bullet for you. There is still a lot of uncertainty in the FY16 budget process right now. Congress can't even say when they are going to get together to meet to discuss the budget. We have some issues we've been trying to work through as far as reallocating some money in FY15 and were hopeful to work it out in conference committee but still don't even know when they are going to meet. Typically it would be before the end of the fiscal year. So again a lot of uncertainty so I would just tell you to work with your local delegation.

Plutonium Disposition Alternatives Pete Hanlon, Assistant Deputy Administrator, Office of Material Management and Minimization
(slides available here <http://admin.sc.gov/node/1543>)

Questions from Council:

Mr. Byrne: You have a lot of parties involved with Aerospace and the Red Team. What kinds of methodologies are being used to evaluate risks? Aerospace methodologies, expert opinions, Red Team reviews, or is there some kind of analysis methodology to do this?

Mr. Hanlon: The Aerospace methodology that was used is basically as I said. They analyze the risk, put a time frame with each risk, looked at the impact and assigned three levels of costs which is a Monte Carlo analysis. They then conducted individual draws on each risk to get probabilities. They did ten thousand

runs of that. And Aerospace also ran it through their own analysis tool that they've used in their analysis of NASA projects.

Mr. Byrne: The reason I ask is we've done a lot of these in capital projects for companies. Most of the risks seem to be technological and unclear about whether the MOX process will work. Typically in these kinds of things, I mean MOX fuel is not a new technology, it's interesting the uncertainty is about fuel and fuel production rates as opposed to the ability to get the project done on time or maintain schedule. Even if you look at the new build reactor programs, the struggles are construction, regulatory. But here the risks are not construction or budgets but implementation which implies uncertainty about production operability. The focus is on operations and production rates as opposed to the upfront capital costs which quite frankly are the moose on the table here.

Ms. Hanlon: These are the types of issues the Red Team needs to address. Our MOX facility has much more technical challenges than the one operating in France. Aerospace looked at the British attempt to start a MOX facility and they were not successful.

Mr. Byrne: That gets back to my comment here. I know I'm being a little critical but I think we have to be. With respect to the British MOX facility, it was not so much the facility as the organization that was charged at the time with getting it online – a real chart breaker in management and execution as I remember. So I'm still just really curious as to why we haven't done a thorough analysis on up-front risks?

Mr. Hanlon: I believe Aerospace has done that and further analysis is planned.

Mr. Little: How does the downblend option with MOX work? If you use downblending, what happens to the MOX?

Mr. Hanlon: The recommendation was to close it out and seal it up.

Ms. Patterson: It appears about a third of the costs are for construction, a third for operations and a third for supporting elements. How much of those supporting elements would be needed to support the downblending option?

Mr. Hanlon: Primary plutonium disposition and paying for NRC licensing, utilities, etc.

Ms. Patterson: NRC licensing – isn't that the responsibility of the utilities?

Mr. Hanlon: No, this is our responsibility. We pay for the licensing of the fuel and we pay for the licensing and modification of the utilities. This is a large cost that people don't focus on.

Ms. Patterson: We have to get rid of this stuff and need to figure out the least expensive, most efficient way, but the Aerospace report says the downblend process is immature in design and costs of equipment and infrastructure so I'm a little concerned that comparing the cost of MOX, which is pretty well understood, to a program that is immature in design and costs of equipment and infrastructure does not provide a good sense of what downblending will cost and that we are not comparing apples to apples.

Mr. Hanlon: Need to look at the scale of impact when you reference in between.

Ms. Patterson: The Aerospace report says alternate storage may be available if no repository. What does this mean?

Mr. Hanlon: Since we have not met our MOX production objective, we have not brought any more plutonium into South Carolina nor can we. We would only treat what is in K area now; it would just be more secure. This is an independent study and they wrote as they believed.

Ms. Patterson: This is kind of tangential but isn't there a law that says the MOX has to start leaving South Carolina by next year? Has DOE considered what they are going to do about that yet?

Mr. Hanlon: That's what these option analyses are trying to do.

Ms. Patterson: But we're not going to make that deadline I'm pretty sure. And the other thing I'm concerned about is EM's FY16 budget is barely capable of doing safe storage. If we continue like that, that also is not going to sit well with the state. If the plutonium is going to stay here until a solution is found, the least we can do is spend the money to manage it. Congress needs to spend the money to process so we will be ready when you do have a solution. I know you're not EM, but I think this is important.

Mr. Hanlon: I am aware of this issue and we are all working to trying to resolve it.

Ms. Patterson: I think DOE is very optimistic about when WPP's going to reopen. We still don't have a repository and whatever form the plutonium ends up in, we have to find a place for it. It will only become more and more difficult to deal with South Carolina if DOE doesn't get the plutonium out of here. WIPP repository is very important and the timeline appears to be longer than DOE is projecting.

Mr. Hanlon: I really can't speak much to the WIPP plan but we are looking to start repository operations by 2016 with full operation by 2018. This repository is important to the entire DOE complex.

Mr. Little: I recall a study done that indicated that once you looked at a plant that is actually processing, most of the cost is caught up in concrete. How much MOX concrete is yet to be poured?

Mr. Hanlon: In this instance, operations are costing more at approximately \$13 billion. \$5 billion has already been sunk into the plant and it is an estimated altogether \$12 billion to complete, then \$13 billion in operations and \$8 billion in other costs. So over \$25 billion left versus \$9 billion in life cycle costs for downblending. Additionally, all of the delays have added costs - \$1 billion/year to do MOX approval and we are just not getting the funding.

Mr. Byrne: So in essence you are saying downblending is simpler? And given uncertainties about production rates and use of this fuel, downblending is simpler.

Mr. Hanlon: Yes. And we just aren't getting the funding for MOX so that's why we are doing these studies – to see if there is a better approach.

Dr. Van Brunt: Was downblending considered back when all of this began?

Mr. Hanlon: Yes. Through an evolution of studies in the 90's, it was dismissed because it did not change the isotopics of the material or take us from weapons to non-weapons grade, nor did it have a radiological barrier of protection. Today, threats have changed and the focus is on a chemical to separate out plutonium and prevent terrorist usage. There has been a change in paradigm to non-state actors in terrorism.

Ms. Patterson: Has the State Department weighed in on this?

Mr. Hanlon: Yes, we have been working with the State Department hand in hand throughout this process and have spoken with the Russians and they are aware and we will continue to communicate.

Ms. Patterson: When will there be a final decision?

Mr. Hanlon: DOE has been working to resolve. Studies are going up to the Hill and we hope for a decision soon. The decision resides with the Secretary but we need the support of others.

Public Comments

Public comments available at <http://admin.sc.gov/node/1543>.