Governor's Nuclear Advisory Council

Meeting Summary

Thursday, December 13, 2012

Gressette Building, Room 209, 1105 Pendleton Street

Columbia, South Carolina

Council Members in Attendance:

Ms. Karen Patterson, Chair

Sen. Tom Young

Mr. Steve Byrne

Dr. Carolyn Hudson

Dr. David Peterson

Captain Claude Cross

Ms. Rebecca Griggs, Committee Staff

Call to Order – Adoption of Minutes

Ms. Karen Patterson called the meeting to order at 1:00 p.m. The first order of business was the approval of last meeting's minutes. Approval of meeting minutes was deferred by the council until the next meeting. Ms. Patterson announced that the council's senate seat, vacated by retiring senator Ryberg, will be filled by Senator-Elect Tom Young. Senator Tom Young, formerly of the House, vacated his House appointment seat, which now needs to be filled. The appointment will not be made until after January 1, 2013. Since the last meeting, Ms. Patterson attended the tank closing celebration at the Savannah River Site. Two more tanks were closed, with a total of four closed tanks. Ms. Patterson expressed her desire to have more tanks closed, but was optimistic that four tanks are better than none. Rebecca Griggs and Ms. Patterson toured the Salt Waste Processing Facility that will ultimately process salt in high-level waste tanks. The facility had been waiting on processing tanks and subsequently had to rearrange construction. Ms. Patterson thanked Savannah River Site and Parson's for the informative tour.

Ms. Patterson attended CAB meetings (SRS's public advisory board), in September and November.

Due to the presence of several new attendees, Ms. Patterson explained the process of GNAC meetings: presentations are an information exchange between a presenter and members of the council; public participation is limited to the public comments period reserved for the last part of the agenda.

Mr. James Harris of Energy*Solutions* delivered the first presentation regarding the Barnwell Low Level Radioactive Waste Disposal Site update.

Barnwell Site Low Level Radioactive Waste Disposal **Annual Update**

James Harris, Vice President, Energy*Solutions*

Mr. Harris's presentation included an update in safety and operational compliance, a description of the progress of the disposal site, an update on the processing facility, a brief discussion of the on-site Environmental and Dosimetry Laboratory, Nuclear Services and Support Facility (NSSF) and Liner Operations, and Hittman Transportation and cask logistics.

From a safety perspective, Barnwell has zero first aids: total recordable case rate remains at zero; days away, restricted or transferred remains zero; and days-away cases remains zero. The processing facility is nearing six thousand days without any accidents. From a transportation perspective, the National Safety Council awarded Barnwell the 2011 Perfect Record Award. The site also expects the 2012 award, as well as the same award through the National Private Truck Council. The awards are given with respect to transportation itself, in comparison to other companies with the same type of operation.

In response to a council member's question, Mr. Harris explained that the Barnwell site is responsible for initiating actions in an emergency-type situation.

From a compliance standpoint, there have been 43 years of uninterrupted operations, accomplished through many modes of internal and external operations and a management team at the complex. The site goes through extensive DHEC licensing and oversight, frequent inspections – including an on-site inspector who performs daily inspections, a DHEC engineering team who performs weekly inspections, and staff who perform unannounced inspections. In 2012, the site had two unannounced inspections, one of which was performed last week, which both resulted in zero penalties.

The site is currently considered 91% closed. Certain areas are available as future disposal sites. The current 235-acre active disposal site, owned by the state of South Carolina and operated by Energy*Solutions*, through a lease with the Budget and Control Board. The site is a member of the Atlantic Compact and accepts class A/B/C waste seven days a week, 24 hours a day. Additionally, the site accepts large components and irradiated hardware shipments.

Mr. Harris showed pictures of the process of removing the liner from the cask out of the disposal trench, the liner being placed from the cask to the concrete vault, and the site preparing to receive irradiated material. He also showed a picture of large component received in 2010, the last year the site received large a component.

The site became a member of the Atlantic Compact in the 2008 fiscal year. All waste comes from states that are members of the compact (SC, N J and CT), and most of the waste comes from utilities

Energy*Solutions* employs 232 people in South Carolina, including 34 at the disposal site, 10 at the processing facility, and 32 at the liner operations, etc. At the Barnwell site, the average employment length is 20 years.

Mr. Harris showed pictures of the disposal and processing facilities. Close to Highway 64, the Barnwell Processing Facility (BPF) is a 17-acre licensed facility. It consists of two existing facilities with an additional third facility designed and approved through the permitting process. The BPF provides volume reduction, dewatering, waste treatment, decontamination, water processing, among other services. The BPF shares a fence with the Savannah River Site.

BPF Building 101 is the smaller of the two existing facilities, consisting of 7500 square feet, with 5000 square feet of processing space. It is a large, open work bay with a small super compactor which compacts active waste for volume reduction purposes. A Sort and Segregation Facility is about 700 square feet.

