

# Alliance for Nuclear Accountability

*A national network of organizations working to address issues of nuclear weapons production and waste cleanup*

December 26, 2012

Cindy Bladey,  
Chief, Rules, Announcements, and Directives Branch (RADB)  
Office of Administration  
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U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

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RULES AND DIRECTIVES  
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**Re: Docket ID NRC-2012-0246 (Consideration of Environmental Impacts of Temporary Storage of Spent Fuel After Cessation of Reactor Operation – “Waste Confidence”)**

The Alliance for Nuclear Accountability (ANA) - <http://www.ananuclear.org/> - hereby submits the following comment for the record. We reserve the right to submit other comments about

## **Spent Plutonium Fuel (MOX) Poses Unique Problems and Challenges Due to Higher Decay Heat and Higher Radioactivity**

Though the United States does not currently use nuclear reactor fuel made a mixture of uranium and plutonium oxides, so-called MOX fuel, the U.S. Department of Energy and affiliated contractors are attempting to introduce experimental MOX made from surplus weapons-grade plutonium into the US fuel market. Such weapons-grade MOX fuel, a “new fuel form” according to the NRC, has never been considered to be licensed and used on a commercial basis anywhere in the world. It has not even been subjected to testing in a boiling water reactor (BWR) and was only tested for two NRC-licensed irradiation cycles in a pressurized water reactor (PWR) before the test was aborted.

While a host of problems confront the use of weapons-grade MOX, an experimental fuel form, DOE is currently conducting a Supplemental Environmental Impact Statement (SEIS) which aims to support MOX use in the Browns Ferry BWRs and Sequoyah PWRs owned by the Tennessee Valley Authority. TVA clearly states in the draft SEIS that “The TVA does not have a preferred alternative at this time regarding whether to pursue irradiation of MOX fuel in TVA reactors and which reactors might be used for this purpose.”

(July 2012, Summary, page iv, <http://nnsa.energy.gov/sites/default/files/nnsa/07-12-inlinefiles/Summary.pdf>)

In spite of indications that TVA is choosing not to consider experimental MOX fuel at this time, DOE presses ahead with the MOX program even lacking utility customers. During a public

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The draft SEIS mentioned above failed to discuss details of storage and handling challenges of spent MOX fuel and thus fails to meet requirements under the National Environmental Policy Act.

In spite of political, technical and financial obstacles facing the DOE's MOX program, it is incumbent upon the NRC to consider the implications of spent weapons-grade MOX in its waste confidence analysis.

The following, from a December 30, 2011 letter from the Nuclear Waste Technical Review Board to DOE's Assistant Secretary for Nuclear Energy (<http://www.nwtrb.gov/corr/big162.pdf>) is instructive about problems with spent MOX made from weapons-grade plutonium or reactor-grade plutonium. The letter reviews presentation made to the board at one of its meeting in September 2011 – those presentations can be found on the NWTRB website at: <http://www.nwtrb.gov/meetings/2011/sept/11sept.html>.

### Implications for Waste Management of Using MOX

Over the last few years, increased attention has been paid to the possibility that the United States might adopt a closed fuel cycle involving reprocessing of light-water reactor SNF and recycling the extracted plutonium in the form of MOX fuel assemblies and perhaps recycling the reprocessed uranium as well. DOE originally investigated this possibility as part of its now-defunct Global Nuclear Energy Partnership. DOE's Office of Fuel Cycle Technologies continues some of the same work today. To understand better the waste-management implications of using MOX, the Board invited three practitioners to report on lessons learned by their organizations.

Mr. Daniel Stout from the Tennessee Valley Authority described the process that his utility is employing to determine the implications of using MOX fabricated surplus-weapons plutonium at one or more of its reactors. He noted that the decay heat of a spent MOX fuel assembly would be between 1.3 and 1.7 times higher than that for an equivalent spent-uranium fuel assembly. Consequently, the used MOX would need to be kept in dry cask storage for an additional 56 years to have the same thermal impact on a repository at the time of emplacement. For certain repository designs, that difference could be consequential.

Mr. Patrice Fortier from Transnuclear International, a division of AREVA, indicated that casks have been approved in France for transport of spent MOX and for HLW generated during commercial reprocessing of SNF.

The most detailed technical discussion was provided by Dr. Wolfgang Faber from the German utility EON, which operates eight reactors that have burned MOX. He noted that the use of MOX complicates the on-site management of both unirradiated and irradiated fuel, in part because of the increased security burdens. MOX fuel also requires longer post-discharge cooling time before removal from the spent-fuel pool, and there are other

difficulties associated with the intermediate storage period after discharge. In investigating the potential consequences for U.S. utilities of introducing reprocessing and recycling of plutonium and possibly uranium, the Board recommends that DOE take account of the full range of implications for utilities and not just the perceived value of extracting the energy remaining in the spent fuel.

As but one example of the host of scientific literature citing the higher decay heat of spent MOX fuel, in a 2011 Princeton University document entitled "Managing Spent Fuel from Nuclear Power Reactors Experience and Lessons from Around the World" (<http://www.princeton.edu/sgs/publications/ipfm/Managing-Spent-Fuel-Sept-2011.pdf>), it is stated that "the heat output of the MOX fuel at 100 years is several times higher than the output of spent low-enriched uranium fuel." (page 6)

The French plutonium company AREVA, in a December 10, 2012 draft presentation to the NRC, entitled "Small Break Loss of Coolant Accident – MOX," stated various things which reveal unique characteristics about spent reactor-grade MOX which must be taken into account:

- "MOX fuel will have a different decay heat curve"
- "Higher energy within the MOX pellet will affect cladding temperatures early in the SBLOCA transient"
- There are "changes in MOX fission gas release and composition" and "increased He production and fission gas release"

Thus, given the higher decay heat and increased radiation levels, the NRC must take into account all the differences in spent MOX (from spent LEU fuel) and address the host of challenges it poses. A full analysis of problems posed by experimental weapons-grade MOX use must be conducted. Some things to be considered, in addition to the points above:

- Impact of storage of irradiated MOX "lead test assemblies" designed to test weapons-grade MOX, as outlined by Global Nuclear Fuel in a presentation entitled "GNF BWR MOX Fuel" to the NRC on August 8, 2012 (For presentation, see it in ADAMS or on the ANA website at: <http://www.ananuclear.org/Portals/0/GNF%20on%20MOX%20LUAs%20NRC%20meeting%208.8.2012.pdf>)
- Full analysis of increased heat during reactor operation in both BWRs and PWRs
- Impact of irradiated MOX fuel handling during reloading outages
- Impact of emergency off-loading of irradiated MOX
- Impact to spent fuel pool storage density by spent MOX

- BWR and PWR Spent fuel pool accident scenarios involving spent MOX, including pool fires with loss of cooling
- Unique problems posed by storing irradiated MOX in above-reactor BWR storage pools
- Length of time need to be stored in the spent fuel pool
- Impact of increased helium production and fission gas release during storage
- Impact of irradiated MOX to fuel cladding during pool and dry cask storage
- Impact of high burn-up MOX to storage
- Issues with loading spent MOX into dry casks, especially radiation exposure to workers and any need for special handling equipment
- Length of storage in dry casks to certain temperature and radiation levels and other unique issues posed by spent MOX in dry cask storage
- Impact to geologic repository of spent MOX due to higher heat output
- Impact of higher plutonium content in spent MOX, including proliferation impacts during all phases of handling and storage;
- Waste streams with reprocessing of spent MOX; analysis of weapons-usability of plutonium removed from spent weapons-grade MOX
- Any other unique or important differences between irradiated MOX and irradiated LEU fuel

Thank you for fully considering these comments.



UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD

2300 Clarendon Boulevard, Suite 1300  
Arlington, VA 22201

December 30, 2011

The Honorable Peter B. Lyons  
Assistant Secretary for Nuclear Energy  
U.S. Department of Energy  
1000 Independence Ave., SW  
Washington, DC 20585-1290

Dear Dr. Lyons:

On September 13 and 14, 2011, the U.S. Nuclear Waste Technical Review Board held a public meeting in Salt Lake City, Utah. The majority of the meeting was devoted to presentations by U.S. Department of Energy (DOE) officials and technical experts from six DOE National Laboratories. Those talks provided the Board with a solid overview of the activities being funded by the Office of Used Nuclear Fuel Disposition Research and Development (NE-53).

In addition, the Board heard from an official of DOE's Office of Legacy Management (LM) and from three panels. The first panel discussed the draft *Report to the Secretary* by the Blue Ribbon Commission on America's Nuclear Future (BRC), the second described work undertaken by the Extended Storage Collaboration Program (ESCP), and the third explored some of the waste-management implications of using mixed-oxide fuel (MOX).

This letter conveys Board comments and recommendations related to work being sponsored by NE-53 within the Office of Nuclear Energy and other DOE activities discussed at the meeting.

