Alliance for Nuclear Accountability – South Carolina Chapter of the Sierra Club
Friends Committee on National Legislation – Oak Ridge Environmental Peace Alliance
NC Waste Awareness and Reduction Network – Southern Alliance for Clean Energy
Blue Ridge Environmental Defense League
Bellefonte Efficiency & Sustainability Team – Mothers Against Tennessee River Radiation
Nuclear Watch South – Georgia Women's Action for New Directions
Nuclear Watch of New Mexico – Tri-Valley CARES – The Peace Farm
Concerned Citizens for Nuclear Safety – Public Citizen – Friends of the Earth
Nuclear Information and Resource Service – Nuclear Age Peace Foundation
Women's Action for New Directions – Physicians for Social Responsibility
Western North Carolina Physicians for Social Responsibility
Physicians for Social Responsibility-Kansas City – Proposition One Committee
Rocky Mountain Peace and Justice Center – Partnership for Earth Spirituality
Women's International League for Peace and Freedom
SAFE Carolinas – Peace Action New York State – Nuclear Energy Information Service
Citizens' Environmental Coalition – Nukewatch – Coalition Against Nukes
Don't Waste Michigan – Coalition for a Nuclear Free Great Lakes
San Luis Obispo Mothers for Peace – Citizens for Alternatives to Chemical Contamination
Stand Up/Save Lives Campaign – Huron Environmental Activist League
Home for Peace and Justice – Tennessee Environmental Council
Citizens to End Nuclear Dumping in TN – Snake River Alliance
The Colorado Coalition for Prevention of War

Group Comments Submitted for the Record of the Department of Energy's *Draft Surplus Plutonium Disposition Supplemental Environmental Impact Statement* (DOE/EIS-0283-S2, July 2012)

October 10, 2012

The groups noted above and at the end of this submission appreciate the opportunity to comment for the record and expect that all of our comments, including those on legal matters concerning the National Environmental Policy Act (NEPA), will be responded to in a substantive manner.

We believe that the Department of Energy's (DOE) current *Draft Surplus Plutonium Disposition Supplemental Environmental Impact Statement* is inadequate for a host of reasons, which are discussed below in detail and briefly summarized here:

- **DOE has failed to identify utilities committed to testing and use of experimental plutonium fuel (MOX) made from weapons-grade plutonium;**

- **DOE's pro-MOX "preferred alternative" is flawed as the Tennessee Valley Authority has not agreed to test or use MOX; the "preferred alternative" must be reconsidered;**
- **DOE has failed to evaluate all the risks involved with MOX use in commercial reactors;**
- **DOE has failed to analyze the required testing of weapons-grade MOX, never before used on a commercial scale and never tested in boiling water reactors (BWRs);**
- **DOE has failed to evaluate all the risks associated with processing plutonium for MOX;**
- **DOE has failed to outline the operational schedule of the MOX plant and what type of MOX fuel would be fabricated;**
- **DOE has failed to thoroughly evaluate options to dispose of plutonium as waste;**
- **The Tennessee Valley Authority has not evaluated MOX testing and use and has no "preferred alternative" to use MOX; TVA must stick with the no-MOX option;**
- **A full discussion of revisions of facilities at SRS and Los Alamos to process plutonium from nuclear weapons "triggers" must be included;**
- **Costs for the MOX program are out of control and cheaper options should be the focus;**
- **Around $17.5 billion is yet to be spent on MOX, the highest-cost option for plutonium management;**
- **Costs for the MOX program and other costly and poorly-managed DOE projects are putting budgetary strain on key DOE clean-up and non-proliferation programs;**
- **Given legal issues under NEPA, DOE is compelled to not issue a Final Supplemental EIS and must prepare a new Programmatic EIS on plutonium storage and disposition;**
- **DOE has no "Plan B" to pursue for plutonium management when the MOX program fails due to cost, technical and scheduling challenges and must pursue non-MOX options.**

New Approach Needed to Plutonium Disposition

The Department of Energy (DOE) document we are commenting on - the *Draft Surplus Plutonium Disposition Supplemental Environmental Impact Statement* (Draft Supplemental EIS or Draft SEIS) - is part of the problem in the challenge to deal with surplus weapons plutonium and not part of the solution. Almost five years in preparation, the document breaks little new ground and only serves to reaffirm the troubles facing the policy to fabricate plutonium into mixed oxide plutonium fuel (MOX) for use in commercial reactors such as those operated by the Tennessee Valley Authority (TVA). MOX is the highest-cost, riskiest option with the most proliferation concerns.

What is urgently needed is for DOE and the department's National Nuclear Security Administration (NNSA) to start over and begin a new programmatic process to determine the best and least expensive options to dispose of the surplus plutonium as nuclear waste. This would include an analysis of the financial ramifications of the various alternatives, many of which are not considered in the document before us.

