Blue Ridge Environmental Defense League

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August 5, 2010

Comments to US Department of Energy National Nuclear Security Administration
Re: SPD Supplemental EIS, DOE/EIS–0283–S2, Amended Notice of Intent
Surplus Plutonium Disposition Supplemental Environmental Impact Statement

On behalf of the Blue Ridge Environmental Defense League, I submit the following comments.

The amended notice of intent seeks scoping comments on the supplemental EIS for:

1. Disposition of approximately 7 metric tons of additional plutonium from pits not included in DOE's prior decisions;
2. Alternatives for approximately 6 MT of non-pit plutonium;
3. Additional plutonium to be declared surplus in the future;
4. Up to 100 kilograms (220 pounds) of plutonium which the US may accept from other nations; and
5. Whether to pursue use of plutonium fuel in Tennessee Valley Authority nuclear power plants.

These remarks will center on item 5, TVA's plan to use plutonium fuel in its Sequoyah and Browns Ferry nuclear power stations.

Overview

In January 2000, the US Department of Energy Office of Fissile Materials Disposition issued an official decision to convert up to 34 metric tonnes of surplus weapons- grade plutonium metal for use in commercial nuclear reactors. This fuel would be a mixture of oxides of plutonium and uranium; hence, a mixed oxide.[1] DOE has signed contracts with the consortium Duke COGEMA Stone and Webster, now Shaw AREVA, to design and build a plutonium fuel factory at the Savannah River Site near Aiken, South Carolina.

The plutonium fuel fabrication process would have two major procedures: 1) Aqueous polishing to remove impurities—gallium, americium and uranium—from the weapons-grade plutonium and 2) Fuel fabrication, blending plutonium and uranium oxides and recycled scraps to a mixed oxide, putting the powder into fuel pellets, loading fuel pellets into fuel rods, and bundling the rods into fuel assemblies.[2]

[1] The nuclear industry's term for this novel fuel is "MOX" because it is a mixed oxide containing both uranium and plutonium. However; the primary fissile isotope of the nuclear fuel in this matter is plutonium. All commercial nuclear fuel contains oxides of uranium, and mixed oxide fuel would utilize depleted uranium 238. Therefore I will use the more precise term "plutonium fuel" throughout these comments.
[2] Mixed Oxide Fuel Fabrication Facility, Environmental Report, Rev 1&2, page 3-8

The plutonium fuel would be fabricated for the sole purpose of irradiating it in nuclear reactors. In order to irradiate all the weapons-grade plutonium produced by the proposed fuel factory as outlined by DOE and NRC, commercial nuclear power reactors must be designated. Originally, DOE had contracted with two electric utilities to provide this service: Duke Energy and Virginia Power. But in 2000 Virginia Power withdrew its reactors from the program, and following aborted plutonium fuel tests in 2008 at the Catawba nuclear power plant, Duke Energy abandoned its plan to use the fuel.

We oppose the reprocessing of plutonium as civilian nuclear power fuel because it presents unsupportable risks to public safety and the environment. Plutonium fuel requires transportation of weapons grade plutonium and fuel across thousands of miles of open country, making transport vulnerable to terrorist attacks and theft. Manufacturing plutonium fuel would create vast quantities of radioactive waste. The plutonium fuel contractor for the US estimates *annual* waste outputs of up to 21,000 gallons of high activity radioactive waste containing 84,000 Curies of americium, 46,000 gallons of plutonium- and uranium-bearing wastes, and 385,000 gallons of low-level radioactive waste.[3]

Transportation from Savannah River Site to TVA Nuclear Power Plants

The plutonium fuel option requires hundreds of shipments of plutonium on public roads, increasing radiation exposure to the public and raising the risks of armed terrorist attacks. A minimum of 438 shipments of plutonium fuel[4] would be needed from the factory in South Carolina to nuclear power plants now being considered by TVA in Alabama and Tennessee, each shipment containing an estimated 19.3 kilograms of plutonium, enough for at least six nuclear weapons.[5]

Because the plutonium-MOX fuel plan necessitates shipping nuclear weapons-usable plutonium over enormous distances, it might well increase the likelihood that such material could fall into the hands of terrorists. The U.S. National Academy of Sciences stated that shipments of plutonium fuel will require security measures equivalent to those needed for transport of nuclear weapons. Harvard Law School and the United Kingdom Royal Commission on Environmental Pollution have also raised concerns about the security measures needed for plutonium as an article of commerce.

