To Whom it Concerns:

In your document *Management of the UK's Plutonium Stocks*, there is an error concerning the U.S. disposition program which needs correcting.

Your document states:

"Reusing plutonium as MOX fuel is a more mature option. For this reason it was adopted by the US and Russia as the method which will be used to manage their excess weapon grade plutonium under the Plutonium Management and Disposition Agreement that they both signed." (page 6)

While production in the U.S. of weapons-grade MOX fuel from surplus weapons plutonium is indeed a possible disposal option, immobilisation (vitrification) of some plutonium is also being pursued and might yet emerge as the sole option if the troubled MOX program collapses.

Up to 400 kg of weapons plutonium is now being immobilized in existing high-level waste (HLW) at the U.S. Department of Energy's Savannah River Site in the state of South Carolina. The U.S. Department of Energy (DOE) is also considering immobilizing up to several tonnes more of plutonium in HLW but the decision concerning that material and the pertinent Environmental Impact Statement are currently on hold. (That EIS is to also look at the possible use of nuclear reactors supplied by the Tennessee Valley Authority for MOX use, but that secretive proposal is now frozen as uncertainties abound. See information about the EIS at: http://nnsa.energy.gov/nepa/spdsupplementaleis)

At the Savannah River Site, plutonium is being immobilised into large canisters at the Defense Waste Processing Facility (DWPF), along with high-level waste removed from the HLW storage tanks. This radioactive waste is a by-product of separation of plutonium for military purposes and placement of plutonium into this waste is essentially putting it back into the material from which it came.

Commercial-scale production and use of plutonium mixed oxide fuel (MOX) made from weapons-grade (WG) plutonium has never taken place anywhere in the world. The U.S. conducted a failed test involving WG MOX manufactured in the now-closed AtPu facility in France and plans are on hold to conduct further tests required before any wider use of WG MOX could take place in a few nuclear reactors. While the European MOX experience with MOX made from reactor-grade plutonium may be instructive, extensive NRC-licensed testing will have to take place before experimental MOX made from weapons-grade plutonium can move forward.

At Savannah River Site, a MOX plant is under construction but construction is only about 32% complete and the operating license for that facility is being challenged before the U.S. Nuclear Regulatory Commission (NRC) by public interest groups which have concerns about the risks and costs of the MOX program. Start-up dates have slipped and, predictably, the cost has elevated and no new cost estimate has been released in the last several years and now stands at $5 billion.

The U.S. MOX program is in serious trouble as no private electricity utilities have stepped forward to provide their light-water reactors (LWRs) for MOX irradiation. Duke Energy conducted a test of MOX “lead test assemblies” in one of its reactors but the test failed and the LTAs were withdrawn in 2008 after two 18-month irradiation cycles, which means the test lacked a third 18-month irradiation cycle. Duke subsequently dropped out of the MOX program. Lengthy NRC-licensed tests – 3 irradiation cycles, plus post irradiation examination and licensing reviews - in both pressurised water reactors (PWRs) and boiling water reactors (PWRs) will have to take place if any utility steps forward to present its reactors for MOX testing and possible “batch” use. As MOX changes operating parameters and poses more risk in case of accident many utilities have no interest in MOX use.

On 3 February 2011, the U.S. branch of the international environmental organization Friends of the Earth released information that DOE is pursuing another utility to use MOX but that idea is fraugt with problems. See FOE news release: *Secret Plan Exposed to Use Surplus Weapons Plutonium in Washington State Nuclear Reactor* at http://www.foe.org/secret-plan-exposed-use-surplus-weapons-plutonium-washington-state-nuclear-reactor

For more information on the failed MOX test in the U.S., see Friends of the Earth news release *Duke Energy Abandons Plutonium Fuel (MOX) Testing Program in South Carolina Reactor*, 12 November 2009, at http://www.foe.org/duke-energy-abandons-plutonium-fuel-mox-testing-program-south-carolina-reactor

Many environmental and non-proliferation groups in the U.S. believe that disposing of plutonium as nuclear waste is cheaper, quicker, safer and more proliferation-resistant than implementing a costly and technically challenged MOX program. It is clear that the U.S. MOX program is being pursued as some especial interests see the program as a stepping stone into U.S. reprocessing of spent commercial reactor fuel and development of plutonium breeder reactors, from which they would profit. Pursuit of MOX use in the U.S. has long-term proliferation concerns that should give pause before any U.S. MOX plant operates or introduces weapons-grade plutonium into commerce.