BPF Building 201 is the larger of the two existing facilities (20,000 square feet). It has an 80-ton overhead bridge crane. The space is used to conduct dewatering processes, preparing for filter shredding operations, which is unique to the company. There is also a small radioactive waste lab that is used for conducting analyses.

In response to a question from a council member, Mr. Harris explained that the processing facility is not part of the Atlantic Compact and that the site receives waste from government and commercial facilities throughout the United States, processes the waste, and sends it out for disposal.

Filter shredding operations are currently under construction. The site will receive the filters in a large liner, which will be placed in a large pit for radiation purposes. The filters will be pulled out, shredded, and placed into a bin. The filters are then mixed into a homogenous mixture and combined with concrete to solidify the mixture, which is then taken to the waste disposal site. The site aims to begin filter shredding operations in the first quarter of 2013.

BPF Building 301 has not yet been constructed, although its design has been approved and has attained RCRA Part B permit. It is a large, open work space, supported by a 50-ton overhead bridge crane. The RCRA Part B permit allows for a 5,000 square foot expansion.

On-site laboratories support the institutional portions of the site, performing water analysis, soil sampling, and air sampling.

Liner operations are based at the Nuclear Support Services Facility (NSSF). Liner operations include preparing commercial support equipment, building liners to send to utilities for waste packaging, and providing technology for dewatering.

At the end of the presentation, Mr. Harris answered questions from the council and provided the following information. The Barnwell site has a 99-year lease with the state, beginning in 1969. Independent assessments can either come internally from the company or externally from utilities to which the company provides services. Services for the military, including decommissioning, ended in 1992. All five licenses are in good condition; the license for the disposal site is still going through the appeal process, but is in timely renewal. The purpose of shredding filters is to meet the technical requirement for a homogenous mixture at the time of disposal. Shredding also results in volume reduction. The site recently started shipping waste to WCS in Texas. At that disposal site, most waste comes from other states. The Barnwell site processes but does not dispose of waste from other states (those not in the Atlantic Compact).

Barnwell Site Update

Susan Jenkins, Manager, Infectious and Radioactive Waste Management Section, Division of Waste Management, South Carolina Department of Health and Environmental Control

In March 2004, DHEC renewed the Chem-Nuclear System's license. In April 2004, the decision was appealed by the Sierra Club and Environmentalists, Inc. The court dismissed Environmentalists, Inc.'s appeal based on lack of standing, and the next year, in October 2005, the Administrative Law Court (ALC) found that Sierra Club failed to present evidence warranting the reversal of the license and denied motion for reconsideration. Sierra Club appealed the decision to the South Carolina Court of Appeals, who then remanded the case back to the ALC, so that they could rule on whether or not Chem-Nuclear was in compliance with certain sections of the regulation: specifically, the Radioactive Materials Regulations of South Carolina, Chapter 7 dealing with the disposal of low-level radioactive waste. DHEC filed a petition for rehearing on the grounds that Sierra Club had not properly preserved issues relating to the Sections in question. In May 2010, the rehearing was denied. Chem-Nuclear filed a petition with the South Carolina Supreme Court asking them to review that previous decision of the ALC, and the

petition was denied, so it was sent back to the ALC in July 2011. In July 2012, the ALC ruled that the facility was in compliance with the regulations and the Sections in question, and DHEC's renewal of the license was proper. On August 30, 2012, Sierra Club appealed that ruling back to the SC Court of Appeals. The brief was due to the court by November 19 but they have requested an extension until January 9, 2013. The extension has not been approved yet, but DHEC and Energy*Solutions* will have 30 days from that date to file the reply briefs to the court.

Tritium from the site has contaminated the groundwater under the site. Chem-Nuclear samples 179 monitoring locations, some on-site and some off-site. The sampling is performed quarterly. DHEC samples at 31 locations and provides QA splits of those samples with Chem-Nuclear. The site began accepting waste in 1971 in older trenches, which is where the majority of the tritium originates. Ms. Jenkins stated that the disposal practices at that time were not as advanced as they are today; for example, liquids were disposed of and the packaging was not as robust. In monitoring (on-site) well 110, the concentration is 29.1 million picocuries per liter (pCi/L), continuously the highest concentration found at any of the wells. The tritium plume travels in a southeasterly direction. In the second quarter of 2012, there were about 500,000 pCi/L at the headwaters of the creek which flows from the site to the SRS, and eventually to the Savannah River. At DHEC's compliance point, the tritium concentration is about 82,400 pCi/L. Levels have been around 100,000 pCi/L for about a decade. The regulatory limit for the compliance point is 500,000 pCi/L; this limit was established by the Nuclear Regulatory Commission, and has become part of DHEC regulations.