A report prepared by a special commission of International Physicians for the Prevention of Nuclear War and the Institute for Energy and Environmental Research states:

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[3] *Mixed Oxide Fuel Fabrication Facility Environmental Report, Revision 1 & 2*, Duke COGEMA Stone & Webster, 11 July 2002, (tables 3-3 and 3-4)

[4] *Update to the Fissile Materials Disposition Program SST/SGT Transportation Estimation*, John Didlake, Sandia Report SAND99-8796, November 1999, Table 1

[5] *Plutonium Fuel Transportation: More Uncertainties, Hidden Dangers, Increased Risks*, Don Moniak, Blue Ridge Environmental Defense League, 2001, available at http://www.bredl.org/pdf/Plutonium_Fuel_Transportation.pdf

> Using plutonium as fuel on a large scale would be difficult to safeguard and would involve a high risk of diversion. In the case of plutonium from weapons, there would be a regular traffic of plutonium oxide from dismantlement and storage sites to fabrication facilities and reactors, with the risk of attack along transportation routes.[6]

Plutonium oxide fuel shipments would be valuable target. The Department of Energy's program would transport plutonium fuel from South Carolina across hundreds of miles of isolated countryside to utility reactors in Tennessee and Alabama. This overland transport link presents a unique opportunity to those who might intercept and divert the fuel for weapons use. The freshly fabricated fuel rod assemblies would be the most desirable form for groups who would go after the plutonium for unlawful use in their own explosive devices. DOE admits this vulnerability:

> [T]he unirradiated fuel contains large quantities of plutonium and is not sufficiently radioactive to create a self-protecting barrier to deter the material from theft.[7]

DOE's Transportation Safeguards Division is operated from the National Nuclear Security Agency's Office of Defense Programs, which is responsible for the nation's nuclear weapons. The schedule and priorities of the fleet and its special couriers are driven by national security concerns, not electric utility interests. The movement of commercial nuclear fuel is not a priority, and this is illustrated by the fact that the fleet was not designed to handle nuclear fuel, with newer vehicles even less capable of handling plutonium fuel assemblies.[8] Unexpected bottlenecks in SST shipments of plutonium fuel could make DOE and unreliable partner for TVA.

Plutonium Fuel Use in Power Plants Increases Health Risk to Public

Plutonium fuel has greater quantities of plutonium and other hazardous radioactive isotopes such as Americium 241 and Curium 242—actinide elements—which would cause additional harmful radiation exposure to the public.

> Public attention has been drawn to the higher actinide inventories available for release from MOX than from conventional fuels. Significant releases of actinides during reactor accidents would dominate the accident consequences. Models of actinide release now available to the NRC staff indicate very small releases of actinides from conventional fuels under

[6] *Plutonium: Deadly Gold of the Nuclear Age,* International Physicians for the Prevention of Nuclear War and The Institute for Energy and Environmental Research, International Physicians Press, Cambridge Massachusetts, 1992, p.133-134

[7] Revised Conceptual Designs for the FMDP Fresh MOX Fuel Transport Package, Ludwig et al, ORNL/TM-13574, March 1998

[8] *Plutonium Fuel Transportation: More Uncertainties, Hidden Dangers, Increased Risks, Id.*

> severe accident conditions. (emphasis added) [9]

In 2004 the Nuclear Regulatory Commission's Atomic Safety and Licensing Board heard oral arguments from Blue Ridge Environmental Defense League challenging the safety and predictability of Duke Energy's plan to test plutonium fuel at its Catawba nuclear station. We said that Duke's plan was inadequate because experimental data revealed that the fuel rods could rupture during a serious accident, leading to core meltdown. BREDL's consultant Dr. Edwin Lyman of the Union of Concerned Scientists presented testimony on the safety risks of testing nuclear fuel made with weapons-grade plutonium.

Security Concerns for TVA: The Problems of Theft and Sabotage

Plutonium use raises special security issues because of its utilization in atomic weapons. Less than 18 pounds of plutonium is sufficient to make a nuclear weapon. The atomic bomb which leveled Nagasaki in 1945 contained just 13 pounds of plutonium.

The particular issues for nuclear power plant operators involve worker security clearances, access and search provisions, physical protection barriers, and tactical team response capabilities.[10] The benchmark is the *design basis threat* (DBT); that is, the conceivable theft, diversion, or sabotage which the owner-operator of a nuclear facility must be prepared to defend against. Standard nuclear power stations must meet one such standard, but a higher standard is required for facilities which handle Category I quantities of special strategic nuclear materials, including plutonium fuel. The Atomic Safety and Licensing Board, ruling on Duke Energy's license amendment to test plutonium fuel at its Catawba nuclear station in 2005, stated:

> The plutonium contained in the MOX fuel assemblies that are the subject of Duke's [license amendment request] will, during the limited time after delivery and prior to irradiation in the core of the reactor, be weapons-usable material.[11]

If it proceeds with plutonium fuel, TVA would have to meet the higher standard for Category I quantities of special strategic nuclear materials at its reactors.

TVA Reactor Safety Issues: Ice Condensers and Poor Performance

Plutonium is fundamentally different from uranium. With plutonium fuel loaded into the reactor, the power station becomes more dangerous because plutonium releases energy in a different way than uranium. Plutonium has a higher neutron flux, meaning higher

[9] Letter from Advisory Committee on Reactor Safeguards to US Nuclear Regulatory Commission Chairman, May 17, 1999

[10] Federal Regulations 10 C.F.R. §§ 11.11(b), 10 C.F.R. §§ 73.46(d)(9), 10 C.F.R. §§ 73.46(c)(1), 10 C.F.R. §§ 73.46(h)(3) and (b)(3-12), respectively

[11] Atomic Safety and Licensing Board Panel, Final Partial Initial Decision, LBP-05-10, April 18, 2005, Available at: http://www.bredl.org/pdf/050418NRC-ASLBP.pdf

energy particles at higher speeds. This and other nuclear phenomena break down metal reactor parts quicker; a process called embrittlement. This weakening of metal components would be accelerated in any reactor using plutonium fuel. Greater embrittlement means the reactor vessel may fail under circumstances which would otherwise not cause a problem. If and when failure happens and radioactive materials are released from the plant, more dangerous radionuclides are released from a reactor containing plutonium fuel, including greater quantities of radioactive elements which pose hazards to human health.