History of Plutonium Disposition

In 2000, in a once-noble effort to forever prevent the use of a large amount of surplus military plutonium in nuclear weapons, the US entered into an agreement with Russia to "dispose of" 34 metric tons of surplus weapons-grade plutonium. [Note: This negotiated document with Russia was not a treaty, as a DOE video used at the hearing on the Draft SEIS states. That video must not be used again with this erroneous language.] The US chose two parallel disposition strategies: one track to make experimental mixed oxide plutonium fuel for use in unspecified nuclear reactors; and a cheaper quicker, safer track to immobilize plutonium in high-level nuclear waste. DOE subsequently dropped the cheaper immobilization option in 2002, without a public process, and has gone on to spend billions of dollars building a MOX fuel fabrication plant which has no customers and no production schedule, the so-called "MOX factory to nowhere."

The US-Russia "Plutonium Management and Disposition Agreement (PMDA) can simply be terminated "by written agreement of the Parties." Given the many changes and vagaries in the plutonium management and disposition programs in both countries since the signing of the agreement in the year 2000, it now has limited value.

In 2003, DOE estimated that construction of the MOX plant at DOE's Savannah River Site in South Carolina would be finished in 2007 and cost $1.6 billion. Under the terms of the plutonium disposition agreement with Russia, both countries were to begin operating MOX facilities in 2007. The MOX plant cost estimate has been frozen at $4.8 billion for the last several years and there remain no customers to use the experimental weapons-grade MOX that the factory is slated to produce. Russia is not constructing a similar MOX plant.

It was reported in the Weapons Complex Morning Briefing on September 26, 2012, that DOE's internal rebaselining of the MOX plant construction had jumped $2 billion, to almost $7 billion. Despite repeated requests from public interest groups, DOE has adamantly refused for all of 2012 to release this new cost estimate for either the MOX plant construction or overall plutonium disposition program and is keeping this vital information secret.

Now, the MOX program continues to spin out of control due to massive cost overruns and little interest by nuclear utilities to use costly experimental MOX fuel in their reactors. The time has come to again investigate options to manage plutonium as nuclear waste.

Where Are We Now with Russia? US Helping Russian Proliferation

The US has functionally but not rhetorically distanced its plutonium disposition program from the Russian program. Russia never wanted a MOX plutonium fuel program unless they could continue to reprocess their commercial spent fuel and pursue new plutonium breeder reactors, as part of their program to reuse plutonium. Likewise, Russia balked at the idea to dispose of plutonium as waste either in the US or Russia, but both sides have been free to manage the plutonium as they choose.

When Russia canceled efforts to use MOX in its VVER (light-water) reactors, it became clear that Russia's disposition program was concentrated on an effort to build a new BN-800 breeder reactor that can produce, or "breed," weapons-grade plutonium if allowed to operate with a depleted uranium "blanket" around the reactor in which plutonium can be produced. Though Russia has said it will initially operate the reactor in a "non-breeding mode" it could later operate the reactor to produce weapons-grade plutonium.

Thus, the US program has given cover for Russia to continue constructing the BN-800, which is a blow to US non-proliferation efforts though the State Department turns the matter on its head and seems to triumph a new plutonium breeder reactor in Russia as indicating progress in plutonium disposition.

The sodium-cooled BN-800 reactor could be operable in 2014, though a host of technical questions, including potential design flaws, raise questions about the ability of the reactor to operate. Any rush by the US to produce MOX fuel in the SRS MOX factory, if it were to ever be licensed and operate, simply for the State Department to make a questionable claim that we are proceeding in a parallel disposition track with Russia, is fallacious.

It's All about the Money

An estimated $3 billon has already been spent on the MOX plant construction, being carried out by Shaw AREVA MOX Services (SHAMS), and another $4 billion is apparently needed to complete construction. It is clear that MOX is a worsening investment. With no apparent constraint on DOE's spending on the MOX plant construction program, costs may well go even higher, which will enrich AREVA and Shaw and other contractors and squander tax dollars.

The negative impacts of MOX spending will continue into the future. The out-year spending projection through 2017 for the MOX program is approximately $900 million a year for an estimated total of $3.6 billion. The FY 2013 budget request is for $388 million for construction costs of the MOX plant and $499 million for associated plutonium disposition costs. No other program at the Savannah River Site, including the much more urgent clean-up of high-level nuclear waste, is getting such funding commitment. It is becoming clearer that the huge cost for the MOX program is causing considerable and lasting harm to essential clean-up activities at SRS and other sites.

The Alliance for Nuclear Accountability (ANA) estimates $17.5 billion or more will need to be spent through the remaining life of the overall MOX program as now presented. DOE refuses to release their cost estimates for either the future funding needed for the MOX program or for the life-cycle cost of the overall plutonium disposition program. Likewise, DOE continually refuses to respond to the ANA estimate. At some point this stone-walling of the public and Congress will be considered a cover-up.

It has been repeatedly stated that DOE wanted to save money by not building the Pit

Disassembly and Conversion Facility (PDCF) at SRS to disassemble plutonium triggers (pits) now stored at the DOE's Pantex site in Texas. The truth is that due to the MOX program costs soaring out of control, DOE had to reduce costs somehow and was forced to shelve plans for an expensive stand-alone pit disassembly building. Congress has wisely pulled all funding from the PDCF construction project but the presentation that this is saving money is a smoke screen designed to make the exorbitant costs of MOX somehow appear more reasonable and to shore up MOX funding.

DOE has not provided their estimated costs associated with the alternatives to MOX, making it impossible to compare the cost of MOX with other options. Costs of alternatives – such as immobilization in different manners, geological disposal, and via "off-specification" MOX rods inserted into spent LEU fuel bundles - must be discussed by DOE in NEPA documents.