**Activities Sponsored by the Office of Used Nuclear Fuel Disposition Research and Development**

Three topics were addressed by DOE officials and technical experts:

- Exploration of generic disposition options
- Studies of specific technical issues associated with developing a repository either in crystalline rock (granite) or clay/shale
- Research directed toward understanding the issues associated with extended storage and subsequent transport of spent nuclear fuel (SNF)

*Generic Research on Options for the Disposition of High-Level Radioactive Waste (HLW) and SNF.* Representatives from the NE-53 team, Dr. William Boyle, Dr. Peter Swift, and Dr. Mark Nutt, detailed efforts to develop that organization's strategic direction. Dr. Boyle provided an overview of his unit's administrative structure and budget, spoke about the major accomplishments to date, and set forth both short-term milestones and long-term goals. Dr. Swift described the technical basis for selecting four disposition options that NE-53 will focus on in the near term: deep-mined geologic repositories embedded in salt, granite, and clay/shale formations as well as deep borehole disposal. He also briefly identified several areas of research and development (R&D) that

NE-53 supported during the 2011 fiscal year. Dr. Nutt described the elaborate process, grounded in systems engineering techniques, used to construct the NE-53 “Research and Development Roadmap” to identify knowledge gaps and opportunities that offer the greatest potential contribution to achieving the national goal of disposing of high-activity nuclear waste in a deep geologic repository.

The Board understands and appreciates the rationale that motivated NE-53 to undertake these planning exercises. The results reported by Dr. Swift are consistent with work being undertaken by national waste management programs abroad that has already identified salt, granite, and clay/shale as the most promising host rocks in which to place a mined deep geologic repository. Given the wealth of relevant experience that has been gained in other countries, the Board strongly urges NE-53 to strengthen its technical interactions with the organizations that are responsible for waste management programs in those countries. This might enable DOE to learn from those programs and avoid duplicating their research. DOE also may be able to share costs with other programs on future work, which could free up funds that could be reallocated to other elements of the R&D program, such as research supporting development of the technical basis for extended dry storage of SNF.

In establishing research priorities, the Board believes that when compared with mined deep geologic disposal, the development of deep borehole disposition as a potential waste management option should be given a lower priority. The Board will address issues related to geologic disposal at its meeting planned for March 7, 2012, in Albuquerque, New Mexico, and the potential for deep borehole disposal will be discussed in more detail at that time.

Dr. Nutt’s explanation of the “roadmap” was clear and detailed; however, the rankings were not truly quantitatively derived. They were, as Dr. Nutt acknowledged, based essentially on qualitative expert judgments. Learning more specifically on what basis this “living document” might evolve would have been valuable.

*Studies of specific scientific and technical issues.* Dr. Scott Painter from Los Alamos National Laboratory presented early results on discrete fracture network modeling undertaken in collaboration with the Swedish implementer, SKB. Dr. Jens Birkholzer from Lawrence Berkeley National Laboratory discussed investigations for supporting disposal of HLW and SNF in clay or shale host rocks. He focused on a key technical issue: the evolution of the thermal-hydraulic-mechanical-chemical disturbed zone surrounding the waste package following emplacement. He also described the possibility of validating the results of these studies against field data from studies that might be conducted in Switzerland or Belgium. The Board believes that both these efforts represent cutting-edge R&D. Moreover, both areas of work underscore the Board’s view that NE-53 should intensify its technical interactions with other national programs.

*Extended storage and subsequent transportation of spent nuclear fuel.* Dr. Brady Hanson from Pacific Northwest National Laboratory presented the results of DOE’s analysis of knowledge gaps related to extended storage of SNF from the current US fleet of light-water reactors before transportation to a centralized storage or reprocessing facility or a repository site. The Board’s comments on this analysis, together with observations and recommendations concerning the R&D program that DOE proposes to support a program of extended dry storage, are recorded in the Board’s December 8, 2011, letter to Dr. Monica Regalbuto concerning DOE’s draft gap analysis report.<sup>1</sup>

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<sup>1</sup> *Gap Analysis to Support Extended Storage of Used Nuclear Fuel*, prepared by National Laboratory staff for the Used Fuel Disposition Campaign of the U.S. Department of Energy (DOE) Office of Nuclear Energy, June 30, 2011.

Mr. Paul McConnell from Sandia National Laboratories discussed the R&D priorities identified in the draft gap analysis report as being required in the near term, medium term, and very long term to support transportation of SNF following extended storage. He also identified the lead National Laboratories for the main program components. Dr. John Wagner from Oak Ridge National Laboratory outlined the engineering analysis required to support extended storage and subsequent transportation of SNF, including an integrated approach to addressing safety issues.

Our December 8 letter to Dr. Regalbuto notes that the Board's report<sup>2</sup> on extended storage of SNF identifies R&D requirements similar to those included in DOE's draft gap analysis report. However, the Board believes that there are other issues associated with extended storage of SNF that also should be addressed by DOE in developing an integrated approach to the management of SNF under the Nuclear Waste Policy Act. Three such issues are described below.

- The potential for operations being undertaken today that limit future options in managing SNF and HLW. One example of this is the continued use of a wide range of SNF container designs for dry-storage systems. As was the case in the design of the fuel-handling facilities for the Yucca Mountain repository, the lack of a standardized container design, or at most a small range of designs, can result in additional complexity at later stages of the waste management system.
- The dose and cost implications of the need to repackage SNF. An initial assessment by the Board indicates that there necessarily would be a significant additional dose to operators from the need to repackage fuel after storage and before repository disposal. Reducing the need to repackage SNF before disposal would unquestionably reduce the dose to plant operations staff. Estimating the dollar cost of repackaging is beyond the Board's mandate, but an appropriate observation is that there inevitably are significant costs associated with repackaging SNF, and to the extent this can be avoided those costs can be reduced.
- The implications of a requirement for early removal of SNF from reactor storage pools, in response to the events at the Fukushima site in Japan in March 2011. The Board believes that a careful review of the implications of such a change for the nation's long-term SNF management system should be undertaken. Among the factors that should be considered are the current trend toward larger dry-storage containers and higher fuel burnups that will require longer onsite storage before transportation to a reprocessing or disposal facility and the practicality of establishing the industrial capacity needed to manufacture the large number of additional dry-storage systems that would be required. The Board estimates that moving all SNF that has been discharged for more than 10 years into dry storage, for example by 2020, would require a significant increase in fabrication capacity for dry-storage systems. Once the backlog has been dealt with, however, demand would fall again to a level that matches the actual rate of discharge of SNF. It may be difficult for vendors to respond to this relatively short-term increase in demand, both in terms of the fabrication requirements and in managing the accompanying increase and decrease in the size of the production workforce, the training requirements, and an increase in the need for quality assurance staff. As mentioned above, estimating the dollar cost is beyond the Board's mandate, but an appropriate observation is that there would inevitably be significant cost implications from the need for vendors to recover over a period of only 10 years the capital investment for establishing increased production capacity.

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<sup>2</sup> *Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel – Executive Summary*, U.S. Nuclear Waste Technical Review Board, December 2010.

## **Office of Legacy Management's Preservation of the Documents from the Yucca Mountain Project**

In its May 24, 2010, response to the Yucca Mountain licensing board, DOE stated that [It] had contacted the Nuclear Waste Technical Review Board about the NWTRB's interest in providing independent oversight of DOE's actions in preserving the scientific information that has been developed by OCRWM [Office of Civilian Radioactive Waste Management]. The NWTRB could thus review the planned disposition of the relevant scientific information before its disposition in accordance with National Archives and Records Administration approved schedules. NWTRB has expressed interest in such an arrangement, and DOE and NWTRB will discuss how such oversight could be accomplished.<sup>3</sup>

Those discussions have been ongoing for more than a year as OCRWM documents have been transferred from Las Vegas, Nevada, to Morgantown, West Virginia, for preservation. Mr. John Montgomery, Site Manager of the Legacy Management Business Center, and his staff lead, Mr. Edwin Parks, briefed the Board on the status of their efforts. Members of the Board staff intend to visit Morgantown in the coming months to carry out a high-level observation of LM's activities and, subsequently, to issue at least one report containing findings and recommendations.

### **Panel on the Draft Report to the Secretary by the Blue Ribbon Commission on America's Nuclear Future**

The Board invited Mr. John Kotek, Executive Director of the BRC, to summarize the major conclusions and recommendations in the draft *Report*. They included the following:

- A new approach to siting and repository development
- A new, single-purpose organization with the responsibility for transporting, storing, and disposing of HLW and SNF
- Changes in the way funds from the Nuclear Waste Fund are appropriated so that management of the program is not affected by limited access to funding
- Expedient development of a deep geological repository for HLW and SNF
- Expedient development of a centralized interim storage facility

In addition, the Board asked Mr. Ward Sproat, former Director of OCRWM, to reflect upon those key conclusions and recommendations. Mr. Sproat noted that the process used by the BRC was thorough, the draft *Report* generally addressed the major issues, and a number of the recommendations were specific and appropriate. He did observe, however, that the draft *Report* ignored some lessons learned from the Yucca Mountain experience as well as important political realities associated with the siting process. At the end of his presentation, Mr. Sproat urged the BRC to recommend that the Yucca Mountain licensing process be completed and to provide more-specific guidance on how to structure efforts for identifying candidate locations for a repository or a centralized interim storage facility.

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<sup>3</sup>U.S. Department of Energy Answers to ASLB Questions from Order Dated April 21, 2010, May 24, 2010, pg. 37. In House Report 112-118, Energy and Water Development Appropriations Bill, 2012, the Board was directed to "provide support to the Department of Energy ... to archive and preserve all Yucca Mountain-related documents and physical materials of scientific value."

The Board subsequently provided the BRC with comments on the draft *Report*. The Board's comments are available on the Board's Web site, [www.nwtrb.gov](http://www.nwtrb.gov).