DHEC requires that Chem-Nuclear submits an annual trending report in order to monitor the movement of tritium. The data spans the last 5 years and includes 27 locations. A statistical analysis is performed. In the most current report, 7 of the 27 locations have an upward trend in concentration, 9 are showing a downward trend, and 11 are showing no trend. The headwaters of the creek and the compliance point are currently showing no trend. There are covenants that prohibit the use of surface or ground water emanating from the site for any reason without DHEC permission.

Ms. Jenkins completed her presentation and responded to questions with the following information. In the early 1990s, when the tritium was first found, there was an initiative to cap the leak. Multi-layered caps are designed to prevent rain from entering trenches and percolating through the waste to the underlying groundwater. Tritium has a 12-year half-life. DHEC has installed additional wells to ensure a more complete picture of the tritium's movement. If the tritium was higher than regulatory limits at the compliance point, the only remediation available would be some sort of evaporation, which would require formal discussion beforehand. The groundwater remains(I think "below" needs to be inserted here) the waste trenches, but it takes about 10 years for the tritium to move from the trenches to the groundwater, and about 10 years to travel the half mile from the site to the compliance point, at the headwaters of the creek. The monitoring wells are about 80-90 feet deep. Ms. Jenkins stated that there has been a great reduction in the levels of radioactive material that remains at the site versus what has been disposed of, due to radioactive decay. A study conducted several years ago confirmed that the tritium plume was not flowing under the nearby creek which flows into the Savannah River.

Both DHEC and Chem-Nuclear send their samples from the monitoring sites to independent laboratories. DHEC would not dig up the waste because it would cause unnecessary exposure of workers to radioactive material. DHEC looked into the possibility of phyto-remediation, a process which involves using plants to release tritium into the atmosphere through transpiration, although DHEC has not made a decision regarding this possibility. Another option is "pump-and-treat," which would involve pumping water from the creek and evaporating it. DHEC would have to look closely at these options before making a decision. DHEC compiles an annual update of the monitoring data and sends it to the residents living within one mile of the site. Ms. Jenkins stated that DHEC is comfortable with the tritium levels and responded to public concern about the plume several years ago by putting additional monitoring wells on private property . DHEC feels confident that the plume has been well characterized and has not affected any drinking water wells near the site, and the public is safe. Ms. Jenkins said that DHEC has

never received feedback from any of the site's nearby residents in response to the newsletter sent to them. The annual report, map of the monitoring sites, and other information is also available on DHEC's website. It's believed to take about 20 years to travel from the oldest trenches to the creek. The site began collecting waste in 1971 and tritium was first detected in 1991. Air monitoring is conducted at the site perimeter.

Max Batavia, the Executive Director of the Atlantic Compact clarified that the BPF is not part of the Barnwell Disposal Site. The disposal site is a regional, low-level radioactive waste facility. No low-level waste from the BPF site can be disposed of at the Barnwell Disposal Site because that site is limited to wastes from the Atlantic Compact states.

In response to a question regarding the difference between NRC's and EPA's regulatory limits Ms. Jenkins clarified that the limits are based on different assumptions (EPA's is based on drinking the water; NRC's is based on total annual dose, but assumes that the water is not being drunk) but that all limits ensure the protection of human health. .

AREVA, Interim Storage and Recycling of UNF

Paul Murray, Technology Director, AREVA Federal Services

Chairperson Patterson welcomed the next speaker, Mr. Paul Murray. She noted that the purpose of GNAC is to gather information and inform the governor of pending issues, and that GNAC is the only forum open to the public to hear ideas early in any decision process and comment on them.

Mr. Murray described the typical fuel cycle for commercial reactor fuel.

Once fuel comes out of the reactor it is initially placed in a pool inside the reactor facility. Some utilities place their older, decayed fuel in dry storage where it will remain until it can be dispose in a repository, per current US statute. The United States has 65,000 tons of used nuclear fuel (UNF) spread out across the country, and an additional 2,000 to 2,200 tons of fuel are produced each year. This equates to about 240,000 used fuel assemblies (in dry storage and in pools) by the end of 2012, and every year an additional 7,000 used fuel assemblies are added.

The United States consequently has a very large inventory of used nuclear fuel, consisting of an array of different burn ups, uranium concentrations, etc. This is a unique feature of the United States which will allow us to do different things at the back-end of the fuel cycle that other countries cannot.

The United States is divided into four different regions by the Nuclear Regulatory Commission (NRC). The Southeast region alone has over 20,000 tons of UNF.

A spent fuel storage installation consists of a concrete pad surrounded by fencing and surveillance equipment, upon which sit steel casks containing the fuel assemblies surrounded by a concrete overpack. At the reactor is a loading facility and a transporter to move the casks from the fuel pool to the spent fuel storage installation.

