



BRUCE H HAMILTON  
Vice President  
Oconee Nuclear Station

Duke Energy Corporation  
ON01VP / 7800 Rochester Highway  
Seneca, SC 29672

864 885 3487

864 885 4208 fax

bhhamilton@duke-energy.com

November 20, 2007

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: Duke Power Company LLC d/b/a Duke Energy  
Carolinas, LLC (Duke)  
Oconee Nuclear Station  
Docket Nos. 50-269  
Special Event Report 269/2007-002, Revision 0  
Problem Investigation Process No.: O-06-4569

Gentlemen:

Pursuant to 10 CFR 71.95 Sections (b) and (c), attached is Special Event Report 269/2007-002, Revision 0, regarding instances in which the conditions in the certificate of compliance (CofC) of a spent fuel shipping cask were not followed during two shipments made in 1987. 10 CFR 71.95 does not contain a "statute of limitations" clause relative to old events; therefore, this event is reportable following discovery even though the applicable shipments occurred twenty years ago.

The shipments each included a fuel assembly which also contained a neutron source inserted into one of the guide tubes. The neutron sources were used to facilitate initial startup and were installed in the associated fuel assemblies during the first three cycles of unit operation. The CofC lists specific types of components which are allowed to be included with a fuel assembly during shipment but these neutron sources are not included in that list.

This event is considered to be of no significance with respect to the health and safety of the public.

Document Control Desk  
Date: November 20, 2007  
Page 2

Very truly yours,



*for Bruce Hamilton*

Bruce H. Hamilton, Vice President  
Oconee Nuclear Site

Attachment

cc: Dr. William D. Travers  
Administrator, Region II  
U.S. Nuclear Regulatory Commission  
61 Forsyth Street, S. W., Suite 23T85  
Atlanta, GA 30303

Mr. L. N. Olshan  
Project Manager  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

Mr. D. W. Rich  
NRC Senior Resident Inspector  
Oconee Nuclear Station

INPO (Word File via E-mail)

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

<b>1. FACILITY NAME</b> Oconee Nuclear Station, Unit 1	<b>2. DOCKET NUMBER</b> 05000- 0269	<b>3. PAGE</b> 1 OF 7
---	--	--------------------------

**4. TITLE**  
Cask Shipments Include Startup Neutron Sources Not Listed in CofC.

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	24	2007	07	002	0	11	20	2007	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

<b>9. OPERATING MODE</b> N/A	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)									
<b>10. POWER LEVEL</b> N/A	<input type="checkbox"/>	20.2201(b)	<input type="checkbox"/>	20.2203(a)(3)(i)	<input type="checkbox"/>	50.73(a)(2)(i)(C)	<input type="checkbox"/>	50.73(a)(2)(vii)		
	<input type="checkbox"/>	20.2201(d)	<input type="checkbox"/>	20.2203(a)(3)(ii)	<input type="checkbox"/>	50.73(a)(2)(ii)(A)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)		
	<input type="checkbox"/>	20.2203(a)(1)	<input type="checkbox"/>	20.2203(a)(4)	<input type="checkbox"/>	50.73(a)(2)(ii)(B)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)		
	<input type="checkbox"/>	20.2203(a)(2)(i)	<input type="checkbox"/>	50.36(c)(1)(i)(A)	<input type="checkbox"/>	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)(A)		
	<input type="checkbox"/>	20.2203(a)(2)(ii)	<input type="checkbox"/>	50.36(c)(1)(ii)(A)	<input type="checkbox"/>	50.73(a)(2)(iv)(A)	<input type="checkbox"/>	50.73(a)(2)(x)		
	<input type="checkbox"/>	20.2203(a)(2)(iii)	<input type="checkbox"/>	50.36(c)(2)	<input type="checkbox"/>	50.73(a)(2)(v)(A)	<input type="checkbox"/>	73.71(a)(4)		
	<input type="checkbox"/>	20.2203(a)(2)(iv)	<input type="checkbox"/>	50.46(a)(3)(ii)	<input type="checkbox"/>	50.73(a)(2)(v)(B)	<input type="checkbox"/>	73.71(a)(5)		
<input type="checkbox"/>	20.2203(a)(2)(v)	<input type="checkbox"/>	50.73(a)(2)(i)(A)	<input type="checkbox"/>	50.73(a)(2)(v)(C)	<input checked="" type="checkbox"/>	OTHER			
<input type="checkbox"/>	20.2203(a)(2)(vi)	<input type="checkbox"/>	50.73(a)(2)(i)(B)	<input type="checkbox"/>	50.73(a)(2)(v)(D)	<input type="checkbox"/>	Specify in Abstract below or in NRC Form 366A			