Additionally, as MOX is getting the lion's share of DOE's nuclear non-proliferation budget, important programs to secure nuclear materials in the former Soviet Union are now under chronic strain. As such programs as the Global Threat Reduction Initiative (GTRI) can be argued to be far more important from a nuclear non-proliferation perspective than a MOX fuel program in the US, it is possible that some in DOE and Congress have their spending priorities reversed.

The MOX program is but one of the four big budget-busting projects being pursued by DOE: the Chemistry and and Metallurgy Research Replacement (CMRR) project at Los Alamos - $6 billion plutonium "pit" facility - which is rightfully halted (at least for the moment), the maldesigned Uranium Processing Facility (UPF) at Oak Ridge - a $7.5 billion dollar thermonuclear bomb plant - and the Waste Treatment Plant (WTP) at Hanford – a $12 billion facility to process high-level nuclear waste. Even though the WTP project is mired in problems some form of high-level waste processing capability is urgently needed at Hanford so the program must continue. As they are not needed, the budget pressures caused by the highly questionable MOX and UPF programs are likely to increase.

If accurate, a $2-billion increase in the MOX construction budget will cause much additional pressure on all aspects of the DOE budget. Though DOE may attempt to continue to hide the MOX plant cost estimate, the budgeting problems are causing is apparent and must be faced by Congress and budget watchdogs like the Office of Management and Budget (OMB).

Where Are the Customers for Experimental MOX fuel?

DOE has spent billions of dollars with no results and the Draft Supplemental EIS only hints at the problems facing the program. First and foremost, there are no reactors or customers committed to use MOX fuel. Further, the document is unrealistic and inadequate concerning MOX testing and use. Further, no MOX plant operational schedule is presented, no plan or schedule for MOX testing in TVA or "generic" reactors is presented and no schedule for full-scale use of MOX in nuclear reactors is outlined. Thus, DOE's "preferred alternative" based on MOX use is flawed and must be reassessed.

Plutonium Disposal as Waste - Cheaper, Safer

It appears that DOE could prepare 34 metric tons of plutonium for disposal as waste for a sum of only $3.4 billion. This figure based on a DOE cost estimate made public at a Savannah River Site Citizens Advisory Board (SRS CAB) meeting on September 24, 2012, that it is costing about $100,000 per kilogram to prepare for disposal as waste in the Waste Isolation Pilot Plant. The cost for disposal as waste in other facilities, including a geologic facility for spent fuel, must be reviewed by DOE.

Given the critical and essential information that such an analysis would provide, as part of the required NEPA cost-benefit analysis, an assessment of costs of disposing of plutonium as waste vs MOX costs must be developed and presented in any subsequent or new NEPA document.

A careful review of all options to dispose of plutonium as a waste form will likely yield the best path forward, a path away from a proliferation-prone and risky attempt to commercialize the use of plutonium as a nuclear power fuel. If DOE will not prepare this review on its own initiative, Congress should so direct it. The Government Accountability Office (GAO), which has reported before on the plutonium disposition program and is now tracking the MOX program, may also have a role in such an alternatives study.

DOE Violating NEPA – Must Conduct Programmatic EIS

DOE/NNSA is not in compliance with the National Environmental Policy Act and must not proceed with issuance of a Final Surplus Plutonium Disposition Supplemental Environmental Impact Statement. The Draft Supplemental EIS to support decisions about surplus plutonium disposition is tiered from the December 1996 Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS (Storage and Disposition PEIS). However, the surplus plutonium disposition program discussed in the Draft Supplemental EIS is fundamentally changed from the program and alternatives discussed in the Storage and Disposition PEIS. Therefore, 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.

The program presented in the Draft Supplemental EIS is greatly changed from the Storage and Disposition PEIS in several ways. First, the Storage and Disposition PEIS considered and eliminated the alternative of disposing of surplus plutonium at the Waste Isolation Pilot Plant (WIPP) (pages 2-10 to 2-15). Nonetheless, the Draft Supplemental EIS includes WIPP as the preferred alternative for disposition of surplus plutonium that is not suitable for MOX fuel fabrication. Second, the Storage and Disposition PEIS did not include Los Alamos National Lab (LANL) as a pit disassembly or conversion location (pages 2-89 to 2-95). Nonetheless, the Draft Supplemental EIS includes LANL as a pit disassembly and conversion alternative. Third, the Storage and Disposition PEIS included sites for up to 50 years of long-term storage (pages 2-2 to 2-7). However, storage at SRS and Pantex could be necessary for more than 50 years, given that the disposition program as described in the Storage and Disposition PEIS has not been

implemented. Thus, at least three important elements of the current program were not considered in the earlier PEIS, leading to the unavoidable conclusion that the program has dramatically changed, and a new PEIS or supplemental PEIS is required before the current SEIS process can proceed.

TVA and the "Preferred Alternative" - the "No-MOX Option"

The Tennessee Valley Authority (TVA), founded in 1933, is "a corporation owned by the U.S. government, [that] provides electricity for 9 million people in parts of seven southeastern states" (http://www.tva.com/abouttva/index.htm). TVA, which operates six nuclear power reactors, is thus subject to the National Environmental Policy Act. If TVA, as a lead agency in supplying reactors for a DOE-defined mission, decides to test and use MOX, this will be considered a major federal action subject to NEPA.