### **Extended Storage Collaboration Program**

Because of the uncertainty surrounding the future of the Yucca Mountain Project, SNF is now likely to remain in storage for a longer time than previously anticipated. Several groups, including the Board, have begun to explore the implications of this situation. (As mentioned above, the Board released a report, *Evaluation of the Technical Basis for Extended Dry Storage and Transportation of Used Nuclear Fuel*, in late 2010.)

The Electric Power Research Institute (EPRI) has organized an international effort, Extended Storage Collaboration Program (ESCP), to establish the technical bases for continued safe, long-term SNF storage and future transport. The Board is, along with DOE, the Nuclear Regulatory Commission (NRC), the Nuclear Energy Institute, nuclear utilities in the United States and abroad, and nuclear vendors, closely following the work of this collaboration, whose objectives include:

- Reviewing current technical bases and conducting gap analyses for SNF storage and transportation systems
- Conducting experiments, field studies, and additional analyses to address gaps
- Coordinating research that results in a program documenting the performance of a dry-storage system loaded with high-burnup (greater than 45 GWd/MTU) fuel.

During the panel discussion on these issues, Dr. John Kessler from EPRI observed that there appears to be an emerging consensus that more attention needs to be focused on corrosion of the stainless steel canister, especially in marine environments, on the bolted-cask metallic seals, and on delayed hydride cracking of the cladding. Mr. Adam Levin from Exelon Generation Company stated that the demands for R&D could be simplified significantly if changes were made to the established regulatory framework so that the storage canister is considered the waste form for storage, transportation, and disposal rather than just for storage. He also noted that there would be significant benefit from taking full credit for burn-up and encouraged that this be pursued. Finally, Dr. James Rubenstone from the NRC described two on-going activities: (1) establishing a firm technical basis for regulations related to extended storage of SNF and (2) providing support for a potential extension of the waste-confidence decision to more than 60 years beyond the life of a commercial nuclear reactor. Although these activities are complementary, they are not identical.

The Board believes that ESCP is an extremely valuable undertaking and strongly endorses DOE's continued active participation in the collaboration. As noted above, the Board recommends that DOE provide adequate resources to support ESCP's objectives. In that regard, the Board understands that with the decommissioning of the Test Area North Hot Cell at Idaho National Laboratory, opportunities for conducting potentially important investigations on SNF at a National Laboratory may have been foreclosed. If this is so, the Board urges DOE to evaluate other options that might allow those experiments to be conducted.

### **Implications for Waste Management of Using MOX**

Over the last few years, increased attention has been paid to the possibility that the United States might adopt a closed fuel cycle involving reprocessing of light-water reactor SNF and recycling the extracted plutonium in the form of MOX fuel assemblies and perhaps recycling the reprocessed uranium as well. DOE originally investigated this possibility as part of its now-defunct

Global Nuclear Energy Partnership. DOE's Office of Fuel Cycle Technologies continues some of the same work today. To understand better the waste-management implications of using MOX, the Board invited three practitioners to report on lessons learned by their organizations.

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The most detailed technical discussion was provided by Dr. Wolfgang Faber from the German utility EON, which operates eight reactors that have burned MOX. He noted that the use of MOX complicates the on-site management of both unirradiated and irradiated fuel, in part because of the increased security burdens. MOX fuel also requires longer post-discharge cooling time before removal from the spent-fuel pool, and there are other difficulties associated with the intermediate storage period after discharge. In investigating the potential consequences for U.S. utilities of introducing reprocessing and recycling of plutonium and possibly uranium, the Board recommends that DOE take account of the full range of implications for utilities and not just the perceived value of extracting the energy remaining in the spent fuel.

The Board appreciates the effort that NE-53 made to prepare lucid and candid presentations for the September meeting, and we look forward to continued interactions with DOE in future. We would be pleased to meet with you to discuss any of the issues raised in this letter.

Sincerely,

A handwritten signature in black ink, appearing to read 'B. John Garrick', with a stylized flourish at the end.

B. John Garrick  
Chairman

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## SRS Projects in "Red Zone" Push Site Over its own Fiscal and Management Cliff; Plutonium Fuel (MOX) Leads the Way into Abyss

By Thomas Clements | Dec 19, 2012

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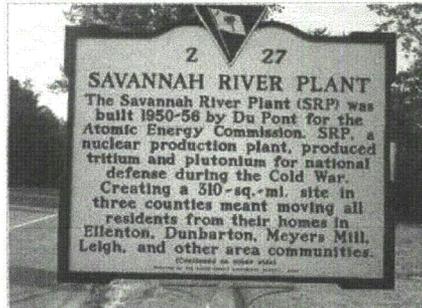


Photo by: Tom Clements, Alliance for Nuclear Accountability (ANA)

Historic marker at the Savannah River Site (SRS) boundary south of Aiken, South Carolina. SRS is home to several construction projects, including the \$7-billion mixed oxide plutonium fuel (MOX) plant, which are in DOE's "red zone" due to cost overruns and mismanagement. SRS has already fallen over a self-induced "fiscal cliff" due to an explosion in construction project cost overruns and lack of adequate congressional oversight. The Alliance for Nuclear Accountability (ANA) and other public interest groups continue to try and pull SRS back from the abyss by supporting cuts to MOX and adequate funding for the most important project at the site - management of highly radioactive waste.

the "project dashboard" assessment for December 2012, already two weeks late in being released, has not yet been posted on line.

The management assessment deals with a host of DOE projects complex-wide. At SRS, it addresses three projects in the red zone: the plutonium fuel (MOX) plant construction, the Salt Waste Processing Facility (SWPF) - for high-level waste from storage tanks - and the Waste Solidification Building (WSB) - for MOX plant waste - and lists the projects as being "expected to breach ... Performance Baseline cost, schedule, or scope." The assessment unfortunately fails to provide much-needed new costs estimates for the projects or how management problems are being addressed.

In the project dashboard matrix, the MOX project and the SWPF moved from the yellow zone ("Project is at risk of breaching its Performance Baseline cost, schedule, or scope") to the red zone in the [March 2012 report](#). DOE's National Nuclear Security Administration (NNSA) has remained mum about the mounting cost and management problems facing the MOX project and has offered no explanation about how the problems will be dealt with or how the overall project will be paid for as budget stresses increase.

A recent estimate of the costs for the three construction projects was about \$6.5 billion but it appears that they are now facing a combined cost overrun that could be as high as \$3 billion or more in the last 11 months alone, according to Tom Clements of the [Alliance for Nuclear Accountability \(ANA\)](#).

In the "Project Dashboard" assessments issued during 2012, the cost estimates for the SRS projects have become fossilized at figures which do not reflect actual cost increases. And, no indication has been presented in any of the assessments as to how mismanagement of the SRS projects will be dealt with.

**Details of Troubled SRS Construction Projects:**

**Cost of MOX Plant Construction Escalates a Stunning 41% Since February 2012? When will DOE Management and Contractors be Held Accountable for the MOX Plant Cost and Schedule Debacle?**

Columbia, SC - A monthly Department of Energy assessment of construction projects affirms that all the large capital-intensive construction projects at the Savannah River Site (SRS) face chronic cost-increase and management problems. The projects are marked with an ominous red indication, underscoring unresolved management and potentially severe cost-escalation problems.

The troubling news was released in the DOE's Office of Engineering and Construction Management's monthly assessment entitled "[Project Dashboard - November 2012](#)." The "red zone" projects at SRS reveal that the budget for SRS will continue to be under huge pressure and will likely face shortfalls. It is unknown why

Documents Reveal Time-line and Plans for "Small Modular Reactors" (SMRs) at the Savannah River Site (SRS) Unrealistic and Promise no Funding  
Thomas Clements



**One SMR Design being Eyed at SRS for Use of Plutonium Fuel (MOX) and Production of Tritium Gas Used in Nuclear Weapons**

**UPDATE of November 21, 2012: No SMR designs teamed up with SRS received the DOE subsidy - SMR companies will have to go through another solicitation process - the "Enterprise SRS" scheme, which is based on SMRs at SRS, faces more troubles**

Documents obtained under the Freedom of Information Act (FOIA) by the Alliance for Nuclear Accountability (ANA) in Columbia, South Carolina reveal unrealistic plans for pursuit of "small modular reactors" (SMR) at the Department of Energy's Savannah River Site, located near Aiken, South Carolina. The obtained Memoranda of Agreement (MOA) between SMR vendors and the Savannah River Site address three conceptual designs: NuScale, SMR, LLC and Gen4 Energy (formerly Hyperion). "It's clear that officials at SRS are caught up in an unrealistic public relations campaign to promote imaginary SMRs at the site," said Tom Clements, Nonproliferation Policy Director with the Alliance for Nuclear Accountability. "SRS is unfortunately staking its future on development of SMRs when there is little indication that they will be economically or technologically practical.

The future of SMRs at SRS is doubtful at best and no amount of public relations spin will make them come true absent sound designs and large amounts of private funding."

The MOAs indicate that sale of electricity to SRS via "Purchase Power Agreements" (PPAs) is being viewed as a way to fund the reactors. "Sales of electricity produced by SMRs at high rates to SRS would likely be nothing but a back-door subsidy by big government and will not be defensible to the public or Congress," said Clements.

The main goal of the SMR vendors appear to be a desire to obtain part of the \$452 million subsidy that DOE will award in September to two reactor designs.

"It's time for big government to stop choosing winners and losers among SMR concepts and let the free market decide if SMRs will be pursued," said Clements. "It's shocking that Governor Haley of South Carolina would support the big-government approach being presented by the Obama Administration over the decisions about SMRs being made by the free market."