Mr. Murray briefly outlined possible storage options being considered by Congress and the nuclear industry, such as moving fuel to one interim storage site or regional interim storage sites, repackaging fuel and/or reducing the size of the fuel and moving it to a geological repository, recycling some fuel and dispose of the remaining waste in a geological repository, and developing an advanced fuel cycle. Many of these options require additional research and.

The government is considering a pilot interim storage project. AREVA has developed a concept for using the pilot interim storage facility as feed for a research and development facility to develop

methods to recycle used fuel using COEX™, which eliminates plutonium proliferation concerns. The facility would use existing nuclear infrastructure to manage the product. The pilot facility could supply fuel to a few LWRs, about four generation 3 reactors, or a couple of 500 MW sodium reactors, reactors which have not yet been developed or licensed.

Waste from recycling would be turned into waste glass, as is done at SRS, and sent to an engineered waste storage facility and ultimately to disposal in a geological repository. Recycling does not produce more waste than simple disposal of used nuclear fuel. Back in the 1980s, there was a large volume of high-level nuclear waste, but the nuclear industry invented new technologies and processes to reduce the volume of high-level waste. The amount of waste produced from one ton of nuclear fuel has dramatically reduced over the decades. High-level waste canisters are one-third the size produced at the Savannah River Site. They are called universal canisters, which are used by all other nuclear-producing countries.

Based on an operational plant in France, one fuel assembly produces about 1.4 cubic meters of used fuel, and once recycled produces about 0.6 cubic meters that requires disposal. About 0.6 cubic meters per assembly is low-level waste, and most activity goes to the high level waste. Low-level waste is separated from high-level waste. About 97% of low-level waste is short-lived, meaning that it is radioactive for less than 200 years.

Typical of any nuclear project, it would take a long time to construct this facility and require a construction workforce of about18,000. Five-six thousand full-time employees would be required once the plant is operational. The job multiplier is estimated at 2.5, meaning that each direct job would create 2.5 indirect jobs so the recycling plant could result in the employment of about 45,000 people in the region (within commuting distance of the facility).

In conclusion, the United States is unique due to its large inventory of nuclear fuel. There are specific Environmental Protection Agency regulations that will govern the back-end of the fuel cycle. All options should be considered. AREVA considers recycling economically viable and a way to reduce high-level waste.. AREVA proposes a phased approach for whatever happens at the back-end of the fuel cycle and that the country should not commit 100% to any one technology, and any technology deployed should be upgradable and economically viable. A final geological repository will influence fuel cycle deployment.

In response to questions from council members, Mr. Murray provided the following information. He prefers the notion of regional interim storage, although he expressed hesitation that utilities will move all their waste from individual reactors to a regional site. Some of the waste in the United States is very old and cool. A geological repository will be necessary, regardless of waste recycling decisions. Waste is currently stored very safely at reactor sites. Mr. Murray stated that the Savannah River Site could potentially meet the standards for a regional interim storage site, because it has a long track record of safety and experience looking after special nuclear material. Existing regulations would allow a recycling plant to be built today.

The Baby and the Nuclear Bathwater

Dr. Terry Michalske, Laboratory Director, SRNL

Dr. Michalske wrote a guest column in *The State* newspaper in October 2012 discussing opportunities to capture economic value from Savannah River Site (SRS) legacy waste. SRS is the nation's only complete nuclear materials management complex – a place where nuclear materials can be packaged, processed, stored, prepared for disposition, and moved to a final disposition location,

whether as waste itself or as recylced commercial fuel. This complete set of capabilities is critical to SRS's ability to manage legacy waste and to ensure that legacy waste can be dispositioned properly. The Department of Energy and on-site contractors are preparing and moving waste off the site. SRS remediation efforts aim to stabilize high-level waste (3,500 canisters to date) and ship transuranic waste off-site (12,000 cubic meters have already been shipped to Waste Isolation Pilot Plant). The site is beginning to move plutonium to WIPP. 200 kg have already been moved, another 500 kg is being prepared for shipment, and up to 6 metric tons is being considered for that route of removal and disposition.

SRS has a legacy of capturing value from waste materials. For example, from 2003-2011, using the nuclear processing capabilities on-site, highly-enriched used uranium was converted to nuclear fuel to be used in Tennessee Valley Authority reactors. This product could have powered the entire state of South Carolina for ten years.

Under a U.S. Treaty Agreement, the mixed oxide fuel (MOX) conversion facility is scheduled to convert 34 metric tons of surplus weapons-grade plutonium into commercial MOX fuel. Once converted into fuel, those 34 metric tons could power South Carolina for another decade, for a total of two decades' worth of power from just the waste on-site.