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME B.G. Davenport, Regulatory Compliance Manager	TELEPHONE NUMBER (Include Area Code) (864) 885-3044
--	--

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

<b>14. SUPPLEMENTAL REPORT EXPECTED</b>				<b>15. EXPECTED SUBMISSION DATE</b>		
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> X	<input type="checkbox"/> NO		MONTH	DAY	YEAR

**16. ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 9/24/2007, personnel at McGuire Nuclear Station (MNS) performed an inspection of two fuel assemblies stored in the MNS spent fuel pool and confirmed obstructions in one guide tube on each assembly. This provided confirmatory information that these assemblies contained neutron sources used at Oconee Nuclear Station (ONS) during initial startup in the early 1970's. The fuel assemblies had been shipped to MNS in 1987 due to storage limitations at ONS.

Upon review, it was recognized that the Certificate of Compliance (CofC) for the TN-8L shipping cask used in 1987 did not list such sources as components acceptable for inclusion with the fuel assembly during shipment. This event is being reported per 10 CFR 71.95(b) as "instances in which the conditions in the certificate of compliance were not followed during a shipment." This event is considered to have no significance with respect to the health and safety of the public.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Oconee Nuclear Station, Unit 1	05000269	07	002	0	2	OF 7

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

EVALUATION:

BACKGROUND

This event is being reported per 10 CFR 71.95(b) as "instances in which the conditions in the certificate of compliance of a spent fuel shipping cask were not followed during a shipment. 10 CFR 71.95 does not contain a "statute of limitations" clause relative to old events; therefore, this event is reportable following discovery even though the applicable shipments occurred twenty years ago. This is being reported as an Oconee Nuclear Station (ONS) event because ONS initiated the shipment.

ONS Unit 1 experienced initial criticality in April 1973. Unit 2 followed in the fall of 1973 and Unit 3 in 1974. The initial cores for each of the three ONS units included two Americium-Beryllium-Curium (A-B-C) neutron emitters as sources of neutrons to facilitate initial start-up. In various documents these sources are described as "primary sources", "startup sources" and "neutron sources." This report uses the term "neutron sources." These neutron sources do not qualify as special nuclear materials (SNM) or "source material" as defined in the regulations.

Problem Investigation Process (PIP) G-95-0896, written on 11/15/95, identified potential weaknesses in ONS tracking of the specific location of these sources. A search of various documents, such as completed ONS procedures, was performed to determine the fuel assemblies which contained the neutron sources in the early ONS reactor cores.

The documents did not conclusively give the final location of the neutron sources. They indicated that two assemblies, possibly containing the ONS Unit 3 sources, were stored in the ONS Unit 1 and 2 spent fuel pool and that the neutron sources from Unit 2 may have been installed in fuel assemblies 2C40 and 2C52, which were shipped to the McGuire Nuclear Station (MNS) spent fuel pool in 1987. (Due to limitations in the capacity for fuel storage at ONS, Duke Energy Carolinas, LLC (Duke) shipped spent fuel from ONS to MNS over a period of several years.)

