EDO Principal Correspondence Control

FROM: DUE: 09/04/08 EDO CONTROL: G20080546
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FINAL REPLY:

Kay Drey
St. Louis, Missouri

TO:

Chairman Klein

FOR SIGNATURE OF : ** GRN ** CRC NO: 08-0436

Miller, FSME

DESC:

Radioactive Waste Generated at the Callaway Nuclear Power Plant (EDATS: SECY-2008-0470)

ROUTING:

Borchardt
Virgilio
Mallett
Ash
Ordaz
Cyr/Burns
Weber, NMSS
Collins, RIV
Leeds, NRR
Johnson, NRO
Campbell, OEDO

DATE: 08/12/08

ASSIGNED TO: CONTACT:

FSME Miller

SPECIAL INSTRUCTIONS OR REMARKS:

Coordinate with NMSS.

EDATS
Electronic Document and Action Tracking System

EDATS Number: SECY-2008-0470 **Source:** SECY

General Information

Assigned To: FSME
OEDO Due Date: 9/4/2008 5:00 PM
Other Assignees:
SECY Due Date: NONE
Subject: Radioactive Waste Generated at the Callaway Nuclear Power Plant
Description:

CC Routing: NMSS; NRO; NRR; Region IV
ADAMS Accession Numbers - Incoming: NONE
Response/Package: NONE

Other Information

Cross Reference Number: G20080546, LTR-08-0436
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Special Instructions: Coordinate with NMSS.

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OFFICE OF THE SECRETARY
CORRESPONDENCE CONTROL TICKET

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AUTHOR:	Kay Drey		
AFFILIATION:	MO		
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EDO --G20080546

To: Dr. Dale E. Klein, Chairman
U.S. Nuclear Regulatory Commission. Washington DC 20555-0111

From: Kay Drey 515 West Point Ave. St. Louis MO 63130

Date: August 4, 2008

Subject: **Some questions for the U.S. Nuclear Regulatory Commission about the Radioactive Wastes generated at the Callaway nuclear power plant in Missouri --- both currently and at the proposed second reactor.**

This memo is a request for answers to questions that were not addressed during the **July 9 NRC public meeting**, held to discuss Ameren/Union Electric's plans to submit an application to build a second reactor at its nuclear power plant in Callaway County. The meeting was held at Westminster College in Fulton, in Callaway County.

As anticipated, AmerenUE has now submitted a combined Construction and Operating License Application to the NRC to build a second reactor in Callaway County, adjacent to the current reactor. The 8,000-page COLA was submitted on July 28, 2008.

A. "Low-Level" Wastes:

The only radioactive wastes the NRC categorizes as "high-level" are the irradiated fuel rods that have been removed from a reactor, after fissioning for about three years, for replacement with fresh uranium rods. And wastes left over from the reprocessing of irradiated fuel rods after not-yet-fissioned uranium and plutonium have been extracted for fabrication into new rods or nuclear weapons. All other radioactive wastes, including some that can give an exposed person a lethal dose, are called "low level."

1. Questions about the increasing volume of low-level radioactive wastes (LLRW) now needing to be stored at the Callaway plant site for an indefinite period:

As of July 1, 2008, South Carolina shut its borders to "low-level" radioactive wastes from Missouri and 35 other states, and from Washington DC, Puerto Rico and the US Territories. The extremely hot LLRW (Classes B & C) are now only being accepted at the Barnwell SC disposal facility from states in the Atlantic "regional" compact (SC, CT and NJ).

Prior to July, Barnwell had been the only remaining licensed disposal facility in the U.S. willing to accept Callaway's B & C "low-level" wastes. (I do not know what Ameren does with its "Greater than C" LLRW.)

a. For how many years does the NRC expect to allow AmerenUE to provide "extended interim storage" for its B & C wastes on site at Callaway, in accordance with the NRC's Regulatory Issue Summary 2008-12 (May 9, 2008)?

b. According to that RIS: "To the extent possible, licensees may wish to estimate the total life-cycle financial burden of extended interim LLRW storage (including but not limited to operations and maintenance, inspection and monitoring, and eventual disposition) and provide this estimate to organization decision makers for overall budget consideration." (p.5, emphases added.)

(1) Regarding the phrase, "eventual disposition," above: As of the passage in 1985 of the federal Low-Level Radioactive Waste Policy Amendments Act, Missouri began negotiations with co-member states in the Midwest Regional Compact in order to choose the first Midwest site. When Michigan became the first designated host state, it withdrew from the compact. Does the NRC know of any state in the Midwest or the nation that has expressed its willingness to install and operate a disposal site that might accept B & C "low-level" wastes from any of the 36 states now banned from South Carolina?