Helium-3 is a byproduct of tritium that is critical in a number of applications, such as neutron detection for homeland security, medical imaging, well-logging, and oil recovery. SRS is the only source of helium-3 in the nation. Helium-3 sells for up to $5,000 per liter on the commercial market. The Department of Energy has worked with the Darla Moore School of Business at the University of South Carolina to look at the expansion of production of helium-3. The School concluded that, even at the price of $1,500 per liter, it is a profitable business. The School estimated the market demand for helium-3 as between 15,000-25,000 liters per year. Currently, the market for helium-3 is controlled by the government, although the government is about to begin an auction, with the lowest price starting at $2,500 per liter. There is potential to develop public-private partnerships.

There are other potential assets that can be recovered as waste is being dispositioned. One is Americium-241, a product of plutonium decay, one of the most widely-used isotopes in the energy business. It is a neutron source and critical to well-logging in the oil and gas industries. The United States purchases it from Russia and also manufactures a substitute, Californium-252. The High flux isotope reactor (HFIR) in Oak Ridge is kept running solely to produce this material, and produces waste in the process. . Americium is currently at $1.5 million per kilogram. SRS's legacy waste have the largest supply of this material.

There are many other isotopes available in the legacy waste that are commercially valuable with applications in standards, research and development, and nonproliferation.

SRS also has a significant amount of remaining highly-enriched fuel assemblies that are stored on-site. Continuing to capture the value from those assemblies would return a value of $8 billion to the U.S. economy. SRS, as the only complete nuclear management complex, has the opportunity to capture the economic benefit for the region and provide national security for the country.

In response to questions from council members, Dr. Michalske provided the following information. SRS currently has about a 50-70 years' supply of Americium-241 at our current rate of use. Americium-241 would be recovered by separating it from plutonium as the plutonium is processed for MOX feed. The Department of Energy has to be authorized by Congress before enacting the decision to extract Americium-241. The isotope program of DOE lies within the Office of Science. The Office of Science operates the largest number of the national labs, including Oak Ridge.

DOE-Savannah River, H-Canyon and EM Update

Zack Smith, DOE-SR Deputy Manager and Patrick McGuire, DOE-SR Assistant Manager for Nuclear Material Stabilization Projects

Mr. Zack Smith began this presentation. SRS's tanks 18 and 19 are the first large high-level waste tanks closed by the Department of Energy in the last 15 years. It is regarded as a huge accomplishment and success for SRS, URS, and the liquid waste organization, SRR.

The remediation completion of more than 5,000 cubic meters of transuranic waste was one of the big goals of the American Recovery and Reinvestment Act of 2009. The material is remediated and prepared to be shipped. There is a 12-to-18-month shipping schedule to ship the waste to WIPP, depending on the funding for the WIPP and SRS sites.

Technology for the salt waste processing facility is robust, demonstrated by the success of the ARP/MCU facility, which is using that technology. The processing system is one of the simplest for nuclear waste. ARP/MCU has consistently reached decontaminaiton factors in excess of 200. The salt waste processing facility has achieved in tests decontamination factors of over 700,000.

The SWPF large tanks were received and have been installed. In terms of safety, there have been no significant events within the past two years. Construction has had no substantive quality assurance issues. Improvements in the salt waste processing facility construction planning process include better projections of the implications of the tank delay from a cost and schedule standpoint,. Costs have increased and the schedule has been delayed, although the facility is now 65% complete. This issue will need to be taken to the Energy Secretary Acquisition Advisory Board in order to obtain the Deputy Secretary's approval for the remaining funding. Beyond a fixed funding profile, congressional appropriators fund the project to its completion. This part of the process should happen in the next three to four months. In principle, the DOE executives recognize the importance of this facility and are determined to finish construction.

The federal budget is of great concern at the moment. There are challenges with the continuing resolution, such as terminating approximately 800 employees. There will only be limited construction during the continuing resolution. The President's and Senate's budget proposals would support most of the key activities for the site, if they are passed.

The site celebrated several successes in 2012. DWPF produced a record 277 radioactive waste canisters, the highest yearly total since the defense waste processing facility began operation in 1996. Over one million gallons of high-level salt solution were dispositioned, again highlighting the success of the ARP/MCU process. This was the site's best year ever for transuranic waste remediation and disposition. This year alone, the site shipped more than 1,600 cubic meters to WIPP. A biomass cogeneration facility was constructed and began operation, reducing site energy demands – including the reduction of 100% of the need to purchase the site's steam needs and reduction of particulate releases by over 400 tons per year.

The processing of vulnerable spent fuels was initiated through H-Canyon. The site packaged 87 kilograms of non-MOXable plutonium, and completed the first shipment of this waste to WIPP. The site completed the down-blending of 300 metric tons of low-enriched uranium that went to the TVA. Two hundred cubic meters of the most difficult TRU waste was worked off to 73 cubic meters. Once the remaining 73 cubic meters is sent to WIPP, all legacy TRU waste will be gone from the SRS. The ARRA goal was 5000 cubic meters.