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
Oconee Nuclear Station, Unit 1	05000269	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3	OF 7
		07	- 002	- 0		

**17. NARRATIVE** (If more space is required, use additional copies of NRC Form 366A)

Revision 13 of the Certificate of Compliance (CofC) for the TN-8L shipping cask, which was used for shipping the two assemblies to MNS, contains the following condition:

"7. PWR assemblies may be shipped either with or without burnable poison rod, thimble plug, or control rod assemblies."

**EVENT DESCRIPTION**

On 07/19/2006, PIP O-06-4569 was written primarily to address issues related to the two assemblies in the ONS Unit 1/2 spent fuel pool suspected to contain Unit 3 neutron sources. However, corrective actions were created to develop appropriate tooling and procedures in order to physically inspect the assemblies in the ONS and MNS spent fuel pools to confirm the presence of primary sources.

On 9/24/07, a tool was inserted into the fuel assembly guide tubes of 2C40 and 2C52, the two assemblies in the MNS spent fuel pool suspected to contain ONS Unit 2 neutron sources, to determine if there were obstructions consistent with occupancy by a neutron source. Obstructions were confirmed in one guide tube in each of the two assemblies. While the primary sources were not visually confirmed, Duke personnel have high confidence that the obstructions are due to the presence of the sources.

Upon concluding that the neutron sources were present, the MNS personnel initiated PIP M-07-5072 to document the condition and made a one hour notification, on 9/24/07 (event number 43660), as loss/discovery of SNM. This event notification was subsequently retracted on 9/25/07 because these sources do not meet the definition of SNM.

However, as a part of the reportability review for this condition, Duke concluded that the shipments of these two fuel assemblies to MNS in 1987 may not be in full compliance with the CofC for the shipping casks used. As quoted in the Background section above, Condition 7 of the CofC appears to specifically limit the radioactive material associated with a fuel assembly allowed to be included in a shipment to the listed items, which do not include neutron sources.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
Oconee Nuclear Station, Unit 1	05000269	07	002	0	4	OF 7

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Therefore this event is being reported per 10 CFR 71.95(b) as "instances in which the conditions in the certificate of compliance were not followed during a shipment."

10 CFR 71.95(c)(2) specifies the narrative description must include the following specific information as appropriate for the particular event:

(i) Status of components or systems that were inoperable at the start of the event and that contributed to the event;

Not Applicable - This event did not involve inoperable components or systems.

(ii) Dates and approximate times of occurrences;

Fuel assemblies 2C40 and 2C52, including the neutron sources, were irradiated in the ONS Unit 2 reactor, cycles 1, 2, and 3 from December 1973 to November 1978.

Fuel assembly 2C40 was shipped from ONS to MNS on 8/17/87.  
Fuel assembly 2C52 was shipped from ONS to MNS on 9/24/87.

(iii) The cause of each component or system failure or personnel error, if known;

There were no component or system failures involved in this event. The issue is believed to be the result of a programmatic deficiency rather than a personnel error by any individual. See section vii below.

(iv) The failure mode, mechanism, and effect of each failed component, if known;

Not Applicable - This event did not involve inoperable components or systems.

(v) A list of systems or secondary functions that were also affected for failures of components with multiple functions;

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
Oconee Nuclear Station, Unit 1	05000269	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	5	OF 7
		07	- 002	- 0		

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Not Applicable - This event did not involve inoperable components or systems.

(vi) The method of discovery of each component or system failure or procedural error;

To summarize the event description given above:

In 2006, Duke identified that the locations of the primary sources could not be positively ascertained based on available records. It was determined that attempts should be made to verify, to the extent practicable, the locations of these sources. A task was generated to inspect those assemblies. Following generation of appropriate procedures and tooling, on 9/24/07 a tool was inserted into the guide tubes of two assemblies stored at MNS to determine if there were obstructions consistent with occupancy by a neutron source. Obstructions were confirmed in one guide tube in each of the two assemblies. Therefore, Duke personnel have high confidence that the obstructions are due to the presence of the sources. Following this inspection, in evaluating the reportability of the event, Duke personnel concluded that the presence of the sources during shipment would constitute "instances in which the conditions in the certificate of compliance were not followed during a shipment."