There are known differences between plutonium fuel and conventional fuel which occur during accidents involving the loss of cooling water. Slumping and ballooning of zirconium clad fuel has been observed in French fuel tests, altering core geometry and restricting water flow. Sequoyah's nuclear reactors utilize ice condenser containments, baskets of borated ice, to reduce heat and pressure in the event of an accident. Sandia National Laboratories evaluated the reactor containment structures at similar to those at Sequoyah Units 1 and 2 and found that if an accident involving hydrogen ignition occurs, the concrete containment will almost certainly fail.[12] Such systems are particularly vulnerable to reactor sump clogging; numerous problems with ice condensers have been identified during the last two decades of operation.

TVA's Browns Ferry and Sequoyah are identified in the July 19th Notice of Intent as the reactors designated for plutonium fuel use. Attached to these remarks are two lengthy appendices listing problems at the two nuclear power stations. Below are some highlights.

Browns Ferry

- On June 21, 2010, an unplanned shut down to approximately 70 percent rated thermal power was triggered by an unexpected closure of a turbine control valve.
- On April 19, 2010, a Notice of Violations was issued to Tennessee Valley Authority for violations involving the licensee's failure to meet the requirements of 10 CFR 50, Appendix R, III.G, fire protection of safe shutdown capability. There were multiple examples of the licensee not providing fire protection features capable of limiting fire damage and failing to ensure one train of systems or components was free of fire damage by approved methods.
- In March 2010, TVA granted three waivers to allow 11 contractors to exceed the work hour limitation of "72 hours in any seven day period" without providing an adequate basis to demonstrate the waivers were necessary to mitigate or prevent a condition adverse to safety; and without conducting the required face-to-face fatigue assessments to establish reasonable assurance of worker competency to perform duties during the additional work period.

[12] NUREG/CR-6427, Assessment of the Direct Containment Heating Issue for Plants With Ice Condenser Containments, April 2000

- Continuing adverse trends in the radiation protection areas of occupational dose, contaminated surface area, catch containments and hot-spots) have existed since 2008. The corrective actions to arrest these trends have not been effective.

Sequoyah

- A May 27, 2010 Inspection Report documents a finding regarding physical protection and security requirements. Because the incident involved SUNSI—sensitive unclassified non-safeguards information— the details are shielded from public view. According to the NRC: "SUNSI means any information of which the loss, misuse, modification, or unauthorized access can reasonably be foreseen to harm the public interest, the commercial or financial interests of the entity or individual to whom the information pertains, the conduct of NRC and Federal programs, or the personal privacy of individuals."[13]
- On January 5, 2009 a Confirmatory Order (effective immediately) was issued to TVA regarding violation of site security procedures caused by the deliberate actions of a contract security supervisor at the Sequoyah Nuclear Plant, who falsified an inventory form to conceal the supervisor's failure to verify inventory as required by licensee procedures.

As outlined above, the handling of special strategic nuclear materials requires the highest safety and security procedures. *At a minimum, the identified problems with fire protection, over-worked plant employees and site security requirements at these two TVA power plants should eliminate them from further consideration by the DOE-NNSA for plutonium disposition.*

Plutonium Fuel, Nuclear Waste and Global Nuclear Weapons Proliferation

In the 1970's the United States rejected plutonium fuel and breeder reactors because of the environmental and proliferation dangers. Throughout the administrations of Presidents Ford, Carter, Reagan, and George H.W. Bush, the policy of the Federal Government banned the use of plutonium in commercial nuclear power plants due to the risk that the plutonium could be diverted to terrorists and to nations that have not renounced the use of nuclear weapons. Today we face a new and more complex international security picture. The Blue Ridge Environmental Defense League has opposed plutonium fuel since the first public hearings on the project in 1999.

While we applaud the dismantling of strategic nuclear weapons, we are deeply troubled by the provisions of the U.S./Russian bilateral agreement which allows each nation to use 34 metric tons of weapons-grade plutonium in civilian nuclear electric power plants. Our concerns are shared by many Russian environmental groups.

The plutonium fuel program undermines international agreements for nuclear non-

[13] NRC Policy: SUNSI, http://www.nrc.gov/reading-rm/doc-collections/commission/comm-secy/2005/2005-0054comscy-attachment2.pdf

proliferation. The circulation of plutonium fuel in the commercial sector would increase the risk of diversion. There is no way to ensure that plutonium reprocessing facilities for electric power will not be turned to military use. For example, chemical processing facilities for plutonium fuel can also be used to make plutonium pits for nuclear weapons. There is no way to separate good plutonium from bad plutonium. Radioactive waste from the Cold War should not be transmuted into a plutonium-fueled economy. A global movement for a world without nuclear weapons must also halt the drive for plutonium power.