Keeping in mind the bigger issue of the need to conduct a new Programmatic EIS on the plutonium disposition program, in the draft environmental document before us it is stated 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***." (Summary, page S-iv) This is in conflict with DOE's "preferred alternative" to provide MOX fuel for testing and use in TVA reactors. How under the National Environmental Policy Act (NEPA) can one U.S. Government agency legally dictate to another what to do? This simply can't comport with the law and no further NEPA documents can be issued due to this legal conflict.

While DOE is named as the "lead agency" and TVA as the "cooperating agency" in preparation of the Draft SEIS, TVA is, in fact, much more than a cooperating agency.

The summary Draft SEIS states: "A cooperating agency participates in the preparation of an EIS because of its jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative)(40 CFR 1501.6, 1508.5)." (page S-2)

As the MOX program hinges on TVA's participation, TVA contributes far more than certain "jurisdiction by law or special expertise." The entire MOX program as presented in the Draft SEIS depends on TVA. It appears that DOE may well be interpreting NEPA incorrectly by claiming that DOE can make a final decision, a "preferred alternative," for TVA in any Final SEIS.

TVA must not bow to pressure by internal MOX advocates or to the DOE and must not be forced to make a premature decision before any Final SEIS is issued. Too much is at stake for TVA to come to a hasty decision that could have a host of negative technical, safety, cost and public relations ramifications for both TVA and its customers.

TVA must stick with the "preferred alternative" presented in the Draft SEIS and not decide to test or use MOX fuel on DOE's schedule. DOE's attempt to force TVA to agree to a pro-MOX "preferred alternative" may not reflect the reality of TVA's decision-making process and raises legal questions under NEPA.

Likewise, if DOE is somehow able to issue a Final SEIS – perhaps via a watered down "preferred alternative" statement – it must not then go on and issue a "Record of Decision" (ROD) establishing the policy of MOX use by TVA, a decision for which DOE has no legal authority and which TVA's chief nuclear officer has stated will not be made until years from now. Issuance of a ROD in 2013 without full TVA sign-on and before a public decision-making process, including a new PEIS and site-specific EISs for the TVA nuclear reactors being considered, will be questioned under NEPA.

Incomplete Analysis: MOX Testing and Use and the Tennessee Valley Authority

In addition to a host of technical, cost, safety and public relations challenges, the Tennessee Valley Authority faces many difficulties in meeting the criteria that it has outlined for testing and use of experimental MOX fuel.

MOX made from weapons-grade plutonium has never been used commercially in any reactor worldwide and never even been tested in any "boiling water reactor" (BWR) such as Browns Ferry. This point is emphasized as some entities participating in the MOX program, especially contractors associated with AREVA, have consistently and deliberately made misleading and factually incorrect statements about the testing and use of weapons-grade MOX in BWRs. Those erroneous statements seem, in part, to be part of a public relations campaign to convince the Nuclear Regulatory Commission not to require the requisite MOX testing.

MOX was tested in a "pressurized water reactor" (PWR) owned by Duke Energy for a period of time but the test was halted before its completion. Claims by TVA, DOE or the plutonium company AREVA that weapons-grade MOX have been used and can be licensed by the Nuclear Regulatory Commission without successful testing and evaluation are simply false.

TVA has stated that: "TVA is willing to consider using mixed oxide fuel if it meets three criteria: operationally and environmentally safe; economically beneficial to TVA customers; licensed by the Nuclear Regulatory Commission (NRC)." (TVA fact sheet on MOX, July 24, 2012)

Meeting these criteria poses a series of hurdles for those in TVA who are interested in MOX fuel. TVA management and the TVA board should exercise sound judgment and reject further consideration of experimental MOX fuel.

Even if DOE makes a conclusion that it wants to pursue use of MOX in TVA reactors, it will be TVA which makes that decision. It will be TVA which will then have to do its own reactor-specific analysis under NEPA. That document will have to be in-depth as the analysis now before us is cursory and incomplete and provides no technical justification or cost basis on which TVA can make a decision concerning MOX testing and use.

MOX Will Require Lengthy Testing in Browns Ferry, Constrained in Sequoyah

Even if TVA decides to tentatively pursue testing and use of experimental MOX fuel made from weapons-grade plutonium – a "new fuel form" which has never been used anywhere in the world on a commercial basis – the Nuclear Regulatory Commission will require confirmatory performance testing, followed by extensive post-irradiation examination and "license amendment requests" (LARs) before any license can be considered for commercial MOX use.

In an August 8, 2012 presentation to the NRC, Global Nuclear Fuel (GNF) – the company based in Wilmington, NC, which provides uranium fuel to Browns Ferry – outlined the testing needed of 16 "lead use assemblies" (or "lead test assemblies," LTAs) needed to certify MOX use in a "boiling water reactor" (BWR). (That GNF document has earlier been submitted for the Draft SEIS record.)