(2) Is any NRC licensee discussing with the NRC the possibility of developing a licensed disposal site for B & C wastes within surplus acreage at a nuclear power plant site? For example, AmerenUE owns surplus land that is not needed for the current Callaway reactor, nor for the proposed second reactor. That is, of the 7,200-plus acres Union Electric initially purchased in the 1970s for the construction of four reactors, more than 6700 acres are currently being leased to the MO Department of Conservation for use as the Reform Conservation Area, for public hunting and fishing. (The MDOC advises that when the National Security Level reaches orange or higher, the RCA may be closed to public use.)

(3) Is the NRC discussing with Ameren the possibility of requiring the construction and operation of expanded storage capacity within the Callaway plant site for the primary and secondary solid radioactive wastes from the current reactor? For example, the existing Radwaste Building's Drum Storage Annex was estimated to provide temporary storage capacity for only "approximately 2 years of primary [reactor vessel system] drummed solid wastes." (Callaway Plant Final Safety Analysis Report for the Operating License, June 1986, p. 11.4-13) Or another projection: "The onsite storage facilities for drummed solid wastes have a capacity for temporary storage of solid wastes resulting from up to 5 years of plant operation." (Ibid., p. 11.4-2)

Low-level wastes are categorized on the basis of the contained radioactivity and surface dose rate. The wastes include primary and secondary waste drums, and components and equipment that have been activated (made radioactive during reactor operation) and that have been replaced because of aging, obsolescence or malfunctioning. The hottest wet wastes include evaporator bottoms, and spent resins and filter cartridges saturated with fission, activation and corrosion products.

Some of the LLRW isotopes are extremely long-lived. For example, technetium-99 has a half-life of 211,000 years. Because exposure to some of the hotter LLRW could give an equipment operator a radiation dose vastly in excess of the permissible worker limits, some of the wastes must be handled by remote- or semiremote-controlled equipment.

(4) Has the NRC staff estimated or calculated the life-cycle financial burden of storing and protecting, within a nuclear plant's site, the B & C wastes that are generated annually by a typical 1000-megawatt reactor during the licensed operating period, and beyond? Have the costs been estimated of possibly having to store and guard the LLRW that will be generated during the decommissioning and dismantling of a power plant's radioactively-contaminated buildings and equipment after the plant's closure, for an indefinite period?

2. Questions about potential environmental impacts of the extended interim storage on site at Callaway of the reactor's B & C wastes:

a. According to Regulatory Issue Summary 2008-12, in order to "ensure the integrity of packaging and maintenance of waste form" during extended storage, the NRC is requiring the following: "stored waste packages should be protected from the elements (e.g., wind and precipitation) and from extremes of temperature and humidity. To the extent that circumstances make it impractical to provide such protection from climate, the licensee may wish to determine

how it will maintain package integrity and prevent the release of stored LLRW despite the exposure of stored waste packages to the elements." (RIS, p. 3)

The current Callaway radioactive waste systems and structures are designated as nonseismic Category I. (Callaway Plant Operating License FSAR, Rev. 0, 6/86. p. 3.2-2) Because of the need to begin storing B & C wastes on site into the indefinite future, will the NRC now require that the radwaste storage structures be retrofitted to seismic Category I standards in order to withstand a safe shutdown earthquake? And to withstand the effects of a tornado and other extreme wind and environmental conditions?

b. If the proposed second, larger reactor were to be built at Callaway, would the NRC require more rigid safety-significant construction standards for the second Radwaste Building and Drum Storage Annex, in order to withstand the rigors of extended storage?

c. Are the four huge, highly radioactive steam generators that were removed and replaced at Callaway One, during the 2005 refueling shutdown, still being stored on site? And if so, was the storage structure housing the generators designed to withstand a design basis earthquake and other natural phenomena hazards?

d. Where does the NRC anticipate that storage space, with protection from the elements and climate extremes, will be available at Callaway One for wastes collected during an indefinite number of future refueling and maintenance outages? I understand that the next refueling outage is scheduled for this fall, 2008.

3. Questions about lessons learned from the events of 9/11 in 2001:

a. Has the NRC issued any generic regulatory changes as yet for the extended interim storage of low-level waste on site at nuclear power plants in order to address intensified security concerns, following 9/11?

b. Is it expected that the NRC will require additional armed security personnel at nuclear power plants because of the extended onsite storage and increased volume of primary and secondary LLRW? Is the Commission addressing the possibility that a terrorist could seek to steal these stockpiled materials for use in making a dirty bomb?

c. Does the NRC expect to require Ameren to submit any amendments to its operating license for Unit One in order to accommodate the extended storage of certain radionuclides of concern in quantities that may exceed threshold limits, now that Barnwell is closed to Missouri's B & C wastes?