Sincerely.

Tom Clements

Southeastern Nuclear Campaign Coordinator

Friends of the Earth

To Whom it Concerns:

On 7 February 2011, I submitted a comment to the plutonium consultation about errors and omissions in the consultation document concerning the status of the U.S. Department of Energy's program to dispose of surplus U.S. weapons plutonium. In that message, I included a link to the news release below but thought

that it would make the messy U.S. MOX situation clearer if I submitted the full text of the news release as well as the URLs of the documents cited in the notes at the end of the release.

The chronic problems with the MOX program in the U.S. are instructive to any country trying to determine how to manage plutonium stocks, whether they be from military or civilian reprocessing. The troubled MOX program in the U.S. continues but with growing pressure on the federal budget, absence of an operating license for the MOX plant and cold start-up still five years away (if ever), absence of any nuclear reactors to irradiate the MOX, necessity for a lengthy MOX irradiation testing period, and existence of the cheaper, quicker and safer method of vitrifying the plutonium in existing high-level waste, it is unclear where the U.S. MOX program is headed. The justification for MOX has become murky at best as it has become more a program to funnel vast amounts of tax payer money to special interests, including the socialist company AREVA, than a non-proliferation program as first claimed.

In the spirit of making sure that information about the U.S. plutonium disposition program is accurately discussed and analyzed in the plutonium consultation, I will make additional submissions as appropriate.

In your striving to produce an accurate document, please feel free to contact me at any time to discuss the situation in the U.S.

Sincerely,

Tom Clements

Southeastern Nuclear Campaign Coordinator

Friends of the Earth

*Secret Plan Exposed to Use Surplus Weapons Plutonium in Washington State Nuclear Reactor*

http://www.foe.org/secret-plan-exposed-use-surplus-weapons-plutonium-washington-state-nuclear-reactor

Friends of the Earth - US

Thursday, February 3, 2011

# Secret Plan Exposed to Use Surplus Weapons Plutonium in Washington State Nuclear Reactor

## FOIA Documents Reveal Energy Northwest Plans Plutonium Fuel (MOX) Experiments While Seeking to Control Information Leaks to the Media

**Columbia, SC** -- Department of Energy (DOE) documents released to Friends of the Earth reveal that the public utility Energy Northwest hopes to bring experimental radioactive plutonium fuel into Washington State for use in risky tests in a nuclear reactor not originally designed for that purpose. The documents also reveal that the utility has sought to keep information secret the about the controversial and risky pursuit of use of surplus weapons plutonium as nuclear reactor fuel.

The environmental watchdog group Friends of the Earth believes that the plutonium mixed oxide fuel (MOX) should be kept out of the state and that such tests would pose unacceptable safety risks and lead to unacceptable costs.

According to a DOE document dated January 6, 2011, and confirmed by documents obtained under the federal Freedom of Information Act, Energy Northwest is “formally evaluating the potential use of MOX fuel” in the company’s single nuclear reactor - the Columbia Generating Station reactor - located at the Department of Energy’s Hanford site near Richland, Washington. The reactor is a GE boiling water reactor (BWR) and was licensed in 1984. The Hanford site, where it is located, has produced about 65 metric tons of weapons plutonium in now-closed reactors dedicated to military use.