Safety Perspective: Nuclear Weapons Surety[14]

What is a Safety Culture?

- It is behavior in ways where safety is held premium in its products embodies in thought, speech, action, and artifacts.

How do you recognize a Safety Culture?

- There is no reliance on the fact that "nothing bad has happened yet."
- Probability based models are recognized as models and not necessarily reality

How do you recognize the absence of a safety culture?

- There is a willingness to believe numbers less than one in a million or even one in a thousand for single events.
- Schedule and budget issues override safety concerns.

Conclusion

We plan to submit additional remarks before the close of the comment period.

Respectfully submitted,

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Appendices: NRC Inspection Reports for Browns Ferry and Sequoyah

[14] From W.C. Nickell. Director, Surety Assessment Center. Sandia National Laboratories. Welcoming Address at the *Second High-Consequence Safety Symposium.* 1998. SAND-98-1557

Appendix A: Browns Ferry

TVA operates three nuclear power units at Browns Ferry 32 miles west of Huntsville, Alabama.

Unit 1
Reactor Type: Boiling Water Reactor
Electrical Output: 1065 MWe
Reactor Vendor/Type: General Electric Type 4
Containment Type: Wet, Mark I

Unit 2
Reactor Type: Boiling Water Reactor
Electrical Output: 1104 MWe
Reactor Vendor/Type: General Electric Type 4
Containment Type: Wet, Mark I

Unit 3
Reactor Type: Boiling Water Reactor
Electrical Output: 1115 MWe
Reactor Vendor/Type: General Electric Type 4
Containment Type: Wet, Mark I

Nuclear Regulatory Commission
Escalated Enforcement Actions Issued to Browns Ferry[15]

Browns Ferry Units 1, 2 & 3 - Docket Nos. 050-00259; 050-00260; 050-00296

NRC Action Number(s) and Facility Name	Action Type (Severity) & Civil Penalty (if any)	Date Issued	Description
EA-09-307 Browns Ferry 1, 2 & 3	NOV (Yellow & White)	04/19/2010	On April 19, 2010, a Notice of Violations was issued to Tennessee Valley Authority (TVA) for violations associated with Yellow and White Significance Determination Findings as a result of inspections at the Browns Ferry Nuclear Plant. The Yellow finding involved the licensee's failure to meet the requirements of 10 CFR 50, Appendix R, III.G, fire protection of safe shutdown capability. There were multiple examples of the licensee not providing fire protection features capable of limiting fire damage and failing to ensure one train of systems or components was free of fire damage by approved methods. Compensatory measures are currently in place and long term corrective actions will be

[15] http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions/reactors/b.html#BrownsFerry

			implemented. The White finding involved the licensee's failure to meet the requirements of a Technical Specification. This involved the inappropriate revision to a procedure which could have delayed proper operator response to a major disabling fire event. The procedure has been revised to prevent such an issue from occurring.
EA-09-009; EA-09-203 Browns Ferry 1, 2 & 3	ORDER	12/22/2009	On December 22, 2009, a Confirmatory Order (effective immediately) was issued to the Tennessee Valley Authority (TVA) to confirm commitments made as a result of an Alternative Dispute Resolution (ADR) mediation session held on December 4, 2009. At issue were two apparent violations of the NRC's employee protection regulation (10CFR50.7) identified during two separate investigations conducted by the NRC Office of Investigations at the Browns Ferry Nuclear Plant (BFN). The NRC acknowledged that TVA, prior to the ADR session, had taken numerous actions which address the issues underlying the apparent violations. As part of the agreement, TVA agreed to take a number of additional actions. These actions include, implementing a process to review proposed adverse employment actions before they are taken to ensure compliance with 10CFR50.7 and to ensure the action could not negatively impact the Safety Conscious Work Environment (SCWE), issuing a fleet-wide written communication from TVA's executive management communicating TVA's policy and management expectations regarding the employee's right to raise concerns without fear of retaliation, performing two additional independent safety culture surveys before the end of calendar year 2013, and modifying contractor in-process training and new supervisor training to improve awareness of TVA's policy on SCWE. In recognition of these commitments, and the other actions already completed by TVA, the NRC agreed to refrain from issuing a civil penalty or Notice of Violation for these apparent violations.

EA-04-063 Browns Ferry 1, 2 & 3	NOV (SL III)	05/12/2004	On May 12, 2004, a Notice of Violation was issued for a Severity Level III violation involving four examples of a failure to adhere to the requirements of 10 CFR 50, Appendix B, Criterion V. All four examples were associated with the Long-Term Torus Integrity Program and involved failure to evaluate or incorporate numerous deficient welds into Deficiency Fix Requests sketches; failure to perform numerous repairs on the correct welds; omission of numerous welds requiring repair from Work Orders; and failure of Quality Control to independently verify the correct location of numerous weld repairs.
EA-00-163 Browns Ferry 1, 2 & 3	NOV (SL III)	10/27/2000	On October 27, 2000, a Notice of Violation was issued for a severity Level III violation involving the failure to perform required evaluations for out-of-tolerance measuring and test equipment.
EA-96-199 Browns Ferry 1, 2 & 3	NOV (SL III)	08/01/1996	Violation of TS 3.5.F.1 inoperability of RCIC from inadequate design And inadequate post-modification testing.
EA-95-252 Browns Ferry 1, 2 & 3	NOVCP (SL III) $ 80,000 W/drawal of CP	02/20/1996	Discrimination.