In response to questions from council members, Mr. Smith explained that the choice of funding profile is a deciding factor in the construction schedule for SWPF; once the funding profile is decided upon, the construction schedule will be more definite.

Mr. Patrick McGuire began the second section of this presentation. Over the past several years, GNAC and the South Carolina congressional delegation have been very supportive of the H-Canyon facility. Thanks to this support, the site has expanded from the remedial activities of two years ago. The site began processing some spent sodium reactor experimental fuel at H-Canyon in August 2012. The site is not going to recover any uranium but will co-blend it with some high-uranium- content fuel to facilitate the transition and disposition to the waste system,as described within the system plan, Rev 17. Under the continuing resolution, it is difficult to say when the campaign will be completed. Under the full President's budget, it would completed in about eight months g. Under favorable circumstances, it is possible that the campaign could be completed in the calendar year, but it depends on the budget.

Concurrently, the site provides plutonium for the National Nuclear Security Administration (NNSA), specifically for the MOX fuel fabrication facility. NNSA provides approximately $20 million to DOE-Environmental Management, to use H Canyon to dissolve and purify materials and to make oxides that meet MOX specifications . This dissolution campaign began in October 2012, and the oxidation process is set to begin in late spring/early summer. The agreement with NNSA is to provide more than 3 metric tons of oxide through fiscal year 2017; it will require about $20 million to support those additional operations.

Additionally, H-Canyonis supporting the TRU waste remediation program. H-Canyon has rigorous ventilation and therefore, some of the difficult transuranic waste can be repackaged . TRU remediation activities at H-Canyon will continue through March or April 2013, when the last remaining 73 cubic meters are expected to be completed.

The site anticipates larger campaigns after the sodium reactor experimental fuel is processed, including fuel dissolution and processing some high-enriched uranium content fuel. DOE is maintaining operator qualifications and equipment proficiencies. Mr. McGuire stated that H-Canyon is a different and better place than it was before and, although they face challenges, they are going to maintain themselves in a position to accelerate these programs once they receive a budget.

Mr. McGuire answers questions from the council members. The Site receives foreign and domestic nuclear materials. The majority of the fuel is in wet storage, and the dry waste is in drums, unlike commercial fuel storage. DOE is evaluating a dry fuel storage capability as an alternative to L-Basin to store the spent fuel. It's more cost-effective to store fuel in dry storage. The Savannah River National Lab concluded that the site could store the waste for up to 50 more years in a wet configuration with additional monitoring. Vulnerable fuels include some failed experimental fuel. Some corroding fuels have been overpackaged and L-Basin maintains a robust water chemistry program, which is the key to ensuring the material is safe. Like commercial storage, DOE would monitor the waste until it is ready to go to its final geological repository. The waste is designed to withstand the harshest conditions, so it could be stored safely in dry storage for quite a long time. There organic matter in L Basin was a bacteria. Thebacterial growth does not appear to be getting worse or to be causing any problems. SRS has not begun any chemical treatment and they are working with SRNL to see if any treatment is necessary and if the chemical treatment would have any adverse effects on the pool.

The downblended plutonium that did not meet MOX specifications is TRU waste

SRS-NNSA, MOX Update

Jeffrey Allison, Senior Program Advisor, Office of Fissile Materials Disposition

Kelly Trice, President and Chief Operating Officer, Shaw AREVA MOX Services

Jeff Allison began the presentation. Savannah River Site NNSA Manager Doug Dearolph was unable to attend The 2013 requirements for stockpile stewardship are well-defined and there is sufficient budget to carry out the requirements. Stockpile stewardship is the work that tritium does to provide reservoirs for the Defense Department, a core mission that the site has carried out since the 1950s with a 100% on-time deliveries record. The tritium facility has one extraction campaign planned for 2013. The site will also continue personnel development activities for the operators and engineers this fiscal year, and they expect to complete the construction of two new administrative buildings at the tritium facility. This will allow them to relocate operational and engineering personnel who have office space in some of the old process buildings from the 1950s and 60s, which will subsequently be decommissioned.

In November 2012, the National Nuclear Security Administration (NSSA) announced it completed two milestones towards reduction of plutonium oxide for the MOX fuel fabrication facility. It exceeded the fiscal year 2012 goal of 200 kilograms of plutonium oxide production by disassembling nuclear weapons and converting them into plutonium oxide. NSSA also initiated operations at H-Canyon to begin plutonium oxide production, and is working towards permanent plutonium disposition. The disassembly, conversion, and certification are significant accomplishments in an ongoing effort to safely dispose of surplus weapons-grade plutonium. NSSA used the advanced recovery and integrated extraction system, which is known as ARIES, to prepair and package plutonium oxide product. Following a rigorous product certification process, Shaw-Areva MOX Services has officially accepted a total of 442 kilograms of plutonium oxide from Los Alamos National Lab (LANL where the ARIES process occurs), ready for MOX. Savannah River Nuclear Solutions initiated repackaging and dissolution of non-MOXable plutonium material at H-Canyon, a significant step towards H-Canyon's goal to produce early feed for MOX, supported by $20 million from NSSA. H-Canyon will eventually provide 3.7 metric tons of plutonium oxide feedstock for the MOX fuel fabrication facility.