“It is foolish for Energy Northwest to continue down this costly and risky path and we urge the utility to drop the controversial MOX plans,” said Tom Clements, Southeastern Nuclear Campaign Coordinator with friends of the Earth in Columbia, South Carolina. “Due to non-proliferation and safety concerns, weapons plutonium should not be used as fuel in the Columbia Generating Station or any other nuclear power reactor.”

“It’s no surprise that the utility tried to keep its controversial plans to use reactor fuel containing weapons-quality plutonium secret. Myriad technical and public relations problems are posed by the potential use of a fuel that has never before been tested in a boiling water reactor. Bringing plutonium back to Hanford to be used as fuel and stored as waste will set back cleanup efforts at the site. It’s hard to see how the public could accept bringing plutonium back to Hanford after most of it has been shipped off the site,” Clements said.

MOX fuel made from surplus weapons-grade plutonium has never before been used in any country on a commercial scale and presents a host of political and licensing problems for Energy Northwest. MOX containing approximately five to seven percent weapons-grade plutonium presents technical challenges to reactor operation and fuel management and storage, poses security risks in transport and handling, and presents the threat of larger radiation release in an accident. One of the undated FOIA documents from Energy Northwest states, “It does not make sense from either an economic perspective or risk perspective for Energy Northwest to pursue the use of MOX fuel.” But nuclear officials have pushed ahead in spite of those concerns.

Over 200 pages of FOIA documents reveal that officials at Energy Northwest have been developing plans with the Pacific Northwest National Laboratory and the Department of Energy to begin a “three-¬phased approach to integrating MOX fuel” into the reactor. According to the documents, testing would begin with irradiation of 10 to 20 fuel pins fabricated by the laboratory in 2013 or 2105, followed by the use of up to eight “lead use assemblies” (LUAs) around 2019 for three or more two-year irradiation cycles (a total of six or more years), with loading of up to 30 percent of the reactor’s core with MOX fuel beginning around 2025. Each step would require license amendments from the Nuclear Regulatory Commission.

The Department of Energy is currently constructing a $5-billion facility to make MOX fuel at its Savannah River Site in South Carolina and construction continues even though no nuclear reactor has been identified that will use the MOX fuel. Duke Energy began testing of experimental MOX fuel in 2005 but dropped out of the program after a test in its Catawba reactor in South Carolina

failed after two rather than the necessary three 18-month irradiation cycles (the three cycles would have lasted a total of 54 months). Now, the Energy Department, via the contractor Shaw AREVA MOX Services, is focused on discussions for MOX use with the Tennessee Valley Authority and Energy Northwest as wider interest in the problematic fuel is lacking.

A March 2009 Memorandum of Understanding between the Tennessee Valley Authority and Energy Northwest regarding the exploration of whether MOX could be used in boiling water reactors is among the FOIA documents obtained by Friends of the Earth. Fuel fabricator GE-Hiatchi has also been involved in the MOX-use discussions and participated in a secret meeting with Energy Northwest, the Pacific Northwest National Laboratory, Shaw AREVA MOX Services, and DOE at the Savannah River Site in September 2009.

The MOX program laid out in the documents is speculative as it would have to be licensed by the Nuclear Regulatory Commission and would be dependent on capacity to fabricate MOX test assemblies made from weapons plutonium. No such production capacity currently exists, so the MOX plant at the Savannah River site, scheduled to undergo startup testing in 2016 or later (if construction finishes and if it can overcome an operating license challenge by public interest groups), would have to be used to fabricate "lead use assemblies." This means that the MOX plant at the Savannah River Site is at risk of sitting idle for years as no MOX fuel beyond that used in testing could be produced during the test phase as NRC approval for the fuel's quality and performance would be lacking.

Energy Northwest presentations obtained via the Freedom of information Act point out potential problems with MOX use, saying that there must be "no negative impact on reactor operation" and that MOX use must be "cost neutral" for Energy Northwest. An Energy Northwest senior engineer in charge of fuel management wrote in a December 2009 email that those at Energy Northwest and the Pacific Northwest National Laboratory pursuing MOX use "don't want any unexpected press releases about burning MOX fuel in [the Columbia Generating Station reactor]." That same official commented that the DOE's lack of utilities interested in using the MOX fuel "doesn't look good politically."