BROWNS FERRY NUCLEAR PLANT
NRC INTEGRATED INSPECTION REPORT
05000259/2010003, 05000260/2010003, 05000296/2010003,
05000259/2010501, 05000260/2010501, 05000296/2010501, AND
07200052/2010002
July 30, 2010

Summary of Plant Status

Unit 1 operated at essentially full Rated Thermal Power (RTP) the entire report period except for two planned downpowers and one unplanned downpower. On May 11, 2010, and then again on May 12, 2010, two planned downpowers to 90 percent RTP were conducted to remove from service, and then restore, the 1A 480VAC unit board for reactor feed pump maintenance. The unit was returned to full RTP on May 11 and then again May 12, 2010. On June 21, 2010, an unplanned downpower to approximately 70 percent RTP was conducted when a recirculation pump runback was initiated due to an unexpected closure of the number 2 turbine control valve. After restoring the number 2 control valve, power was maintained at 70 percent RTP due to elevated river temperatures. Unit power was raised to 83 percent RTP on June 25, 2010, to

conduct a control rod sequence exchange, and then returned to 100 percent RTP on June 26, 2010.

Unit 2 operated at essentially full RTP the entire report period except for one planned downpower and an automatic reactor scram. On May 16, 2010, a planned downpower was conducted to 92 percent RTP for routine control rod drive exercise and was returned to full RTP the same day. On June 9, 2010, an automatic reactor scram occurred from 100 percent RTP due to main steam isolation valve (MSIV) closure following an unexpected Group 1 isolation during 2B reactor protection system (RPS) transfer to its alternate power supply. The unit entered reactor startup (Mode 2) on June 10, 2010. Power escalation was held at 85 percent RTP on June 12, 2010, due to 2B condensate pump seal failure. The unit returned to full RTP on June 18, 2010.

Unit 3 operated at essentially full RTP the entire report period except for one unplanned downpower and one planned downpower. On May 9, 2010, an unplanned downpower was conducted to 96 percent RTP due to an automatic runback of 3A recirculation pump caused by failure of the 3A variable frequency drive C5 power cell. The unit returned to full RTP on May 10, 2010. On June 12, 2010, a planned downpower to 75 percent RTP was conducted for a routine control rod sequence exchange. The unit returned to RTP on June 13, 2010.

Docket Nos.: 50-259, 50-260, 50-296, 72-052
License Nos.: DPR-33, DPR-52, DPR-68
Report No.: 05000259/2010003, 05000260/2010003, 05000296/2010003, 05000259/2010501, 05000260/2010501, 05000296/2010501, AND 07200052/2010002
Licensee: Tennessee Valley Authority (TVA)
Facility: Browns Ferry Nuclear Plant, Units 1, 2, and 3
Location: Corner of Shaw and Nuclear Plant Roads
Athens, AL 35611
Dates: April 1, 2010 through June 30, 2010

Opened and Closed

05000296/2010003-01 NCV (non-cited violation)
Inappropriate Use of Waivers to Exceed 10 CFR 26 Work Hour Limitations (Section 1R20)

05000296/2010003-02 NCV
Unit 3 RCIC System Inoperable Beyond the Technical Specifications Allowed Outage Time (Section 4OA3.2)

05000296/2010003-03 NCV
Failure to Provide Complete and Accurate Information in LER 0500296/2009-003-00 (Section 4OA3.2)

05000296/2010003-04 NCV
Transient Combustibles Stored Near Independent Spent Fuel Storage Facility in Excess of Amount Allowed (Section 4OA5.2)

Closed

05000296/2009004-01 URI (unresolved item)
Unit 3 Reactor Core Isolation Cooling Pump Flow Oscillations (Section 4OA5.3)

2515/173 TI (temporary instruction)
Review of the Implementation of the Industry Ground Water Protection Voluntary Initiative (4OA5.5)

2515/180 TI
Inspection of Procedures and Processes for Managing Fatigue (4OA5.6)

05000296/2009-003-00 LER (licensee event report)
Reactor Core Isolation Cooling Inoperable Longer Than Allowed by Technical Specifications (Section 4OA3.2)

05000296/2010-001-00 LER
Safety Relief Valves As-Found Setpoints Exceeded Technical Specification Lift Pressure Values (Section 4OA3.3)