Mixed Oxide Fuel Fabrication Facility (to possibly fabricate experimental MOX fuel for unknown clients);

"Original project budget": \$ 4,814,329,000; "project budget" (current): \$ 4,857,129,000;

Possible cost increase, according to press reports: \$2 billion (a whopping 41% increase over the current public estimate, also in the DOE budget request of February 2012);

Project budget in 2004: \$1.6 billion; completion date in 2004: 2007;

Management impact: unknown if managers will be fired or contracts terminated due to massive cost overruns, growing schedule delays and lack of clients to use experimental MOX fuel;

Recommendation: Project should face sequestration, then termination once a roof is placed over the entire MOX building.

Salt Waste Processing Facility (to process high-level liquid waste)

"Original project budget": \$ 900,000,000; "project budget" (current): \$1,339,000,000;

Possible cost increase due to 3-year delay: unknown, \$1 billion?;

Management impact: unknown if project management will be held accountable for a 3-year delay in the project start-up, to 2015, and for failure to make sure in advance that process tanks could be delivered on time and to quality specification and installed when scheduled;

(See Presentation to the SRS Citizens Advisory Board on November 11, 2013 on the SWPF by Tony Polk, Federal Project Manager - has not been posted publicly but ANA has made it available.)

Waste Solidification Building (facility to process MOX waste)

"Original project budget": \$ 344,455,000; "project budget": \$344,455,000;

Current accurate cost: unknown;

Management impact: unknown.

Though DOE is required by project management regulations, including DOE order 413.3B, to conduct new "rebased" cost assessments for large capital-intensive projects, no new estimates are available for the SRS projects, leaving both Congress and the public in the dark about the real cost of the projects and the impact the cost increases will have on the overall SRS budget.

"Even without the impact of cuts looming due to debt reduction and possible sequestration, SRS has already gone over its own cliff due to mismanagement of the largest construction projects at the site," said Tom Clements, Nonproliferation Policy Director at ANA. "SRS is having problems meeting adequate funding for high-level waste management, the program which poses the most threat to public safety and the environment, and it appears that construction project cost overruns will continue to negatively impact the site budget needed by the Office of Environmental Management (EM) to address the essential clean-up of legacy radioactive waste."

"Frankly, DOE's shielding of the MOX project from revelation of accurate cost information and how mismanagement will be addressed is starting to smell a lot like a cover-up," said Clements. "It is simply unethical for DOE, NNSA and contractor management to be hiding what could be a massive MOX cost-increase from the public. If the cost increase this year alone turns out to be 41%, DOE management has much explaining to do and heads should roll. This is a matter which the DOE's Office of Inspector General (IG) should right now be closely investigating."

SRS clean-up projects administered by Savannah River Nuclear Solutions (SRNS) are facing cuts under the so-called "Continuing Resolution" by which Congress is currently funding projects at last year's levels. According to a presentation to the SRS Citizens Advisory Board on December 11, projects in the H-, K-, L- and F-Areas currently face a \$56 million shortfall. SRS and the contractor are attempting to get the short-fall restored though it is unknown if it will be.

While DOE continues to hint at a huge cost increase for the construction of the MOX plant, it has repeatedly failed to explain why it has hidden the required new cost estimate from the public. DOE regulation requiring a "rebased" cost estimate include no provision for withholding an approved estimate.

According to news reports, the new MOX construction cost estimate could be as much as

The MOA with SMR, LLC for the "Safe Modular Underground Reactor" indicates pursuit of controversial nuclear weapons-related programs. The MOA states that "the Parties agree to invite the NNSA [National Nuclear Security Administration] to discuss the feasibility of additional Agreements to irradiate Tritium Producing Burnable Absorption Rods (TPBARs) and Mixed Oxide Fuel (MOX)." These plans refer to the production of radioactive tritium gas used to boost the explosive power of all U.S. nuclear weapons and the use of experimental plutonium fuel (mixed oxide, MOX) made from weapons-grade plutonium surplus to the nuclear weapons program.

Tritium for nuclear weapons is currently produced by the Watts Bar unit 1 reactor owned by the Tennessee Valley Authority.

According to ANA, this shows that the U.S. has quietly crossed the imaginary line between the military and civilian nuclear processes and is engaged in a project which undermines sound nuclear non-proliferation policies. "For non-proliferation, safety and cost reason, production of tritium and use of MOX fuel should be ruled out for any SMRs," said Clements.

SRS is engaged in an intensive promotional campaign to secure SMRs at the site in spite of the fact that they only exist on paper, no design is licensed by the Nuclear Regulatory Commission and sources of funding for development and construction of the reactors have not been identified. This effort by SRS to present itself as a leading SMR candidate site is in parallel with the overly enthusiastic media campaign by SMR vendors to promote their specific models, according to ANA.

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Two of the three separate "Memoranda of Agreement" for three different and still hypothetical SMR designs include deployment timelines which are already admitted by DOE to be inaccurate since they were signed less than six months ago. As SMRs are being promoted for overseas markets, SRS officials will not say what plans are for used reactor vessels or highly radioactive spent fuel which would be taken back to the production site.

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The three MOAs obtained by ANA include agreements with SRS and the following vendors:

**SMR, LLC** (<http://holtecpower.com/>) – signed December 2011  
<http://www.ananuclear.org/Portals/0/SMR,%20LLC%20MOA.pdf>

a \$2 billion increase on a project estimated in this year's DOE Fiscal Year 2013 budget request to be around \$4.8 billion. This massive increase, to almost \$7 billion, would indicate a stunning 41% cost increase of the cost still being presented to Congress and the public.

The [Government Accountability Office \(GAO\)](#) has long pointed out DOE's chronic problems with management of large, costly projects. This history, to the surprise of no one, seems to be repeating itself at SRS, according to ANA.

A hint as to why members of Congress are not holding DOE accountable to cost overruns and project mismanagement at SRS can perhaps be understood by political donations to two key South Carolina politicians who have defended the MOX project.

On December 4, 2012, the [Center for International Policy](#) released a report entitled "[Bombs Versus Budget: Inside the Nuclear Weapons Lobby](#)" and revealed that Senator Lindsey Graham (R-SC) received \$44,000 in campaign donations from "nuclear weapons contractors" in the 2011-2012 election cycle, with the Fluor Corporation being his "top lifetime contributor." The reports states that Graham has received \$434,660 over his political life from nuclear weapons contractors. Fluor Corporation is a parent company of Savannah River Nuclear Solutions (SRNS), the prime contractor at SRS.

By no coincidence, Senator Graham serves on the Senate Subcommittee on Energy and Water Development, which funds DOE projects including MOX.

Representative Jim Clyburn (D-SC) is also in the top ten defense donation recipients in the U.S. House of Representatives, receiving \$61,500 in 2011-2012 and \$345,527 over his lifetime, with Lockheed Martin being his largest donor, according to the report.

"The bottom line on the SRS construction project cost overruns," according to Clements, "is that DOE must reorder its priorities at SRS, tighten control over costs and project management and make sure that the most important project at the site, high-level waste management, is fully funded and managed properly."

"DOE and SRS management must reprioritize the urgent clean-up at SRS and stop diverting funds into a dead-end MOX program which so far seems to be a getting a blank check," said Clements. "The MOX project, which has no customers for the experimental MOX fuel it might produce, is placing growing stress on both DOE's overall budget and the clean-up budget at SRS. We could agree to additional funding to place a roof over the MOX building and once that is done the construction should be halted and project terminated."

The MOX construction project is being carried out by Shaw AREVA MOX Services. So far, there is no indication that the company is being held accountable for cost overruns and construction schedule problems. ANA believes that a full investigation into the project is needed by both GAO and the Office of Management and Budget (OMB).

Testing and use of experimental MOX fuel made from surplus weapons-grade plutonium, a "new fuel form" which has never been used commercially, will have to go through a lengthy licensing process by the U.S. Nuclear Regulatory Commission (NRC).

A December 13, 2012 "[MOX Progress Update](#)" by Kelly Trice, president and COO of Shaw Areva MOX Services, LLC, to the South Carolina Governor's Nuclear Advisory Council, repeats that the old news that the Tennessee Valley Authority (TVA) "has expressed interest in using MOX fuel." Trice fails to report that [TVA has now balked at MOX use](#) and that there are no contracts with any utility to test or use the experimental fuel.

Notably, the presentation by Trice avoids any discussion of MOX construction cost overruns and schedule delays and even fails to give a current cost estimate for the MOX plant construction. Likewise, no estimate is given for the life-cycle cost of the MOX program, which ANA now estimates to have grown to about \$18 billion. NNSA is also silent about the overall MOX program's life-cycle cost.

Due to the problems with the MOX program and that no utilities are interested in MOX use, it continues to appear that no "Final Supplemental Environmental Impact Statement" on MOX use, now under preparation by NNSA, can be issued.

As Senator Tom Coburn (R-OK) said on December 6, it's not difficult to find "waste, incompetence and stupidity" in federal government programs. MOX is a poster child of the waste that Senator Coburn is talking about, according to Clements.

To their great embarrassment, the senators from South Carolina have helped run up the debt by their positions on MOX. Self-proclaimed fiscal conservative Senator Jim DeMint (R-SC), who resigned the job to which he was elected, was immediately praised on his resignation by Senator Lindsey Graham as "a great leader and strong voice for the conservative movement." But DeMint's has undercut his own claim to leadership as a fiscal conservative by standing by and doing nothing while the MOX project spun out of control.