**Notes:**


1. FOIA documents from Energy Northwest (partial, final)

http://www.foe.org/sites/default/files/2010-02_Clements_Partial_Response_3-8-2010-1.pdf

http://www.foe.org/sites/default/files/2010-02_Clements_Final_Response.pdf

2. DOE Presentation on Status of MOX Plant, January 6, 2011

http://www.foe.org/sites/default/files/MOX_overview_to_BRC_by_Ramsey_1%206%2011.pdf

3. Friends of the Earth letter to Energy Northwest CEO Mark Reddemann, Jan. 31, 2011, urging the end of MOX use.

http://www.foe.org/sites/default/files/letter%20to%20EN%20CEO%201%2031%202011.pdf

4. Friends of the Earth news release "Duke Energy Abandons Plutonium Fuel (MOX) Testing Program in South Carolina Reactor,"

November 12, 2009

http://www.foe.org/duke-energy-abandons-plutonium-fuel-mox-testing-program-south-carolina-reactor

5. Alliance for Nuclear Accountability (ANA) MOX fact sheet - “Plutonium Disposition Remains In Disarray”

http://www.ananuclear.org/Portals/0/documents/2009%20Fact%20Sheets/MOX6%20final.pdf

6. Information on NRC website about Columbia Generating Station

http://www.nrc.gov/info-finder/reactor/wash2.html

7. Energy Northwest overview

http://www.energy-northwest.com/who/documents/EN_Overview_Facts_10.pdf

To Whom it Concerns:

Given the nuclear disaster in Japan and that plutonium fuel (MOX) is present in the Fukushima Daiichi Unit 3, it is incumbent upon this consultation process to take into account the contribution of MOX to the status of reactor number three and to the radiation releases into the environment.

As plutonium has been detected near to the reactors, the consultation must take into account investigations that must be forthcoming to determine the source of that plutonium and if it came from the MOX fuel, likely now melted, present in Unit 3.

Furthermore, as MOX fuel burns hotter than uranium fuel, the impact of this to the reactor’s status must be determined.

Additionally, as there has been much reporting on the use of MOX fuel in Fukushima Daiichi Unit 3, the public perception of use of plutonium fuel must be taken into account in the consultation. Recognizing the sensitivity of the MOX issue, a planned shipment of MOX scheduled for April 2011 from France to Japan has evidently been canceled

I will add that it is only due to public interest organizations that Unit 3 does not contain a 1/3-core of MOX. Only about 5% of the material in the core is MOX. Japanese and international NGOs and individuals in Japan are to be thanked for their efforts to prevent MOX use in the Fukushima reactors.

In the US, the U.S. Department of Energy’s MOX program will face increased scrutiny, in part because DOE is considering MOX use in the Browns Ferry reactors, owned by the Tennessee Valley Authority. These three units are boiling water reactors (BWRs) with the GE Mark I containment, just like the troubled reactors at Fukushima. Other reactors owned by TVA are being considered by DOE for MOX use and these also have a unique pressure suppression system (“ice condensers”), which means they also have thinner containment that the robust PWR containment seen in other reactors and pose unique risks in case of

accident. (I would add that I have been monitoring the US MOX program since the roots of its inception in the early 1990s.)

I formally request that the comment period in this consultation be extended until such time as the public can review reports and assessments which will be forthcoming about the accident in Japan. The public must be able to review the impact of MOX in the Fukushima accident and be able to make comments in the consultation as appropriate. Thus, an extension of a long amount of time is called for. To close off the consultation before reports about the Japanese situation are available for analysis will potentially close off submission of important information and thus possibly have an impact on the credibility of the consultation itself and the quality of the information being analyzed.

Sincerely,

Tom Clements

Southeastern Nuclear Campaign Coordinator

Friends of the Earth