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1R20 Refueling and Other Outage Activities
1 Unit 3 Cycle 14 Refueling Outage
a. Inspection Scope
From February 27 through April 10, 2010, the inspectors examined critical outage activities associated with the U3C13 refueling outage and Unit 3 restart to verify that they were conducted in accordance with TS, applicable procedures, and the licensee's outage risk assessment and management plans. Refueling outage activities that occurred prior to April 1, 2010, were documented in NRC inspection report (IR) 05000296/2010002. Since April 1, the inspectors reviewed and examined selected refueling outage and power ascension activities to ensure they were performed in accordance with licensee procedures, TS requirements, and the licensee's outage risk control plan. Some of the more significant critical outage activities inspected were as follows:

- Monitored critical plant parameters, and operators control of plant conditions, during Cold Shutdown (Mode 4), Startup (Mode 2), and Power Operation (Mode 1) conditions
- Control and management of scheduled and emergent outage work activities, including impact on outage risk
- Reviewed and verified completion of selected items of 0-TI-270, Refueling Test Program, Attachment 2, Startup Review Checklist, and SPP-7.2.3, Plant Startup Review/Checklists
- Witnessed portions of reactor startup and power ascension activities per General Operating Instruction (GOI) 3-GOI-100-1A, Unit Startup, including rod withdrawal for criticality, reactor coolant system heatup, and power ascension to full power
- Reviewed and verified reactor heatup rate in accordance with 3-SR-3.4.9.1(1), Reactor Heatup and Cooldown Rate Monitoring; and suppression chamber temperature control per 3-SR-3.6.2.1.1, Suppression Chamber Water Temperature Check

Corrective Action Program

The inspectors continued to review daily PERs generated during U3R14 RFO, especially those designated as “Restart”. Resolution and implementation of specific corrective actions of selected PERs were also reviewed by the inspectors and discussed with responsible outage management.

b. Findings

Introduction: Inspectors identified a Green Non-Cited Violation (NCV) of 10 CFR 26.207(a) for the licensee’s improper execution of the waiver process for authorizing contractors to exceed the “72 hours in any seven day period” work hour limitation during the U3C14 RFO.

Description: During the U3C14 RFO, the licensee initiated three waivers of the 10 CFR 26.205(d) work hour limitations using Standard Programs and Process (SPP) 1.5, Fatigue Management and Work Hour Limits. The inspectors found that two of the waivers were for two individual contractors who were conducting snubber testing. The third waiver was a blanket waiver for nine other contractors who were working to install Main Steam line strain gages in the Unit 3 drywell for data acquisition to support the Unit 3 Extended Power Uprate license amendment. All three waivers were used to authorize exceeding the work hour limitation of “72 hours in any seven day period” prescribed by 10CFR26.205(d)(1)(iii). The contractors were all working a 12 hour per day, six days a week schedule, with the seventh day off. The licensee stated that the intent of all three waivers was to defer the contractors’ normal day off until the next day in order to continue performing their planned outage work without interruption. As a result of these waivers, these contractors ended up working seven consecutive 12 hour days.
The inspectors reviewed the aforementioned waivers and identified several issues regarding the licensee’s execution of SPP-1.5, Section 3.5, Waivers, which was used to fulfill the requirements of 10CFR 26.207(a). These issues are described below.
The inspectors determined that all three of the reviewed waivers were approved without establishing an adequate basis that these waivers were “necessary to mitigate or prevent a condition adverse to safety”. Also, no justification was provided to explain why the circumstances that necessitated these waivers were reasonably beyond the control of the licensee.

Personal “face-to-face” fatigue assessments, in accordance with SPP-1.5, Appendix A, Section 4.0, Fatigue Assessment, were not conducted for any of the individuals involved with the three waivers. Responsible supervisors and managers only conducted informal, verbal discussions with the contractors in an attempt to verify they were fit from a fatigue perspective. Also, SPP-1.5 required the fatigue assessment to be completed no more than four hours prior to the beginning of the additional work covered by the waiver. The three waivers reviewed were approved more than a shift before the work covered by the waiver was to begin. The responsible supervisors and managers subsequently acknowledged to the inspectors their unfamiliarity with the waiver process, and agreed that informal talks did not constitute the detailed individual, face-to-face fatigue assessments required by SPP-1.5.

To address the issues identified by the inspectors and the apparent misunderstandings

and breakdown of the SPP 1.5 waiver process, the licensee initiated several PERs and promptly prohibited and further use of waivers without the express approval of executive level management and above.

The inspectors also confirmed that no fatigue related human performance errors occurred during the work activities covered by the aforementioned waivers that resulted in a consequential event nor did errors adversely impacted any risk-significant structure, system or components (SSC's).

Analysis: The licensee's improper authorization of numerous individuals to exceed their work hour limitations was considered a performance deficiency. Specifically, the licensee authorized numerous individuals to exceed their work hour limitations for circumstances that could have been reasonably controlled and without conducting individual face-to-face fatigue assessments. This performance deficiency was considered to be more than minor, and therefore a finding, because it was sufficiently similar to examples 9.a and 9.b of IMC 612, Appendix E, Examples of Minor Issues. The finding was determined to be of very low safety significance (Green) by regional management review according to IMC 609, Appendix M, Significance Determination Process Using Qualitative Criteria, because it did not result in a consequential event or adversely affect risk-significant SSC's due to worker fatigue.