Officials at the Heritage Foundation, which DeMint has been tapped to direct, may be

**NuScale** (<http://www.nuscale.com/>) – signed March 2012  
<http://www.anuclear.org/Portals/0/NuScale%20MOA.pdf>  
**Hyperion Power Generation (now Gen4 Energy)**,  
<http://www.gen4energy.com/>) – signed December 2011  
<http://www.anuclear.org/Portals/0/Hyperion%20MOA%20.pdf>

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surprised when they realize DeMint's resume includes turning a blind eye to a costly, mismanaged project in his own state which may well be adding more to the national debt than any other federal construction project in the Southeast.

Now, U.S. Senator-designee Tim Scott (R-SC) is on the MOX budget-busting hot spot. In an interview on FOX TV news on the morning of December 19, Scott stated that there must be "spending reform" and that "we have a spending problem that should be foremost on our minds."

Will the new senator now step up to the plate in his home state and demand that wasteful spending is indeed addressed and the MOX project slashed? Will Senator Scott be hoodwinked by MOX contractors who are getting rich off the U.S. tax payer or not? Will Senator Scott act as a true fiscal conservative and help pull SRS out of its fiscal and management abyss or will he continue the big-spending, big-government MOX policies of Senators Graham and DeMint that helped get DOE in the mess it now faces?

"I hope Senator Scott is up to the task of actively supporting large cuts to the MOX program; if so he would have earned his senatorial fiscal conservative stripes right at home," said Clements.

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## SRS Plutonium Fuel (MOX) Program to Go Cold Turkey in Lame Duck Session as Tennessee Valley Authority (TVA) Balks at MOX Use?

By Thomas Clements | Nov 21, 2012

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Photo by: Tom Clements, Alliance for Nuclear Accountability

CEO-designate Bill Johnson address the Tennessee Valley Authority (TVA) board meeting on November 15. The issue of TVA's testing and use of plutonium fuel (MOX) was notably absent from the board's agenda. Based on cost, technical and public relations problems, Mr. Johnson will have an easy decision before him to terminate TVA's consideration of weapons-grade MOX, a new fuel form never before commercially used. According to the Alliance for Nuclear Accountability, the MOX turkey must not be pardoned and Congress must put it on the chopping block.

### MOX Turkey Headed to Budget Chopping Block in Lame Duck Session?

Columbia, SC – The Tennessee Valley Authority, the main nuclear utility that the Department of Energy is pursuing for use of plutonium fuel (MOX) made from surplus weapons plutonium, continues to stand up to DOE pressure to test and use the experimental MOX fuel.

The TVA board met at the Northeast Alabama Community College in Rainsville, Alabama on November 15 and the controversial MOX issue was avoided during board deliberations. In attendance was Bill Johnson, the new TVA CEO set to begin in January 2013. Even though DOE is now preparing a Supplemental Environmental Impact Statement (SEIS) on MOX use, the MOX issue has not yet appeared on the agenda of the TVA board and TVA continues to maintain its stated position against MOX use.

In the public "listening session" at the start of the board meeting, the Alliance of Nuclear Accountability and several other organizations and individuals spoke about the foolishness of MOX testing and use by TVA and urged the agency to withdraw its consideration of MOX. ANA delivered a letter to board members pointing out problems with pursuit of MOX.

TVA's refusal to consider MOX use is a testimony to TVA's independence and is a service to the US taxpayer and TVA should be congratulated for its position, according to the Alliance for Nuclear Accountability (ANA).

Lack of any TVA board discussion of MOX is an indication of lack of interest by TVA in getting ensnared in the negative technical, political and financial implications of weapons-grade MOX. Comments on the edge of the board meeting indicate TVA is not now considering MOX use.

"As discussions continue to rein in the federal deficit, TVA's affirmation of no interest in MOX is a green light for the MOX turkey to be dragged to the chopping block and appropriately dealt with," said Tom Clements, Nonproliferation Policy Director with the Alliance for Nuclear Accountability.

TVA's lack of consideration of MOX places DOE's National Nuclear Security Administration (NNSA) squarely in a legal dilemma as it is clear that no final Supplemental EIS on MOX use can be issued as TVA does not agree with the DOE's "preferred alternative" affirming MOX use in TVA reactors.

TVA's "no-MOX" position, clearly stated in the draft SEIS – "The TVA does not have a preferred alternative at this time regarding whether to pursue irradiation of MOX fuel in TVA reactors and which reactors might be used for this purpose" (page Summary iv) - remains the agency's position. Such a position legally bars a joint DOE-TVA "preferred alternative" in favor of MOX in the Final Supplemental EIS set to be issued in March 2013,

Documents Reveal Time-line and Plans for "Small Modular Reactors" (SMRs) at the Savannah River Site (SRS) Unrealistic and Promise no Funding  
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Documents obtained under the Freedom of Information Act (FOIA) by the Alliance for Nuclear Accountability (ANA) in Columbia, South Carolina reveal unrealistic plans for pursuit of "small modular reactors" (SMR) at the Department of Energy's Savannah River Site, located near Aiken, South Carolina. The obtained Memoranda of Agreement (MOA) between SMR vendors and the Savannah River Site address three conceptual designs: NuScale, SMR, LLC and Gen4 Energy (formerly Hyperion). "It's clear that officials at SRS are caught up in an unrealistic public relations campaign to promote imaginary SMRs at the site," said Tom Clements, Nonproliferation Policy Director with the Alliance for Nuclear Accountability. "SRS is unfortunately staking its future on development of SMRs when there is little indication that they will be economically or technologically practical. The future of SMRs at SRS is doubtful at best and no amount of public relations spin will make them come true absent sound designs and large amounts of private funding."

The MOAs indicate that sale of electricity to SRS via "Purchase Power Agreements" (PPAs) is being viewed as a way to fund the reactors. "Sales of electricity produced by SMRs at high rates to SRS would likely be nothing but a back-door subsidy by big government and will not be defensible to the public or Congress," said Clements. The main goal of the SMR vendors appear to be a desire to obtain part of the \$452 million subsidy that DOE will award in September to two reactor designs. "It's time for big government to stop choosing winners and losers among SMR concepts and let the free market decide if SMRs will be pursued," said Clements. "It's shocking that Governor Haley of South Carolina would support the big-government approach being presented by the Obama Administration over the decisions about SMRs being made by the free market."

through that date will likely at a minimum be delayed or issuance of the Final Supplemental EIS could be simply withheld.

Weapons-grade MOX, which has never been used commercially and is regarded by the Nuclear Regulatory Commission (NRC) as a "new fuel form" that will have to undergo lengthy in-reactor testing before any large-scale use can be considered in TVA's Browns Ferry reactors.

As the three problem-plagued Browns Ferry reactors, located near Athens, Alabama, are of the GE Mark I Fukushima design, they automatically should be eliminated from use of risky MOX fuel at the end of lives of the aging reactors, according to ANA. In the letter submitted to the board, ANA noted that not a single person spoke up in favor of MOX testing or use at a September meeting on the SEIS which was held near Browns Ferry.

Construction of the \$6-billion MOX plant under construction by MOX Services at the Savannah River Site near Aiken, South Carolina, continues in spite of the troubling reality that neither TVA nor any other utilities are interested in testing and use of experimental MOX fuel in their reactors.

The MOX plant, if it ever obtains an NRC operating license and is able to overcome start-up challenges, would produce MOX fuel but DOE has not been able to outline a MOX production schedule, what type of MOX would be produced or where the fuel might be used.

"DOE's gross mismanagement of the tax-payer funded MOX project is sadly par for the course with an agency which has repeatedly demonstrated little ability to manage large, complex projects," said Clements. The Office of Management and Budget (OMB) and the Governmental Accountability Office (GAO) are mindful of the host of problems facing implementation of the MOX program.

Even though ANA has estimated that an additional budget-busting \$17.5 billion are left to be spent on the MOX program, DOE has staunchly kept secret the price tag of the program from the US tax payer. "It is doubtful that the DOE's stonewalling on costs of MOX can continue for very long and we fully expect budget impacts to soon hit the program," said ANA's Clements.

"The House cut \$169 million from MOX in its budget deliberations earlier this year and we are hopeful that this cut will be adopted by the full Congress. As disposition of plutonium as waste is estimated to be under \$5 billion, it's clear that the MOX program has sadly devolved into a transfer of tax payer wealth to corporations such as AREVA," said Clements.

While MOX has so far been unscathed by the budget crisis, the most important program at SRS - management of deadly high-level waste - is starting to feel budget cuts. DOE has frequently stated that high-level waste at SRS is the biggest environmental threat in South Carolina. Staffing levels in the clean-up program at SRS are being negatively impacted and it has been reported that employees of Savannah River Nuclear Solutions (SRNS) are being furloughed for a large part of December.

"That the unnecessary MOX program has so far been protected from budget cuts while the essential high-level waste management program faces the budget ax reveals that politicians who appropriate funds for SRS have gotten their priorities totally reversed," said Clements.

"A main reason for the pressure on the most important program at SRS appears to be due to the big-spending crony capitalism of Senator Lindsey Graham, aka Senator MOX, who is protecting funding to MOX contractors even as urgent high-level waste projects get cut. Senator Graham needs to do a little soul searching over the holidays as to why he's putting the health and safety of South Carolinians at risk in order to protect special interests profiting from the budget-busting MOX program."