Under the initial GNF plan, the company indicated that a test of MOX would begin in 2019 and end in 2025, which would mean a test for the regular three fueling cycles of two years each, or 6 years. GNF would supply fuel assembly hardware to AREVA, which would operate the MOX plant (if it can obtain a license and operate as designed), and the MOX assemblies would be made in the SRS MOX plant to GNF specifications for its BWR customer – Browns Ferry.

The Draft SEIS fails to discuss the necessity of the test of what the NRC calls a "new fuel form."

Such a lengthy test of "lead use assemblies" (LUAs) in Browns Ferry or other reactors will have severe impacts on the operational schedule of the MOX plant at DOE's Savannah River Site and will drive costs considerably higher.

For the Sequoyah "pressurized water reactors" (PWRs), the Draft SEIS essentially admits that MOX use may well be constrained, if licensed by the NRC, to a maximum of only two 18-month cycles and not the usual three 18-months cycles for uranium fuel. (See page J-5) This is because an unsuccessful test of MOX in Duke Energy's Catawba reactor was halted after two cycles and the burn-up reached for three cycles was not achieved. A repeat of the test could be required if MOX use for three cycles is sought or if test results reveal problems, which would have more cost and schedule impacts on the overall program.

Importantly, in a June 8, 2012 ruling by the U.S. Court of Appeals for the District of Columbia Circuit, "The Appeals Court ruled that NRC should have considered the potential environmental effects in the event a permanent repository for disposing of spent fuel is never built, and found other deficiencies with the agency's consideration of leaks and fires involving spent fuel pools." (NRC news release, September 6, 2012, http://pbadupws.nrc.gov/docs/ML1225/ML12250A653.pdf) In response to the court's ruling, NRC Commission "directed the agency's staff to develop an environmental impact statement (EIS) and a revised waste confidence decision and rule on the temporary storage of spent nuclear fuel."

The NRC went on in the September 6 news release to affirm that the agency will "not issue licenses dependent on the waste confidence rule – such as new reactors and renewal of existing reactor operating licenses – until the Court's remand is appropriately addressed." This "waste confidence" and relicensing matter is of importance concerning MOX use as the 40-year licenses for the two Sequoyah reactors expire in 2020 and 2021. As TVA has stated that additional 20-year licenses will be sought for the reactors, this delay in relicensing matters as well as the additional heat output of spent MOX fuel may well impact consideration of MOX use in the Sequoyah reactors. The court ruling and NRC action in this matter must be discussed in the SEIS.

Browns Ferry Reactors - NRC Violations Raises Caution Flags about MOX Use

Of special concern is the fact that the Browns Ferry reactors are now under increased scrutiny by the NRC. Violations issued for Units Two and Three have merited additional oversight and the only US reactor to obtain a red finding on Unit One, which, according to the NRC, signifies "that it has high safety significance." [The NRC uses a violation scale of green, white, yellow and red, with red being the most severe and of "high safety significance."]

Likewise, in the current NRC's "Reactor Oversight Process Action Matrix" the three Browns Ferry reactors are listed as all needing "supplemental inspections," which places the reactors in a uniquely negative position amongst all US nuclear reactors.

That the reactors are of the GE Mark I Fukushima design underscores the increased scrutiny by the NRC and the public. Unit 3 at Fukushima had a partial core of reactor-grade MOX - not weapons-grade MOX - at the time of the accident. If not for a decade of citizen activism, the core would have held much more MOX fuel and perhaps the other units would have also contained MOX.

Given the safety concerns at the Browns Ferry units, it is a troublesome and potentially costly distraction for TVA to commit any resources towards consideration of MOX in the reactors. Given that reactors are aging - and reach the end of their 60-year licenses in 2033, 2034 and 2036 - use of MOX would cause additional stresses on the reactors and pose unacceptable safety and operational problems.

Spent MOX Will Pose Storage Problems Due to Higher Thermal Output

Spent MOX fuel is thermally hotter than spent uranium fuel and will thus pose problems in on-site storage and in any repository, especially given that the draft document says that 2-16% more spent fuel would be created due to MOX use. These problems will increase handling issues and possibly have a significant cost impact for TVA.

For example, in a September 2011 presentation to the Nuclear Waste Technical Review Board (NWTRB) entitled *TVA's Consideration of the Use of MOX to Fuel its Nuclear Reactors*, the TVA presenter, Dan Stout, stated that *"Used MOX would need to be kept in dry cask storage an*

additional 56 years longer than UOX to have the same thermal impact on a repository at the time of emplacement."

This is an indication of how much hotter MOX fuel is, both in and out of a reactor. Particularly if the spent MOX fuel is stored on site, it could bring additional cost and storage challenges. In a repository, MOX would add additional heat that must be considered in the design of the facility, resulting in higher cost impacts.

Would DOE Pay TVA to Use MOX and Reimburse for All Cost and Risks….or Not?

TVA is also under contract with DOE to produce radioactive tritium gas, which is used in all US nuclear weapons to boost the explosive power of the weapon, via irradiation of special rods inserted into the Watts Bar Unit 1 reactor in Tennessee. Though a nuclear weapons material that is also produced through normal operation of any reactor, tritium is not fissile and thus can't be used by itself to manufacture the core of a weapon. TVA is carrying out the tritium mission for DOE given that TVA is a government-owned corporation and thus has parallels with DOE's MOX program.