NSSA completed 12 of the 16 auxiliary buildings needed to support the operation of the facility. At the main MOX processing facility, more than 132,000 cubic yards of structural concrete has been placed into 21,000 tons of rebar. The roof of the facility is expected to be completed at the end of January 2013. Although the structure is not quite complete, commodities are being installed in the lower levels of the building.

Mr. Allison assured that the work is being performed safely. The project has an outstanding safety record with over 13 million safe work hours without an incident. There continue to be costs and schedule challenges in key areas, including identifying suppliers and subcontractors with the abilities and experience to fabricate and install equipment to the requirements of nuclear quality assurance level one (NQA1). This has resulted in a lack of competition. The project is still experiencing a much higher than expected turnover in experienced personnel because of the expansion of the US commercial nuclear industry. The department is evaluating the potential impacts of these challenges. Since Mr. Allison appeared before GNAC in September 2012, a baseline change proposal was submitted by MOX Services and is currently being reviewed by the Department of Energy. The decision from the BCP from the acquisition executives is expected in 2013.

Construction of the MOX facility will continue in 2013, including the installation of processing equipment and piping, finalizing software design and performing advanced testing. In addition, training materials will be prepared for facility operations and maintenance personnel who will begin training in 2014.

Significant process has been made on the waste solidification facility, including structural work in 2012. Construction will be completed in 2013, followed by one year of startup testing. NNSA has identified factors that could potentially result in cost overruns and schedule delays. NNSA is reviewing a baseline change proposal from the facility and expects a decision soon.

Mr. Allison took questions from council members. Because the tritium facility has only one tritium extraction planned in fiscal year 2013 the targets will remain in the reactors for longer than anticipated, or will be stored tfor future extraction. The site has the capability to store tritium targets and gas.

Mr. Kelly Trice continued the presentation and began by showing a video of MOX facilities. The video can be found at http://youtu.be/ik_8OW4sTRk.

MOX will producefuel for both pressurized water and boiling water commercial reactors. Generally, in the United States, there are three fuel manufacturers: AREVA, GE, and Westinghouse. MOX will be able to produce fuel for all three ma nufacturers, and for the new generation of light water reactors which require 17- or 18-foot long fuel asemblies. The MOX program is a part of the country's nonproliferation objectives.

The United States signed an agreement with Russia to do away with 68 metric tons of plutonium (34 tones per country) – amounting to 17,000 nuclear weapons. Nonproliferation is the mission of the MOX program. The process was selected after several studies. The French facilities were used as a basis. In the United States, the aqueous work and the fuel fabrication work are done at the same plant to avoid shipping anything cross-country.

The MOX fuel has been used in several demonstration projects in the United States, and all projects cited that MOX fuel performed similarly to uranium fuels. Other countries – including France, Belgium, Switzerland, and Germany – have used MOX fuel successfully for 40 years. Shaw Areva does not believe future lead test assemblies are needed due to the history of MOX fuel, however, that decision will be made by the NRC.

It costs the United States about $500 million per year to guard the plutonium, so the investment in this plant is relatively cost-effective over a few years. Earlier in 2012 at the nuclear summit, the President used the MOX facility as an example for sharing best practices for nuclear safety and security in new facility design.

The site is conducting negotiations for a fuel contract with Areva NP and intends to use them as a wholesaler of the fuel because they currently supply fuel to a third of the US reactor operating fleet. Areva suppliers could supply up to 40 reactors, more than MOX's capacity. TVA signed an MOU expressing interest in using MOX fuel, and an environmental impact statement is expected to be completed in 2013. Several utilities have expressed interest as well. Initial demand appears very strong.

The site has completed 13 million consecutive safe work hours without a lost workday accident. It is currently pursuing OSHA Voluntary Protection Program (VPP) certification and expects to achieve Star status in December 2012. The site has no environmental permit violations since start of construction and the South Carolina Environmental Excellence Program awarded membership to MOX. One building is already LEED Gold certified and two more will be applying for certification. A conservation garden is on-site with endangered species plants. An on-site biomass facility burns wood and tires and sells electricity to the MOX facility.

The NRC issued the MOX Safety Evaluation Report, part of the licensing process in 2010. Construction met all requirements in 2010 and 2011 with no improvement needed. The site has 9,600 active small business contracts, amounting to about $86 million. MOX supplies about 4,100 jobs nationally, about 2,200 of which are at the Savannah River Site. MOX is training over 100 fabrication suppliers around the country to build NQA1 nuclear components for the operating fleet.