4. Questions about the potential generation of combustible gas combinations and other reaction products during the extended on-site storage of LLRW:

a. Radiolysis is defined as the decomposition of water into hydrogen and oxygen gases as the result of exposure of the water molecules to radioactivity. Radiolysis has caused the decomposition of residual water in radioactive waste containers into potentially dangerous gas combinations. Does the NRC expect to require Ameren to install and operate "additional ventilation, air filtration, or fire detection/alarm/protection/suppression systems" in order to seek protection against the increased potential for radiolytically generated combustible gases? (RIS 2008-12, p.4)

b. During the train shipments of the irradiated fuel that had melted during the 1979 accident at Three Mile Island (that is, shipments that were routed from Pennsylvania, through St. Louis, to a storage pool in Idaho), recombiner catalyst packages were installed in each of the fuel transport canisters in order to recombine hydrogen and oxygen gases that were separated by the radiolytic decomposition of residual water in the canisters. The NRC was concerned both about the buildup of internal pressure and about the buildup of potentially flammable or explosive mixtures of hydrogen and oxygen.

Since Callaway's hottest wet and dry LLRW will now merely be piled up or stacked in drums in a building at Callaway, is the NRC planning to address the hazards of radiolytically-generated gases that might accumulate during the extended storage duration?

5. Questions about the monitoring of the stored low-level wastes:

a. Is remote-controlled monitoring equipment currently available that can determine if concentration levels of radioactive gases, liquids or particulate materials released to the environment from B & C wastes in the Drum Storage Annex may exceed the NRC's permissible emission levels?

b. If such equipment is not available, is the NRC concerned about the health and safety of workers who may have to enter the storage building in order to measure the surface dose rates and leakage rates of the stored materials? Could operating and maintenance tasks become necessary inside the building to remediate leakage, repackage wastes, and reduce excess releases of radioactive waste to the environment? Could the workers be placed at risk from elevated levels of radiation --- for example, by having to work within high radiation fields?

B. High-Level Wastes:

To repeat: The only radioactive wastes allowed to be called "high-level" are the irradiated fuel rods that have been removed and replaced with fresh uranium rods at a nuclear power plant, or the wastes generated where the spent fuel rods are reprocessed. At a reprocessing plant, after irradiated fuel rods are cut up and soaked in acid, the enriched uranium and plutonium that have not yet fissioned are extracted. These materials are then fabricated into new, mixed-oxide fuel rods or are used in the fabrication of nuclear weapons. No U.S. reprocessing plant for commercial fuel rods is currently in operation. Presidents Gerald Ford and Jimmy Carter refused to allow reprocessing because of concerns that the stockpiled uranium and plutonium could be diverted by terrorists for use in nuclear weapons.

The Department of Energy submitted its 8600-page application to the NRC on June 3 to build and operate the first national deep-geologic repository --- at Yucca Mountain, Nevada --- for the disposal of irradiated commercial fuel rods and some weapons wastes.

A question: If the NRC fails to approve the Yucca Mountain site and/or its design, has the Commission determined the maximum number of years during which it would allow irradiated fuel rods to be stored within a nuclear power plant site, either in a reinforced-concrete spent fuel pool inside a plant building, or in dry storage casks outside in a fenced area?

According to a Platts news release, dated July 30, 2008, a representative from the Nuclear Energy Institute stated that representatives from two unidentified rural communities have expressed interest in hosting a high-level radioactive waste interim-storage facility. One site is in the east; one is in the west. Missouri transport routes, of course, are in the middle.

C. Radioactive Wastes Released to the Environment During a Reactor's ROUTINE Operation:

Economically-feasible technologies do not exist that can filter out the full range of radioactive by-products generated during the routine operation of a nuclear power plant. Some of those materials are therefore released to the atmosphere and to the cooling water source (such as the Missouri River or Chesapeake Bay). Those non-filterable isotopes include radioactive hydrogen (tritium) and noble gases (for example, krypton and xenon isotopes that decay into highly toxic, long-lasting strontium and cesium).

The only question I asked during the NRC's July 9 public meeting had two parts, regarding the timing of the following related, pending NRC research projects: (1) When does the NRC expect to complete its analysis and decision about the certification of Areva's proposed U.S. Evolutionary Power Reactor (EPR) design (Ameren's choice for its proposed second reactor)? --- and (2) When does the NRC expect to issue the Final Environmental Impact Statement for the Reference Areva EPR Plant (being considered for the Calvert Cliffs nuclear power plant site in Maryland, on Chesapeake Bay)? I stated that I could not understand how an analysis of the environmental impacts of a proposed operating reactor could be assessed before the NRC had completed its analysis of that reactor's design, including its planned and anticipated accidental emissions of radioactive wastes to the environment. I am afraid I still do not understand the timing.