If the way DOE treated TVA in its production of tritium for the US nuclear weapons program is an indication, TVA may well be right in expecting to be saddled with additional costs and risks associated with testing and use of experimental MOX fuel. Though DOE aims to provide MOX to TVA at far below its production cost, in order to claim that it costs about the same as uranium fuel, TVA will expect DOE to pay for irradiation of the experimental MOX fuel and for reactor modifications and perhaps for increased risk to reactor operation.

In a 2011 TVA inspector general report entitled *TVA'S TRITIUM PROGRAM UNDER DOE/TVA INTERAGENCY AGREEMENT DE-A102-00DP00315*, the IG stated that "We were unable to determine if tritium production costs were accurately identified and invoiced or if any negative impacts on plant operation from tritium production were reimbursed by DOE due to inadequate documentation."

The report goes on to document irregularities in reimbursement to TVA for services rendered and inadequacies in TVA's own bookkeeping, so it is unclear if TVA was letting DOE rip it off or if DOE was simply taking advantage of another US Government agency. In any event, the rate payers and tax payers suffered and it is unknown if this problem has been rectified.

Given that DOE proved itself not to be a reliable partner in the tritium production program, at least through 2010, caution is urged by TVA in expecting full payment for all costs incurred by using MOX. The NEPA analysis simply can't assume that DOE's MOX program can be carried out given questions about proper billing and reimbursement in the DOE-TVA relationship concerning tritium production.

"Generic Reactors" and "Next-Generation Light Water Reactors" for MOX – What Are They?

DOE claims in the Draft SEIS that it is looking at unnamed "generic" reactors – what utilities are considering MOX use? – and stated in an Interim Action Determination dated April 1, 2011 - http://energy.gov/sites/prod/files/EIS-0283-S2-IAD-2011.pdf - that non-existent "next-generation light water reactors" are also being considered. DOE intends that fuel for these reactors would also be produced in the MOX Fuel Fabrication Facility (MFFF) at SRS.

In that Interim Action Determination it is stated: "DOE proposes to modify the MFFF design to allow the flexibility necessary to manufacture fuel for a variety of reactor designs. The modifications would provide the MFFF with the capability to produce fuel for boiling water reactors (BWR) and next-generation light water reactors, in addition to the current capability for manufacture of pressurized water reactor (PWR) fuel."

That DOE is considering unnamed "generic reactors" and non-existent "next-generation light water reactors" signals that DOE may well believe that pursuit of experimental MOX use in TVA reactors may fail. It is unknown if those "generic reactors" or "next-generation reactors" may include so-called "small modular reactors" (SMRs) which some special interests are pursuing for the Savannah River Site and which have been presented as capable of using plutonium fuel. A full explanation and identification of these non-TVA "generic reactors" and "next-generation reactors," including the possibility of SMRs, is required.

DOE must reveal plans that it may have as to soliciting more utilities to provide nuclear reactors to potentially use MOX, explain what type of reactors are being sought and discuss the impact of the MOX-use timeline if "generic reactors" or other reactors are solicited. Additionally, any modifications to the MOX plant must be discussed for providing "generic" or "next-generation" MOX, including physical modifications needed and associated NRC licensing impacts.

Any solicitation of "generic reactors" may imply that DOE is aiming to provide MOX in smaller batches to a number of nuclear reactors across the country. As it is likely that pursuit of MOX by more utilities will be met with great concern by the public and that reactor safety and licensing issues will place great hurdles in the path of pursuit of such "generic reactors," DOE must reveal which utilities beyond TVA and Energy Northwest have expressed interest in MOX use.

It has been reported that DOE is soliciting low-enriched uranium (LEU) fuel fabrication vendors to have their fuel design be made into MOX fuel by AREVA in the SRS MOX fuel plant. Therefore, the SEIS must fully discuss the solicitation by DOE or contractors of such vendors as GE, Westinghouse and AREVA and associated environmental impact and describe how MOX would be made to the specifications of the various vendors of LEU fuel for both BWRs and PWRs.

As revealed by documents obtained by Friends of the Earth via the Freedom of Information Act, in a secret meeting on April 22, 2009 between DOE, TVA, AREVA, MOX Services and Oak Ridge

National Lab, there was a discussion about the "need to make fast reactor fuel for the first core of a Advanced Recycle Reactor and the MFFF ability to fabricate this fuel if it is oxide fuel." Any plans or capability for production of such fast reactor fuel in the MOX plant must be fully discussed in the SEIS.

No presentation of MOX plant operating schedule

The Draft SEIS not only does provide adequate clarification about of what type of fuel the MOX plant will make, it also doesn't present any operational schedule for the MOX plant. As the schedule for production and the types of fuel to be produced have environmental impacts, this information must be discussed.

DOE has stated in the past that 8 fuel assemblies would be produced in the MOX plant in 2018. It is unknown what these are or where they would be used. A guess is that they will have to be "lead use assemblies" for lengthy testing in a boiling water reactor (BWR) such as TVA's Browns Ferry but DOE needs to clarify what these first 8 assemblies are, how long the MOX plant will operate or be idle given the need for lengthy irradiation testing, and what types of fuel will be produced over the life of the MOX plant. Additionally, lengthy storage of fabricated MOX will lead to build up of americium in the stored fuel.