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## Public Interest Groups Challenge Savannah River Site's Troubled Plutonium Fuel (MOX) Program

By Thomas Clements | Oct 11, 2012

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Photo by: Carolina Peace Resource Center

At a meeting at the University of South Carolina on October 10, attendees heard from Tom Clements of the Alliance for Nuclear Accountability (ANA) about mounting cost and technical problems with the plutonium fuel (MOX) program being carried out at the Savannah River Site. Meeting participants learned that MOX program is amongst the most poorly managed and costly DOE programs which the Government Accountability Office has warned about. Participants also learned about preliminary and secretive efforts by special interests to bring the nation's highly radioactive spent fuel to South Carolina for "extended" storage and possible reprocessing. The crowd uniformly agreed that spent fuel dumping on the state would be soundly opposed by South Carolinians, who will fight like Gamecocks against the scheme.

experimental weapons-grade MOX fuel and for its use in commercial nuclear power reactors.

The cost of DOE's plutonium fuel program, which has been poorly received by utilities, has soared, with about \$17.5 billion yet to be spent, based on an analysis by ANA. This figure is more than three times the cost of disposing of plutonium as nuclear waste and should come as a shock to fiscal conservatives, according to ANA.

Shaw AREVA MOX Services is constructing the \$7-billion MOX plant at the Savannah River Site. DOE has staunchly refused to inform the taxpayer about the cost of both the MOX plant and the overall plutonium disposition program.

"DOE and AREVA expect the tax payer to continue signing blank checks for the misguided MOX program but patience is wearing thin as good money is being thrown after bad," according to Tom Clements of ANA. "Why should the French plutonium company AREVA be profiting off the U.S. tax payer for a dead-end program that lacks a path forward?"

The comments note that currently "DOE has no "Plan B" to pursue plutonium management when the MOX program fails due to cost, technical and scheduling challenges." DOE has already demonstrated how its failure to think about "Plan B" on other projects has resulted in billions of wasted taxpayer dollars, according to ANA. This includes millions of dollars wasted designing a plutonium processing facility in New Mexico that, in the face of cost and schedule problems, DOE now says it doesn't need. ANA and its public interest allies believe that taking time to plan for safer, less expensive alternatives to MOX could save tax payers billions.

Technical and scheduling problems with DOE's plan to make MOX fuel are highlighted in

Columbia, SC -- The Alliance for Nuclear Accountability (ANA), in conjunction with over 40 other public interest organizations, has [submitted comments](#) to the Department of Energy (DOE) in opposition to the MOX plutonium fuel program. The Mixed Oxide Plutonium fuel, or MOX, program would dispose of surplus weapons plutonium by turning it into experimental plutonium fuel (MOX) at the Savannah River Site near Aiken, South Carolina.

The groups oppose MOX for both fiscal and technical reasons and instead endorse preparation of a new analysis to review cheaper and safer options to manage weapons-grade plutonium as nuclear waste.

The groups' comments of October 10 were submitted as part of the [Draft Supplemental Environmental Impact Statement \(Draft SEIS\) on plutonium disposition](#). The Draft SEIS is required by the National Environmental Policy Act before the MOX program can move ahead. The comments focus on DOE's poorly formulated plan for testing

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"It's time for big government to stop choosing winners and losers among SMR concepts and let the free market decide if SMRs will be pursued," said Clements. "It's shocking that Governor Haley of South Carolina would support the big-government approach being presented by the Obama Administration over the decisions about SMRs being made by the free market."

the public interest group comments. Groups signing on to the comments point out that the DOE's "pro-MOX" "preferred alternative" which was presented in the Draft SEIS is inconsistent with the "no-MOX" alternative presented by the Tennessee Valley Authority (TVA). DOE is considering MOX use in five of TVA's aging reactors, including three reactors Browns Ferry which are of the faulty Fukushima design.

In the Draft SEIS, TVA is simply listed as a "cooperating agency," but, in fact, TVA's role as the only utility selected to accept plutonium fuel is central to the MOX program. At this point TVA has not expressed interest in MOX testing or use. This inconsistency poses serious legal problems for DOE under the National Environmental Policy Act.

According to ANA and allied groups, DOE has a legal responsibility to prepare a new Programmatic Environmental Impact Statement (PEIS), due to the significant changes between previous Environmental Impact Statements and the Draft SEIS. Some of these dramatic changes include using Los Alamos National Lab, the Waste Isolation Pilot Plant (WIPP), or other facilities for plutonium disposition had not been considered by DOE in earlier versions of the MOX Environmental Impact Statement. The comments state that "DOE/NNSA must issue for public comment a new Storage and Disposition PEIS or a Supplemental PEIS describing the overall surplus plutonium disposition program and its alternatives before it can proceed with a Final Supplemental EIS."

Groups signed onto the comments noted that MOX made from weapons-grade plutonium has never been used on a commercial scale anywhere in the world and such experimental fuel has never even been tested in a boiling water reactor. The Draft SEIS DOE proposes using MOX in TVA's Sequoyah pressurized water reactors and the problem-plagued Browns Ferry boiling water reactors. However, TVA has not agreed to accept MOX and has not even conducted any public analysis of the testing and use of experimental weapons-grade MOX fuel.

At a recent environmental hearing near Browns Ferry, not a single person spoke in favor of MOX use in the reactors, indicating that TVA will have a public relations nightmare on its hands if it were to consider MOX testing and use in the reactors now at the top of the NRC's list of problematic reactors.

TVA's chief nuclear officer, Preston Swofford, was recently quoted by the [Decatur \(Alabama\) Daily](#) throwing cold water on the idea of TVA using MOX: "It's just so low on my radar screen that I refuse to jump in the fray. I don't think I do service to the ratepayers of the Valley bringing on one more issue. Now three or four years from now, when the fleet's back to steady, we'll take a look at the product."

"It is stunning that DOE is proceeding with construction of a \$7-billion MOX plant at the Savannah River Site without any customers to use plutonium fuel and no operational schedule for the plant," said Tom Clements, ANA's Nonproliferation Policy Director. "The time to terminate the MOX program and explore safer, less costly options to dispose of plutonium as nuclear waste has arrived. Due to technical and legal issues, it is clear that DOE will not be able to issue a Final Environmental Impact Statement endorsing MOX, which will be a strong indication that the MOX program is stumbling and that new non-MOX approaches are needed."

Click [here](#) to view the Alliance for Nuclear Accountability's comments on the Plutonium Disposition Draft Supplemental Environmental Impact Statement.

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## Plutonium Fuel (MOX) Program at Savannah River Site Hit with Major Setback

By Thomas Clements | Sep 17, 2012

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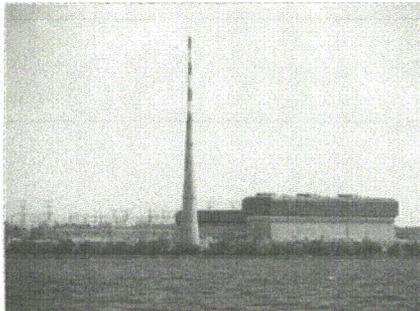


Photo by: Tom Clements, Alliance for Nuclear Accountability

The aging Browns Ferry nuclear reactors, located near Decatur, Alabama, consist of three GE Mark I units, which are the same design that exploded at Fukushima, Japan. The reactors' 60-year license extensions run to 2033, 2034 and 2036, though it remains unclear if they will be shuttered prior to those dates. Unit 1 recently had a "red" finding by the Nuclear Regulatory Commission (NRC), making it the reactor of most safety concern in the entire US. A vague proposal by the U.S. Department of Energy to use experimental plutonium fuel (MOX) made from weapons-grade plutonium in Browns Ferry has drawn public opposition as such fuel has never been tested or used in "boiling water reactors" like Browns Ferry. DOE and the plutonium company AREVA are hoping that the NRC will skirt its own regulations that require testing of "new fuel forms," which could result in the MOX fuel being used in Browns Ferry without testing. In addition, costs for the MOX program are being kept secret though an estimated \$17.5 billion is yet to be spent. Congress and the public likely will not stand for an approach with the MOX program which throws NRC regulations, caution and fiscal responsibility to the wind.

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"Given TVA's reluctance in pursuing MOX and the fact that DOE has no customers to use experimental MOX fuel is reason to put the brakes on the entire MOX program and halt construction of the \$6-billion MOX plant to nowhere," said Tom Clements, Nonproliferation Policy Director with the Alliance for Nuclear Accountability. "It appears that the MOX program continues to degrade into a big-government program with a singular mission: transfer of tax payer money into the pockets of the plutonium industry."

### MOX Garners no Support at Plutonium Hearing near Browns Ferry Nuclear Reactors

At the DOE hearing on the [draft Supplemental Environmental Impact Statement](#) on plutonium testing and use in Browns Ferry, pro-MOX advocates were shocked that sixteen members of the public spoke against use of the experimental plutonium fuel in Browns Ferry while not a single person spoke in favor. Three people spoke in favor of pursuit of thorium reactors, not considered by DOE as an option for plutonium disposition.