I was surprised, after the July 9 meeting, to be told by an NRC official that the NRC's analysis of a certification application for a new reactor design does indeed not include a study or calculations of that reactor's anticipated releases of radioactive materials in gaseous and liquid effluents. I would have thought that the certification process would have included detailed specifications about the reactor design's proposed radioactive waste management systems, structures, and components --- and calculations or estimates of the reactor's planned and unplanned radioactive effluents. How else would the NRC be able to assess whether the reactor would be able to comply with the NRC's regulations designed to protect the health and safety of the public and plant operating personnel, and with the EPA's radiation standards?

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The following comments are also about the radioactive wastes routinely released from nuclear power plants. At the July 9 NRC meeting, an AmerenUE employee reported that the Callaway reactor releases "about seven drops of tritium a year." Either this gentleman does not know better, or he was exaggerating to make some point.

As a response, I thought I would tell you of an experience I had when I was first beginning to learn about nuclear power. I had noticed in 1977, in the NRC's "Final Environmental Statement Related to the Proposed Callaway Plant, Units 1 and 2 -- March 1975," that a calculated annual release of tritium to the Missouri River was expected to be 350 curies per year, for a Westinghouse 1000-megawatt reactor. That amount was compared to 0.6 curies that the NRC staff had calculated to be the combined total of 53 other listed nuclides in the liquid releases, except for dissolved gases. (p. 3-13) (The 350 curies were later changed to 390 curies, and then 410.)

More than three hundred curies seemed like a lot of tritium to me, especially when compared with the 0.6-curie total. So I phoned the Oak Ridge National Laboratory for information about tritium. As I have often repeated, a health physicist replied: "Tritium is no big deal. All it can do is destroy a DNA molecule."

I have read a great deal about tritium since then and have learned that it is indeed hazardous. I have also learned that no economically feasible technology exists to filter tritium

from the gaseous emissions or from the thousands of gallons per minute of liquid wastes released to the cooling water source (river, lake or ocean) from a nuclear power plant. And that since tritium cannot be filtered, it is not required to be filtered during the reactor's routine operation, including impacts from natural phenomena and anticipated operational occurrences -- that is, external man-induced and design basis accidents.

Tritium had not been included in the list of gaseous releases to the environment, in the NRC's 1975 Final Environmental Statement (p. 3-16.) But by the time of the NRC's 1981 Safety Evaluation Report, approximately 1000 curies of tritium had been added to the calculated annual gaseous releases from the radwaste system and building ventilation systems. (pp. 11-4, -11.) I also understand that tritium and other weak beta emitters cannot be monitored accurately in continuous-flow liquid releases, nor during continuous-flow gaseous ventilation and purging. (A valve is opened when the containment building is vented, while purging requires a fan.)

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As you may know, Metropolitan St. Louis still contains what I believe could be called the oldest radioactive wastes of the Atomic Age. Starting in April 1942, near Downtown St. Louis, Mallinckrodt Chemical Works (MCW) accepted the complex challenge to figure out how to purify the tons of uranium that were needed for the world's first self-sustaining nuclear chain reaction and, then, for the earliest atomic bombs. St. Louis is still burdened with the cleanup of the radioactive wastes that were generated from 1942 through 1967. You may also know that our region's Environmental Protection Agency has recently decided to leave some of MCW's highly toxic, long-lived Belgian Congo wastes in the Missouri River floodplain, upstream from major drinking water intakes --- merely with a cover of some rocks, clay and construction rubble on top.

That the NRC can be giving its blessing and encouragement to electric utilities to create a new generation of homeless, permanently radioactive wastes seems to me to be, quite simply, immoral. I hope you will think about the following observation of the late Hannes Alfven of Sweden, a 1970 Nobel Laureate in Physics:

> The fission reactor produces both energy and radioactive waste; we want to use the energy now and leave the radioactive waste for our children and grandchildren to take care of. This is against the ecological imperative: Thou shalt not leave a polluted and poisoned world to future generations.

Your responses to as many of the above questions as possible will be greatly appreciated.

Sincerely,

Kay Drey

Kay Drey
Secretary, Board of Directors
Beyond Nuclear --- Takoma Park, MD

cc: Gary Rainwater, Chairman, President and Chief Executive Officer
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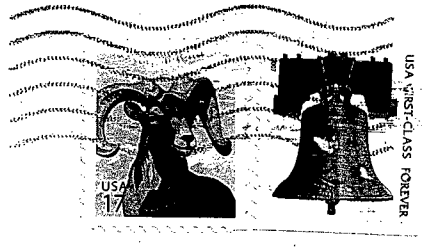

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