The DOE budget to Congress for FY2012 stated that "Supplying BWR MOX fuel to the Browns Ferry BWR's would account for 50 percent of the MOX facility's production" (page 392, NNSA budget volume 1, http://www.cfo.doe.gov/budget/12budget/Content/Volume1.pdf). Apart from doubts that Browns Ferry will ever use experimental MOX fuel, DOE has presented no production schedule at all so it remains speculative as to what kinds of MOX might be made in the facility. Given the need for NRC-licensed testing of weapons-grade MOX in a BWR, which may be conducted from 2019-2025, it will be impossible for any full-scale BWR MOX use, that also must be licensed by the NRC, to begin before 2025 or later.

DOE has stated in the Fiscal Year 2013 budget request various lengths of anticipated operation of the MOX plant, from as little as 13 years to 20 years (NNSA budget request for FY2013, pages 436 and 461, http://www.cfo.doe.gov/budget/13budget/Content/Volume1.pdf). In the Draft SEIS, in Tables C-30 and C-31 on page C-25, DOE states that the "operational years" for the MOX plant ranges from 21 to 24 years. DOE must clarify the length or operation, the yearly production schedule for the MOX plant, including types and amounts of fuel, and what the decontamination and decommissioning plan is and when decommissioning and closure is set to take place.

Use of the MOX plant for unstated or secret missions, such as production of fast reactor fuel or small modular reactor fuel, must be revealed by DOE in NEPA documents. Additionally, if DOE has considered the use of the MOX plant in association with any facilities involved in the reprocessing of spent fuel at SRS - for plutonium removal for fabrication into fuel - this must be revealed in full.

The Draft SEIS fails to discuss the legal challenge by public interest groups before the NRC to the MOX plant's operating license application by Shaw AREVA MOX Services. That intervention (Docket 70-3098-MLA, ASLBP No. 07-856-02-MLA-BD01) against the application is now being reviewed by an Atomic Safety Licensing Board. The intervention has raised significant issues concerning safe and secure operation of the MOX facility and it is possible that redesign of the plant will result in further "contentions" being filed. As it is unknown at this point if an operating license will be issued, any assumption that a license will be granted or that the plant will operate are speculative at this point.

Processing Plutonium at Facilities at the Savannah River Site must be Discussed in Detail

In the transformation over the past year of the H-Canyon from an aging reprocessing facility at SRS into a "national asset," the search for new missions for the H-Canyon has intensified apace with the lobbying for the continued operation of the facility. The justification that underscores this effort rests squarely on the fact that the H-Canyon brings in around $150 million per year to SRS and thus contractors at the site will fight to continue receiving this budget allocation.

Technical details of the H-Canyon's ability to receive and process pits – to provide plutonium oxide feedstock for MOX factory - must be discussed in detail. This would include such things as families of pits to be processed, which dissolver line would do the processing, what the capacity of H-Canyon is to process pits, what upgrades are needed and the associated costs of such upgrades, criticality concerns, seismic and fire risks, worker dose, waste streams, environmental impacts, public health impacts, and risks and uncertainties including impact of a rapid shutdown, with and without restart, of H-Canyon during a pit processing campaign.

DOE must provide information in the SEIS as to how plutonium is being packaged at the HB-Line for disposal in WIPP and how such packaging meets the WIPP WAC. At SRS, plutonium is being packaged into Pipe Overpack Containers and being blended with a special material – "stardust" – to make the removal of the plutonium more difficult via chemical processing. The nature of the "stardust" material must be discussed as well as the packaging process and associated risks and uncertainties. Packaging capacity, criticality risks, waste streams, amounts of plutonium to be processed, condition of aging equipment, worker dose and anticipated shipment schedules are but a few of the issues which must be addressed about use of the HB-Line.

The role of K-Area in preparing pits shipped from Pantex must be fully discussed, including pit receipt and storage, methods to declassify and equipment to cut up pits, criticality issues, impact on pit handling on other K-Area missions, worker dose, environmental and public health impacts, waste generation, seismic and fire risks and security aspects in pit transport, shipping and receipt.

The Draft SEIS fails to discuss details of the role of the MOX plant itself in processing pits. As the MOX plant is being built with a modified PUREX facility inside the plant, the role of this "polishing" facility must be discussed, along with the impact on other MOX operations of

adding a new pit mission to the facility. The SEIS must discuss how the MOX plant design and chemical processing will be changed in any new license amendment submitted to the NRC and how the review of the license and the associated intervention challenging the operating license of the plant will be impacted. Addition of furnaces or other equipment must be discussed, along with the cost and technical aspects of such modifications. The SEIS must discuss how the MOX plant EIS will be amended and what the anticipated schedule is for that process, including the required public meetings. Likewise, the impact of MOX plant modifications to the NRC operating license application must be discussed.

Given the issues at hand, a stand-alone supplemental EIS on pit processing in the H-Canyon is needed, in addition to the new Programmatic EIS on plutonium disposition.