Given the troubles with the Browns Ferry reactors, including have the worst rating by the Nuclear Regulatory Commission (NRC) of any reactors in the US, public sensitivity about

Tennessee Valley Authority (TVA) Nuclear Official Steps Away from MOX Use During Plutonium Disposition Environmental Hearings

Columbia, SC – In yet another series of significant set-backs for the Department of Energy's (DOE) troubled plutonium fuel (MOX) program at the Savannah River Site (SRS), a key Tennessee Valley Authority (TVA) official has backed away from considering MOX use in TVA's aging reactors at this time.

The [Decatur Daily](#), a newspaper located in Decatur, Alabama and just a few miles from TVA's Browns Ferry reactors, quotes Preston Swofford, chief nuclear officer at TVA, as saying that he's not at this point interested in MOX use and the agency is instead focused on a host of problems facing operation and management of TVA's nuclear plants. The official was quoted as a DOE hearing on plutonium disposition, including necessity of testing of MOX in the problem-plagued Browns Ferry reactors, was conducted near Decatur on September 13.

The paper quotes Swofford's negative comments about consideration of MOX: "It's just so low on my radar screen that I refuse to jump in the fray. I don't think I do service to the ratepayers of the Valley bringing on one more issue. Now three or four years from now, when the fleet's back

Documents Reveal Time-line and Plans for "Small Modular Reactors" (SMRs) at the Savannah River Site (SRS) Unrealistic and Promise no Funding  
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Documents obtained under the Freedom of Information Act (FOIA) by the Alliance for Nuclear Accountability (ANA) in Columbia, South Carolina reveal unrealistic plans for pursuit of "small modular reactors" (SMR) at the Department of Energy's Savannah River Site, located near Aiken, South Carolina. The obtained Memoranda of Agreement (MOA) between SMR vendors and the Savannah River Site address three conceptual designs: NuScale, SMR, LLC and Gen4 Energy (formerly Hyperion). "It's clear that officials at SRS are caught up in an unrealistic public relations campaign to promote imaginary SMRs at the site," said Tom Clements, Nonproliferation Policy Director with the Alliance for Nuclear Accountability. "SRS is unfortunately staking its future on development of SMRs when there is little indication that they will be economically or technologically practical. The future of SMRs at SRS is doubtful at best and no amount of public relations spin will make them come true absent sound designs and large amounts of private funding."

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the operation of the reactors is high. Comments from many members of the public who live nearby focused on increased risks to reactor operation if MOX is used in the GE Mark I reactors (Fukushima design).

According to the Nuclear Regulatory Commission in a September 18 blog on "[Mid-Term Grades Go Out For Nuclear Power Plants](#)," the Browns Ferry reactors are in a unique, dangerous class when it comes to poor operation. The NRC states that "Browns Ferry 1 in Alabama, is in the fourth performance category and requires increased oversight due to a safety finding of high significance, which will include additional inspections to confirm the plant's performance issues are being addressed."

TVA is struggling to deal with the host of issue at the Browns Ferry Fukushima-design reactors and do not need to add to problems by taking on the dodgy MOX mission, according to ANA. "If the DOE tries to force TVA to commit now to MOX use in the Browns Ferry degraded reactors, which may never be able to perform at a higher safety level, I predict this arm-twisting approach will be seen for what it is and backfire into DOE's face," according to Clements. "If they were acting in a responsible manner, both DOE and AREVA would announce that the aging Browns Ferry reactors are off the table for testing and use of experimental weapons-grade MOX."

Also, at the hearing in Alabama, it was pointed out to NNSA by ANA, via a written comment, that a video being shown about MOX included an erroneous statement that there was a "treaty" with Russia for plutonium disposition. There is only an "agreement" with Russia, which has much less status than a treaty which must be passed by the Senate. To its credit, NNSA has agreed to edit the video and fix the error.

#### **DOE Won't Able to Legally Issue a Final Supplemental EIS on MOX Use in TVA Reactors?**

Swofford's position and TVA's reluctance to look seriously into MOX use will likely have a decisive impact on DOE's legal ability to issue a final Supplemental Environmental Impact Statement (Final SEIS) on plutonium disposition. While DOE's "preferred alternative" is for MOX use in TVA reactors, the draft SEIS states (page S-iv) that "The TVA does not have a preferred alternative at this time regarding whether to pursue irradiation of MOX fuel in TVA reactors and which reactors might be used for this purpose."

As TVA owns the reactors which might test and use MOX and is charged with complying with regulations of the NRC in operation of the reactors, DOE's National Nuclear Security Administration (NNSA) has no legal jurisdictional authority to direct TVA to accept MOX for testing and use.

Likewise, under the National Environmental Policy Act (NEPA), DOE has no authority to dictate a "preferred option" to TVA. TVA is officially a "cooperating agency" in preparation of the draft environmental document and under regulations of NEPA, TVA does not have to adopt DOE's "preferred alternative." At this point, in addition to Swofford's statements, lacking a TVA-conducted EIS specific to the reactors, absent TVA management and board decisions, absent any applications to the NRC to test and use MOX in TVA reactors, and lacking formal public involvement process in TVA decision-making on this controversial matter, it appears that TVA simply can't even consider a leap to a "preferred alternative" in support of MOX testing and use without a much more lengthy and rigorous public process.

Experimental MOX made from weapons-grade plutonium has never been tested or used in a boiling water reactor (BWR) like Browns Ferry. Testing of MOX will take at least six years in one of the Browns Ferry reactors, according to an August 8 [presentation to the NRC by Global Nuclear Fuel](#), meaning that MOX could not be used before 2025 at the earliest, resulting in a host of scheduling problems at the MOX factory, along with soaring costs which will raise the ire of Congress.

The [DOE budget request for Fiscal Year 2013](#) estimated that yearly operational costs of the MOX would plant would be \$499 million (see page 461), so costs will mount rapidly as BWR fuel could not even be considered for licensing by the NRC until the test of "lead use assemblies" (LUAs) had been completed, the spent MOX allowed to cool down and the fuel subjected to post-irradiation examination. Test MOX will have to be fabricated in the MOX plant at SRS, if licensed to operate by the NRC, as no other facility in the world would have the capability to fabricate MOX from weapons-grade plutonium.

"TVA's agreement with DOE's MOX use plan at this point would not only be premature but raise legal questions under NEPA as TVA has admitted that it is not ready to consider MOX use," said Tom Clements of the [Alliance for Nuclear Accountability \(ANA\)](#). "TVA is now in a good position to protect its interests and those of its customers from DOE and AREVA – it can't be legally forced to commit to a risky and potentially costly decision to test and use experimental MOX fuel."

DOE has refused at three MOX hearings and in a presentation on plutonium disposition to the South Carolina Governor's Nuclear Advisory Council on September 6, 2012 to answer any of some of [the key questions about the MOX program](#), which have been submitted for the record. Of great concern is the overall cost of the MOX program, including the cost by

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Shaw AREVA MOX Services to construct the Mixed Oxide Fuel Fabrication Facility (MFFF) at the Savannah River Site.

The Alliance for Nuclear Accountability (ANA) estimates that an additional \$17.5 billion is left to be spent on MOX while disposing of 34 metric tons of plutonium as waste would cost less than \$4 billion. "Based on costs alone, it is time to terminate the MOX boondoggle, from which AREVA and other special interests are getting rich off the U. S. taxpayer," said Clements. "We challenge DOE to step up to the plate and tell the public what the estimated price tag for this program will be. Failure to reveal MOX costs will result in continued erosion of what's left of DOE credibility related to this problem-plagued program."

The Alliance for Nuclear Accountability is celebrating its 25th anniversary this week in Seattle: <http://www.ananuclear.org/AboutANA/25YearsofGrassrootsOrganizing/tabid/108/Default.aspx>

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**NuScale** (<http://www.nuscale.com/>) – signed March 2012  
<http://www.ananuclear.org/Portals/0/NuScale%20MOA.pdf>  
**Hyperion Power Generation (now Gen4 Energy,** <http://www.gen4energy.com/>) – signed December 2011  
<http://www.ananuclear.org/Portals/0/Hyperion%20MOA%20.pdf>

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## Plutonium Fuel (MOX) Plans at SRS Hit Another Obstacle; Plans for MOX in Boiling Water Reactors Can't Be Implemented before 2025

By Thomas Clements | Aug 23, 2012

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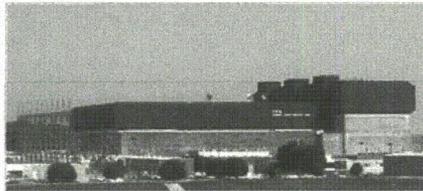


Photo by: Tennessee Valley Authority

The U.S. Department of Energy is seeking approval from the Tennessee Valley Authority (TVA) to test and use experimental plutonium fuel (MOX) made from weapons plutonium in the Browns Ferry reactors. All three of the "boiling water reactors" (BWRs), of the GE Mark I Fukushima design, are currently under increased "oversight" by the Nuclear Regulatory Commission due to significant safety violations. Unit 1 at Browns Ferry received an unprecedented "red" violation in 2010 and remains under increased NRC scrutiny. The 60-year licenses for three aging reactors expire in 2033, 2034 and 2036, which spells trouble for the operational schedule of the MOX plant at the Savannah River Site as the plant will not be able to fabricate BWR fuel until a 6-year test of experimental MOX is completed and analyzed. Weapons-grade MOX has never been tested or used commercially in any BWR worldwide, necessitating the required 6-year test for what the NRC regards as a "new fuel form."

use could take place.