The cause of this finding was directly related to the cross-cutting aspect of Procedural Compliance in the Work Practices component of the Human Performance area because the licensee failed to follow their program guidance for processing and authorizing waivers of the 10 CFR 26 work hour limitations. [H.4(b)]

Enforcement: 10 CFR 26.207(a)(1) states, in part, that licensees may grant a waiver of the work hour controls required in 10 CFR 26.205(d) when the licensee determines the waiver is necessary to mitigate or prevent a condition adverse to safety (10 CFR 26.207(a)(1)(i)), and the affected workers are assessed individually, face-to-face, to determine whether there is reasonable assurance they will be able to safely and competently perform their duties during the additional work period (10 CFR 26.207(a)(1)(ii)). Contrary to the above, during the U3C14 RFO in March 2010, the licensee granted three waivers to allow 11 contractors to exceed the work hour limitation of "72 hours in any seven day period" without providing an adequate basis to demonstrate the waivers were necessary to mitigate or prevent a condition adverse to safety; and without conducting the required face-to-face fatigue assessments to establish reasonable assurance of worker competency to perform duties during the additional work period. However, because this finding was of very low safety significance and has been entered into the licensee's CAP as PERs 161418, 162360, and 162638, this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy. This NCV is being identified as NCV 05000296/2010003-01, Inappropriate Use of Waivers to Exceed 10 CFR 26 Work Hour Limitations.

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4OA2 Identification and Resolution of Problems

.1 Review of items Entered into the Corrective Action Program:
As required by Inspection Procedure 71152, "Identification and Resolution of Problems,"

and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily Service Request (SR) reports and selected PERs, and periodically attending Corrective Action Review Board (CARB) and PER Screening Committee (PSC) meetings.

.2 Semiannual Review to Identify Trends

a. Inspection Scope
As required by Inspection Procedure 71152, the inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review included the results from daily screening of individual PERs (see Section 4OA2.1 above), licensee trend reports and trending efforts, and independent searches of the PER database and WO history. The review also included issues documented outside the normal CAP in system health reports, maintenance WOs, component status reports, site monthly meeting reports and MR documents. The inspectors' review nominally considered the six-month period of January 2010 through June 2010, although some PER database and WO searches expanded beyond these dates. Furthermore, the inspectors verified that adverse or negative trends identified in the licensee's PERs, periodic reports and trending efforts were entered into the CAP. In particular, the inspectors reviewed the licensee's Integrated Trend Review (ITR) program and the implementation of the program. Inspectors also interviewed the appropriate licensee management.

b. Findings and Observations

Inspectors reviewed the licensee's ITR program and the implementation of the program according to SPP 3.1.11, PER Trending, and in SPP-3.1.12, Integrated Trend Review. The inspectors noted, as did the licensee, that the ITR for first quarter 2010 was completed late, for which the licensee initiated PER 230287. The ITR meetings were not always well supported by senior management in that only a few department managers were present. No representative from the Security organization was present at the meetings.

The inspectors conducted an independent review to identify potential negative trends, and identified the following observations:

 A previously NRC identified adverse trend for inadequate PMTs continued to exist with untimely corrective actions. In June 2009, PER 173055 was written to address an NRC identified adverse trend in inadequate PMTs (see inspection report (IR) 50-259, 260, & 296/2009-003). The corrective action plan for this PER was extended seven times, with the plan finally issued on February 9, 2010; but this PER was subsequently closed to PER 213116 with no actions taken. Then in December 2009, an inadequate PMT of the B3 EECW discharge check valve was identified by the inspectors for failure to verify check valve function in the closed direction (PERs 211854 and 2119939). These PERs were also closed to PER 213116. Then again, in April 2010, the NRC identified an inadequate PMT for the D1 RHRSW check valve maintenance (PER 226655). This was a repeat of the inadequate PMT for the B3 EECW pump. Untimely corrective actions from these previous PERs led to repetitive

inadequate PMTs of the B3 EECW and D1 RHRSW discharge check valves. The corrective action plan for PER 213116 to form a PMT team and hold the first meeting was not completed until June 18, 2010. The scheduled action to develop a PMT team charter was still incomplete, and recently extended to July 22, 2010.

 A previously NRC identified adverse trend regarding maintenance rule program timeliness of Cause Determination Evaluations (CDE) documented in IR 50-259, 260, & 296/2009-005 was captured by PER 210091 but subsequently closed to PER 204894 with an action to brief Engineering supervisors. This adverse trend was not included in the licensee's ITR.

 A previously NRC identified adverse trend for incomplete WO packages continued to exist due to apparently ineffective corrective actions. This previously identified adverse trend was documented in IR 50-259, 260, and 296/20009005, and captured by PER 208517. However, during the review of ongoing maintenance work and worker practices in 2010, the inspectors also identified many additional incomplete and/or improperly implemented WO packages with numerous WO instruction, PMT and/or maintenance procedure steps not signed off (including second party verifications) until well after the work had been completed. At the time that these specific observations were made by the inspectors, the licensee initiated the following PERs: 215763, 217065, 218643, 219628, 219803, 219710, 219726, 222304, 222306, and 222482. Consequently, based on these additional observations, the licensee acknowledged that these issues was potentially a continuing adverse trend and initiated PER 239894.