The building is 25 feet underground. The base mat is 6.5 feet thick, and the walls of the lower levels are 10 feet thick. It is a double-walled facility. The roof will be 4.5-6 feet thick. The process pipe is being manufactured in South Carolina.

The facility will be able to produce up to 70,000 fuel pellets per day. Approximately 151 PWR fuel assemblies can be produced annually, utilizing 70 metric tons of heavy metal. The facility will contain 7 Control Rooms.

Mr. Trice showed pictures of ongoing construction. The tech support building is the newest building to be constructed and has applied to LEED Gold certification. There are solar panels on the roof for electricity generation and hot water. The administration building collects rainwater for irrigation. The buildings are made of recycled and environmentally-friendly products. The active gallery module will have 15 miles of piping in one room alone. One building is rated for an 8.2-magnitude earthquake without a crack and will be the most substantial nuclear facility in the United States once completed. HVAC is being installed. The control room floor is laid out. Transformers are set to be energized in the first quarter in 2013 and will be on main power and no longer on construction power. The biggest process glovebox will weigh 110,000 pounds and will be about the size of an airbus. There are 3 warehouses full of equipment, the largest of which, in Barnwell, is 250,000 square feet and at capacity.

Three presidential administrations of both parties have supported the project. The agreement with Russia was initially signed in 1990 and has been re-ratified three times. The Russians are carrying out their end of the obligation. The NNSA has visited Russia to check on their progress.

Mr. Trice took questions from council members. The MOX facility is under negotiations for the first eight assemblies to be complete by 2018. The facility will be powered by SCE&G. At full capacity, the facility will use10-15 megawatts. An average nuclear reactor requires 1,000 megawatts. The operating life of the plant is about 20 years. It will be able to process plutonium from approximately 1,000 nuclear weapons per year. Shaw AREVE has sent about 100 employees to the French MOX plant to learn the process. The plant is about 99% automated. Shaw is based in the United States and is the majority owner and AREVA is the minority owner The main difference between weapons-grade and reactor-grade plutonium is that reactor-grade plutonium is highly radioactive. The MOX plant does not need as much protection because it uses weapons-grade plutonium.

Public Comments

Gerald Rudolph stated that he does not want to see waste from other states coming to South Carolina and that he believes it is a waste of taxpayer dollars. He does not believe that the presenters are giving a balanced view of what is going to be done with waste. He believes that the responsibility of the waste will eventually be turned over to taxpayers.

Susan Corbett, SC Sierra Club stated that two minutes was not enough time for her to ask her question. She requested that the conservation community be allowed to make occasional presentations to GNAC and expressed interest in presenting information about the other side of reprocessing at the next meeting.

Debbie Parker, Conservation Voters gave an overview of Conservation Voters of South Carolina. She stated that the conservation community has gone on record opposing importing waste under any conditions, including for the purpose of consolidated spent fuel storage or reprocessing. She feels that the real issue is South Carolinians' quality of life and national reputation as a repository for waste. She feels that the federal government has broken its promise to clean up 37 million gallons of "unstable, highly radioactive" liquid waste waiting to be processed or moved to a safer site. She believes that, at the current funding, it could take 20 years for the waste to be removed. She feels that political leaders would be "foolish" to accept 70,000 more tons of nuclear waste. ()

Jesse Colin Young stated that his father-in-law came to work at the Savannah River Site in 1957. He feels that interim storage is "kicking the can down the road," and expressed his desire to find a final geographic repository. He believes that it is necessary to convert waste to a form other than liquid.

Connie Young expressed her desire to find a geographic resting place for waste. She urged that the waste must be cleaned up.

Ernie Chaput stated that many issues that were concerns during the mid-1990s are now addressed: there are now disposition pathways for surplus plutonium and high-level waste, and soil and water is monitored. Research reactor spent nuclear fuel must be processed, blended down, and disposed of. He stated that he does not support dry storage and believes that fuel should instead be disposed of through H-Canyon. He urged that waste must be processed quickly.

Clint Wolfe, Citizens for Nuclear Technology Awareness stated that the Savannah River Site has assets that are unique to the solution of how to deal with used fuel. He believes it would be irresponsible to relocate those assets to another location. He believes that Savannah River National Laboratory could benefit from the technology that deals with those issues and providing technology solutions. He believes the state could benefit from funding and jobs at the Laboratory, and the country would benefit by using the assets it has already paid for.

Closing Remarks

Karen Patterson, GNAC Chair

Ms. Patterson thanked members of the public for attending the meeting. As a member of the nuclear community, she believes that the nuclear industry does not communicate well its successes, progress, and plans. She announced that the next meeting will be on March 14, 2013.