(vii) For each human performance-related root cause, a discussion of the cause(s) and circumstances;

The inappropriate action is that, historically, the specific locations of the neutron sources were not adequately tracked. Thus, the personnel involved in processing the actual shipments apparently had no indication that these two assemblies contained primary sources.

This is a legacy issue, and due to the elapsed time involved, the reason that the sources were not tracked cannot be positively determined. The issue is considered a programmatic issue rather than a human performance issue.

The apparent cause of this event is a lack of programmatic guidance to track all radioactive materials and components related to fuel assemblies. In accordance with NRC

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
Oconee Nuclear Station, Unit 1	05000269	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	6 OF 7	
		07	- 002	- 0		

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

regulations, the location of SNM, including the fuel assemblies themselves, has always been tracked. However, in the early years at ONS, associated components (control rods, orifice rods, etc.) were not always tracked. The ONS neutron sources were apparently overlooked when the requirements to track associated components (including neutron sources at the other Duke nuclear sites) were added to the Duke program.

The SNM database has been updated to reflect the locations in associated fuel assemblies in the MNS spent fuel pool. While these sources are not SNM, the SNM database is being used as the tracking mechanism for convenience since the sources are currently associated with fuel assemblies.

(viii) The manufacturer and model number (or other identification) of each component that failed during the event; and

No component failed during the events. However, the involved sources were:

- Component: A-B-C Source
- Manufacturer: General Electric
- Serial numbers: could not be determined

The involved shipping casks were:

- Component: spent fuel shipping cask
- Model: TN-8L
- Manufacturer: Transnuclear, Inc, Columbia, Md.
- Applicable Certificate of Compliance: No. 9015, revision 13

(ix) For events occurring during use of a packaging, the quantities and chemical and physical form(s) of the package contents.

Chemical form of the material, as manufactured: Americium-beryllium pellets (AmO<sub>2</sub>-Be mixed powder); approximately 0.35 lbs

Physical form: Americium-beryllium pellets in a sealed stainless steel capsule. The capsule is then housed in a "neutron source shroud tube assembly", which is positioned in a fuel assembly guide tube. The fuel assemblies are Babcock & Wilcox 15x15 design.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
Oconee Nuclear Station, Unit 1	05000269	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	7 OF 7	
		07	002	0		

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

CORRECTIVE ACTIONS

Immediate:

None: The affected fuel shipments were completed approximately twenty years prior to discovery of the event.

Subsequent:

The Duke database for tracking SNM has been modified to include various control components, now including these neutron sources. While the locations of these sources have not been absolutely confirmed, Duke is highly confident that the inspected assemblies in the MNS spent fuel pool do contain the two sources, and the database has been updated to reflect these locations.

Planned:

None: All corrective actions have been taken and the sources are acceptable for storage in the MNS spent fuel pool.

These corrective actions are not considered NRC Commitment items. There are no NRC Commitment items contained in this LER.

SAFETY ANALYSIS

In 1998, Duke Nuclear Fuels Management personnel in the Duke General Office evaluated the sources and concluded that the neutron sources present no radiological, thermal or criticality concerns.

Therefore, there was no actual impact on the health and safety of the public due to this event.

ADDITIONAL INFORMATION

**LICENSEE EVENT REPORT (LER)**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE	
Oconee Nuclear Station, Unit 1	05000269	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	8	OF 7
		07	002	0		

**17. NARRATIVE** (If more space is required, use additional copies of NRC Form 366A)

There were no releases of radioactive materials, radiation exposures or personnel injuries associated with this event.

This event is not considered reportable under the Equipment Performance and Information Exchange (EPIX) program.