 In July of 2009, NRC identified an adverse trend for the high number of inadequately closed PER actions being identified by the licensee's Closure Review Board, as documented in IR 50-259, 260, & 296/2009-003 and captured by PER 175822. The only action taken for PER 175822 was to brief the NRC on the trend, without addressing the organizational and programmatic aspects that led to the high number of over 70 inadequate PER actions for the first six months of 2009. A review of PERs since January 1, 2010, revealed 61 PER actions which were closed inappropriately. Corrective actions to reduce this trend have been marginally effective. However, the licensee had already recognized PER action closeout as a continuing problem and initiated PER 233394**.**

 Continuing adverse trends in the radiation protection areas of occupational dose, contaminated surface area, catch containments and hot-spots) have existed since 2008. The corrective actions to arrest these trends have not been effective. The continuing adverse trend was recognized by the Radiation Protection Department in the ITR but no PER was written. In response to the inspectors concern that the previous action plans to address these trends did not appear to be effective the licensee initiated PER 239896.

Appendix B: Sequoyah

TVA operates two nuclear power units at Sequoyah 9½ miles northeast of Chattanooga, Tennessee. These reactors utilize the same ice condenser containment system identified as problematic at Duke Energy's Catawba and McGuire nuclear power plants.

Unit 1
Reactor Type: Pressurized Water Reactor
Electrical Output: 1148 MWe
Reactor Vendor/Type: Westinghouse Four-Loop
Containment Type: Wet, Ice condenser

Unit 2
Reactor Type: Pressurized Water Reactor
Electrical Output: 1126 MWe
Reactor Vendor/Type: Westinghouse Four-Loop
Containment Type: Wet, Ice condenser

Nuclear Regulatory Commission
Escalated Enforcement Actions Issued to Sequoyah[16]

Sequoyah 1 & 2 - Docket Nos. 050-00327; 050-00328

NRC Action Number(s) and Facility Name	Action Type (Severity) & Civil Penalty (if any)	Date Issued	Description
EA-08-211 Sequoyah 1 2	ORDER	01/05/2009	On January 5, 2009 a Confirmatory Order (effective immediately) was issued to Tennessee Valley Authority to confirm commitments made as a result of an Alternative Dispute Resolution (ADR) settlement agreement, regarding violation of site security procedures caused by the deliberate actions of one contract security supervisor at the Sequoyah Nuclear Plant, who falsified an inventory form to conceal the supervisor's failure to verify inventory as required by licensee procedures.
EA-04-223 Sequoyah 1 2	NOV (White)	01/26/2005	On January 26, 2005, a Notice of Violation was

[16] http://www.nrc.gov/reading-rm/doc-collections/enforcement/actions/reactors/s.html#Sequoyah

			issued for a violation associated with a White finding involving binding problems with the breaker mechanism operated cell slide assembly for the 1A Residual Heat Removal pump. The violation cited the licensee's failure to correct conditions adverse to quality based on the identification of binding problems during previous surveillance testing.
EA-99-234 Sequoyah 1 & 2	NOVCP (SL II) $110,000	02/07/2000	On February 7, 2000, a Notice of Violation and Proposed Imposition of Civil Penalty of $110,000 was issued for a Severity Level II violation involving employment discrimination against a former corporate employee, for engaging in protected activities.
	CPORDER $110,000	05/04/2001	
EA-98-207 Sequoyah 1 & 2	NOV (SL III)	06/18/1998	Failure of Identifications/Assessment equipment.
EA-97-409 Sequoyah 1 & 2	NOVCP (SL III) $ 55,000 Withdrawal of CP	12/08/1997	Inoperable DC vital board.
EA-97-232 Sequoyah 1 & 2	NOV (SL III)	07/10/1997	Inadvertent RCS drain down with numerous deficiencies noted in the area of operation.
EA-96-414 Sequoyah 1 & 2	NOVCP (SL III) $100,000	12/24/1996	Reactor trip complications.
	CPORDER $ 50,000	05/23/1997	
EA-96-269 Sequoyah 1 & 2	NOVCP (SL III) $ 50,000	11/19/1996	Adverse conditions related to the fire protection program were not promptly identified and/or resolved.
	CPORDER	03/17/1997	
EA-95-199	NOVCP	01/13/1997	Chemistry manager was

Sequoyah 1 & 2	(SL I) $100,000		threatened with termination for raising safety concerns.

SEQUOYAH NUCLEAR PLANT - NRC SECURITY INSPECTION REPORT 05000327/2010402 AND 05000328/2010402
May 27, 2010

This report documents one finding of very low security significance (i.e., Green as determined by the Physical Protection Significance Determination Process). The deficiency was corrected or compensated for, and the plant was in compliance with applicable physical protection and security requirements within the scope of this inspection before the inspectors left the site. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these violations as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy.

NB: Details not publicly available, SUNSI.