This news comes just as the U.S. Department of Energy (DOE) is conducting a series of hearings on its MOX plans, which fail to address GNF's extended testing schedule for the new fuel. At the first hearing on the DOE's *Draft Surplus Plutonium Disposition Supplemental Environmental Impact Statement (Draft SEIS)*, in Los Alamos, NM, Alliance for Nuclear Accountability Director Susan Gordon stated "No MOX plant operational schedule is presented, no plan or schedule for MOX testing in Tennessee Valley Authority or "generic" reactors is presented and no schedule for full-scale use of MOX is presented. Therefore, no Record of Decision can be issued."

The PF-4 facility at Los Alamos National Laboratory is being eyed by DOE to process nuclear weapon plutonium "pits" in order to supply plutonium oxide for the MOX plant. This plan would result in increased risks associated with transporting and processing plutonium. Other public hearings on the Draft SEIS will be held in Santa Fe, NM on Aug. 23, North Augusta, SC on Sept. 4, Chattanooga, TN on Sept. 11 and Tanner, AL, near the Browns Ferry reactors, on Sept. 13.

The information from GNF will significantly delay full-scale operation of the \$6-billion MOX Fuel Fabrication Facility now under construction at the Savannah River Site (SRS) in SC, increasing costs. The MOX facility has yet to receive an operating license from the NRC and a possible redesign to process plutonium "pits" not processed at Los Alamos will add to costs.

"The GNF announcement is confirmation that testing of experimental MOX fuel by TVA is required by the NRC and will result in significant delays for the MOX program," said Katherine Fuchs, Program Director of Alliance for Nuclear Accountability (ANA) in

Columbia, SC - A presentation to the U.S. Nuclear Regulatory Commission (NRC) on experimental mixed oxide plutonium fuel (MOX) made from surplus weapons-grade plutonium reveals a major hurdle for the MOX program at the Department of Energy's Savannah River Site. On August 8, NRC staff in the preliminary stages of licensing MOX plutonium fuel was informed by Global Nuclear Fuels (GNF) that MOX intended for use in boiling water reactors (BWRs) would need to undergo extensive testing, significantly delaying full-scale MOX production and use.

Global Nuclear Fuels, which makes BWR fuel at its facility in Wilmington, North Carolina, revealed that its licensing plan involves testing sixteen "lead use assemblies" (LUAs) between 2016 and 2025. MOX made from weapons-grade plutonium has never been tested or used in a BWR and the NRC agreed that such MOX was a "new fuel form" requiring multi-year testing in a reactor. During this test period, no commercial BWR MOX

Documents Reveal Time-line and Plans for "Small Modular Reactors" (SMRs) at the Savannah River Site (SRS) Unrealistic and Promise no Funding  
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Washington, DC. "This confirms exactly what ANA has been saying and what DOE has been hiding – that required MOX testing will add billions in costs, and could render the entire MOX program untenable. Congressional funders already concerned about the troubled MOX program will not be pleased to hear about this setback."

GNF would provide the hardware and design specifications for MOX to be made in the SRS MOX plant, if it is finished and can be brought online. AREVA, the French government-owned plutonium company, would likely operate the MOX plant making the BWR MOX to GNF specifications.

The only BWRs being analyzed for MOX use are at the Tennessee Valley Authority's (TVA) Browns Ferry site (GE Mark I, Fukushima design), but the Draft SEIS makes the startling admission that "TVA does not have a preferred alternative at this time regarding whether to pursue irradiation of MOX fuel in TVA reactors and which reactors might be used for this purpose."

In its presentation, GNF states that its goal is to "Use LUAs to Demonstrate [Low Enriched Uranium] Equivalent Lifetime," which means that a test of experimental MOX made from weapons-grade plutonium would be conducted for the same period of time as that of uranium fuel: three two-year fuel cycles (six years). GNF states that it would test 16 LUAs. It is unknown if eight of these test assemblies would be the first assemblies that DOE plans to make in the MOX plant at the end of 2018. GNF estimates these same LUAs will be made at the end of Fiscal Year 2019. Notwithstanding the existing confusion surrounding the MOX program, DOE has refused to clarify if the first assemblies from the MOX plant at SRS would be for BWR or pressurized water reactors (PWRs) or for some unspecified "next-generation" reactor.

Given the required 6-year testing, there could be no commercial MOX use in BWRs before the tests are concluded in 2025. DOE stated in the Fiscal Year 2012 budget request to Congress (on page 392) that "Supplying BWR MOX fuel to the Browns Ferry BWR's would account for 50 percent of the MOX facility's production." If the NRC doesn't certify BWR MOX fuel until 2025 or later, full production at the MOX plant will be set-back for seven years or more. As the 60-year license for first Browns Ferry reactor expires in 2033, the schedule for MOX production, testing and use make it ever more difficult to pull off the program in the anticipated life of the MOX plant – 13 years as presented in the DOE's Fiscal Year 2013 budget request (on page 461) to fabricate 34 metric tons of weapons-grade plutonium into MOX.

DOE has steadfastly refused to reveal the operational schedule of the MOX plant or program life-cycle costs to the public. ANA estimates that \$15-20 billion are left to be spent on the MOX program, whereas disposing of plutonium as waste would cost around \$3.4 billion.

DOE is also pursuing MOX use in TVA's Sequoyah pressurized water reactors, though it remains unclear if a new in-reactor test will be required to license MOX use for more than one or two 18-month cycles, compared to normal three cycles for uranium fuel.

#### Notes:

1. "GNF BWR MOX Fuel" Presentation to NRC, August 8, 2012:

<http://www.ananuclear.org/Portals/0/GNF%20on%20MOX%20LUAs%20NRC%20meeting%208.8.2012.pdf>

2. ANA MOX memo to TVA Board, August 16, 2012: <http://www.ananuclear.org/Portals/0/MOX%20memo%20to%20TVA%20board%208.16.2012.pdf>

3. ANA Comments on Draft SEIS, Los Alamos public hearing, August 21: 2012 <http://www.ananuclear.org/Portals/0/ANA%20plutonium%20DSEIS%208.21.12.pdf>

4. U.S. Department of Energy notice in Federal Register, *Notice of Availability of the Draft Surplus Plutonium Disposition Supplemental Environmental Impact Statement*, July 27, 2012: <http://www.gpo.gov/fdsys/pkg/FR-2012-07-27/pdf/2012-18281.pdf>

5. DOE Fiscal Year 2013 budget request, volume 1

<http://www.cfo.doe.gov/budget/13budget/Content/Volume1.pdf>

6. DOE Fiscal Year 2012 budget request, volume 1

<http://www.cfo.doe.gov/budget/12budget/Content/Volume1.pdf>

7. Comments at August 23 Los Alamos, NM hearing on DOE's Draft Supplemental EIS, by ANA director Susan Gordon:

<http://www.ananuclear.org/Portals/0/Susan%20Gordon%20plutonium%20comments%208.23.2012.pdf>

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The MOA with SMR, LLC for the "Safe Modular Underground Reactor" indicates pursuit of controversial nuclear weapons-related programs. The MOA states that "the Parties agree to invite the NNSA [National Nuclear Security Administration] to discuss the feasibility of additional Agreements to irradiate Tritium Producing Burnable Absorption Rods (TPBARs) and Mixed Oxide Fuel (MOX)." These plans refer to the production of radioactive tritium gas used to boost the explosive power of all U.S. nuclear weapons and the use of experimental plutonium fuel (mixed oxide, MOX) made from weapons-grade plutonium surplus to the nuclear weapons program.

Tritium for nuclear weapons is currently produced by the Watts Bar unit 1 reactor owned by the Tennessee Valley Authority. According to ANA, this shows that the U.S. has quietly crossed the imaginary line between the military and civilian nuclear processes and is engaged in a project which undermines sound nuclear non-proliferation policies. "For non-proliferation, safety and cost reason, production of tritium and use of MOX fuel should be ruled out for any SMRs," said Clements.

SRS is engaged in an intensive promotional campaign to secure SMRs at the site in spite of the fact that they only exist on paper, no design is licensed by the Nuclear Regulatory Commission and sources of funding for development and construction of the reactors have not been identified. This effort by SRS to present itself as a leading SMR candidate site is in parallel with the overly enthusiastic media campaign by SMR vendors to promote their specific models, according to ANA.

"While SRS may superficially appear to present certain attractive aspects for the location of SMRs, the site has not had experience with operation of nuclear reactors in over twenty years and has no current expertise in reactor operation," said Clements. "While DOE is set to chose two SMR designs to fund for further development, SRS affirms that no construction funds will be provided, leaving vendors with the difficult and perhaps insurmountable task to find private funding for SMR construction."

Two of the three separate "Memoranda of Agreement" for three different and still hypothetical SMR designs include deployment timelines which are already admitted by DOE to be inaccurate since they were signed less than six months ago. As SMRs are being promoted for overseas markets, SRS officials will not say what plans are for used reactor vessels or highly radioactive spent fuel which would be taken back to the production site.

"If SRS would become a nuclear waste dumping site due to involvement in SMR programs, this is something that the public in the Aiken area and in South Carolina will soundly reject," said Clements.

###

The three MOAs obtained by ANA include agreements with SRS and the following vendors:

**SMR, LLC** (<http://holtecpower.com/>) – signed December 2011  
<http://www.ananuclear.org/Portals/0/SMR,%20LLC%20MOA.pdf>

tclements@anuclear.org

**Alliance for Nuclear Accountability**

*A national alliance of organizations working to address  
issues of nuclear weapons production and waste cleanup*

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