The "Spent Fuel Standard" is Dead - DOE Opens the Door for Non-MOX Waste Disposal Options

DOE earlier presented that getting plutonium into a form which had the equivalent radiation barrier as spent fuel – the so-called "spent fuel standard" – was a main driver for the plutonium disposition program. Now, DOE quietly admits in the Draft SEIS that:

"DOE believes that the alternatives analyzed in this *SPD Supplemental EIS*, including the WIPP Alternative, provide protection from theft, diversion, or future reuse in nuclear weapons akin to that afforded by the Spent Fuel Standard." (S-14)

This admission is an affirmation that MOX isn't the only equally acceptable disposal option and underscores the need for a new, in-depth analysis for disposal of plutonium as waste. Given the lack of clarity with the MOX option, it is clear that a "Plan B" for non-MOX options is urgently required. This draft "alternatives study" must get underway immediately and DOE must fully explain as part of the NEPA process when this will be finished and when the public can comment.

The only way that disposal of contaminated surplus plutonium in the Waste Isolation Pilot Plant (WIPP) can be considered is if the requisite Waste Acceptance Criteria are met and other regulatory requirements are met and if there is sufficient volume in WIPP, as specified by the Land Withdrawal Act. The exact amount of plutonium now destined to WIPP must be discussed both in the SEIS and the new PEIS as well.

While the draft document mentions the "glass can-in-canister" option, which we support as a viable disposition option, DOE must place other disposition options back on the table. As the MOX program is possibly fated to total failure, it is incumbent that DOE now begin a new analysis of all non-MOX options, some of which were included in early NEPA analyses. DOE must actively pursue an array of non-MOX disposal options open lest the collapse of the MOX program results in a total halt in the plutonium disposition program. This is an unacceptable outcome that is becoming more possible given DOE's years of mismanagement of the overall plutonium disposition program.

Risks and Uncertainties of Expanded Pit processing in the PF-4 facility at Los Alamos must be Discussed in Detail

Risks related to criticality, vault storage, cost and schedule, secure shipping and handling, waste handling, staffing, worker dose, and impacts to other programs are among the possible risks. Given recent attention to seismic risks at the PF-4 facility by the Defense Nuclear Facilities Safety Board (DNFSB), the "seismic integrity" of the facility is of special concern. Among other things, this must address risks associated with handling and processing larger amounts of plutonium, especially in the more dispersible oxide form.

DNFSB concerns about the PF-4, expressed in a July 18, 2012 statement entitled "Board Issues a Reporting Requirement Concerning Seismic/Structural Analysis at the Plutonium Facility, Los Alamos National Laboratory" must be analyzed – see http://www.dnfsb.gov/sites/default/files/Board%20Activities/Letters/2012/ltr_2012718_19811.pdf - as well as the September 28, 2012, DOE response to the DNFSB about those concerns (http://www.hss.energy.gov/deprep/2012/TB12S28B.PDF).

Risks associated with ramping up production of plutonium feedstock using the Advanced Recovery and Integrated Extraction System (ARIES) equipment must be discussed given that this process was never planned to be a production-scale facility. The SEIS must discuss risks associated with ARIES contingency plans if higher throughput is necessitated to provide feedstock for the MOX plant in the eventuality that the H-Canyon and other SRS facilities would not be available for pit processing. Additionally, an assessment must be made if the LANL Site-Wide Environmental Impact Statement (SWEIS) will need modifying given any new pit disassembly mission.

The absence of analysis in the draft document on the ARIES process is striking. A thorough analysis of ARIES is needed.

Roof it and Mothball It

The idea to halt construction of the MOX plant has been raised with Congress. A stipulation for this approach was dependent upon getting the roof over the facility so that internal portions of the building would be protected from the weather. As no production schedule for the MOX plant has been produced and no reactors are secured to use MOX and given growing budget pressures, the possibility of construction being halted at some point looms large. Thus, the SEIS must address the environmental impacts of a halt to not only the MOX plant construction but all aspects of the plutonium disposition program, including extended secure storage of plutonium in the K-Area at the Savannah River site.

All Referenced Documents Must be Made Available

All documents listed as references in the SEIS documents must be available publicly via the NNSA website. This has been a recurring issue with DOE EIS documents and needs to be

promptly addressed. For example, this document is listed as a reference but has not been publicly available but must be made available during the comment period: *MPR (MPR Associates, Inc.), 2011, Pit Disassembly and Conversion Project-Evaluation of Alternatives, MPR-3651, Rev 0, November*. (Page S-59)

40 CFR §1502.21 supports the above interpretation and states: "Incorporation by reference. Agencies shall incorporate material into an environmental impact statement by reference when the effect will be to cut down on bulk without impeding agency and public review of the action. The incorporated material shall be cited in the statement and its content briefly described. No material may be incorporated by reference unless it is reasonably available for inspection by potentially interested persons within the time allowed for comment. Material based on proprietary data which is itself not available for review and comment shall not be incorporated by reference."

In conclusion, the MOX program still remains an expensive, speculative program which likely can't be implemented due to a host of problems. DOE's attempt to avoid problems facing the program is a strategy doomed to failure and the time to end that approach has arrived. The Draft SEIS is inadequate from both technical and legal perspectives and the conflicting "preferred alternatives" aren't consistent with NEPA requirements, which necessitates that the entire NEPA process concerning the vexing problem of what to do with surplus weapons plutonium be started anew.

Respectfully Submitted,

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