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September 19, 2006

Docket No.: 50-321

NL-06-2087

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant - Unit 1
Supplemental Licensee Event Report
Discrepancy in Special Nuclear Material Inventory

Ladies and Gentlemen:

On August 21, 2006 SNC updated a previous Event Notification (continuation of NRC Event # 42135, previously reported on November 10, 2005) concerning a loss of special nuclear material (SNM) from the historic fuel reconstitution activities in the 1980s. This loss amounted to, in the aggregate, approximately 18 inches of a spent fuel rod.

The August 21, 2006 notification was made in accordance with the requirements of 10 CFR 74.11(a). This report is submitted pursuant to the reporting requirements of 10 CFR 20.2201(b), which requires a written report to be submitted within 30 days.

The NRC Resident Inspector was informed at the time of the notification.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

A handwritten signature in black ink, appearing to read "L. M. Stinson".

L. M. Stinson

LMS/MNW/daj

Enclosure: LER 1-2005-003-02

References: 1. LER 1-2005-003 transmitted by letter NL-05-2262, dated 12/9/05
2. LER 1-2005-003-01 transmitted by letter NL-06-0689, dated 4/14/06

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cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. D. R. Madison, General Manager – Plant Hatch
RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. C. Gratton, NRR Project Manager – Hatch
Mr. D. S. Simpkins, Senior Resident Inspector – Hatch

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Edwin I. Hatch Nuclear Plant-Unit 1	2. DOCKET NUMBER 05000-321	3. PAGE 1 OF 5
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4. TITLE
Discrepancy in Special Nuclear Material Inventory

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER(S)
11	10	2005	2005	003	02	9	19	2006		05000
									FACILITY NAME	DOCKET NUMBER(S)
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § : (Check all that apply)				
	<input checked="" type="checkbox"/>	20.2201(b)	20.2203(a)(3)(i)	50.73(a)(2)(i)(C)	50.73(a)(2)(vii)
10. POWER LEVEL		20.2201(d)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(A)
		20.2203(a)(1)	20.2203(a)(4)	50.73(a)(2)(ii)(B)	50.73(a)(2)(viii)(B)
		20.2203(a)(2)(i)	50.36(c)(1)(i)(A)	50.73(a)(2)(iii)	50.73(a)(2)(ix)(A)
		20-2203(a)(2)(ii)	50.36(c)(1)(ii)(A)	50.73(a)(2)(iv)(A)	50.73(a)(2)(x)
		20-2203(a)(2)(iii)	50.36(c)(2)	50.73(a)(2)(v)(A)	73.71(a)(4)
		20.2203(a)(2)(iv)	50.46(a)(3)(ii)	50.73(a)(2)(v)(B)	73.71(a)(5)
		20.2203(a)(2)(v)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(C)	OTHER
		20.2203(a)(2)(vi)	50.73(a)(2)(i)(B)	50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME K. A. Underwood, Performance Analysis Supervisor, Plant Hatch	TELEPHONE NUMBER (Include Area Code) (912) 537-5931
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	X	NO		MONTH	DAY	YEAR

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

During a review of Special Nuclear Material (SNM) inventory and accounting records initiated in response to industry events, a licensee-initiated corrective action, and Nuclear Regulatory Commission (NRC) Bulletin 2005-01, it was determined that a discrepancy existed between the amount of spent fuel that exists in the Spent Fuel Pool (SFP) and the amount recorded within the SNM physical inventory records. This was reported as NRC Event Number 42135 on November 10, 2005, pursuant to 10CFR20.2201(a)(1)(ii) and 10CFR50.72(b)(2)(xi). After an extensive review of documentation, a thorough inspection of the SFPs, and an inspection of fuel bundles, Southern Nuclear Operating Company (SNC) has determined that fragments/segments of fuel rods and/or fuel pellets, amounting to approximately 18 inches (in the aggregate) of fuel rod, is unaccounted for. A follow-up notification was made on 8/21/2006, pursuant to 10 CFR20.2201(a)(1)(ii), 10CFR50.72(b)(2)(xi), and 10CFR 74.11. Based on the nature of the fuel rod segments, fragments, pellets, pellet chips, and small particles, and the barrier provided by in-plant radiation monitoring instrumentation, a high degree of confidence exists that the unaccounted for SNM is either still in the SFP, was washed out during reactor operation, or was inadvertently shipped to a licensed low level waste processing facility. Throughout its investigation and review, SNC has identified no evidence to indicate the possibility of theft or diversion of the missing quantity of SNM material.

This event was caused by an inadequate procedure which did not require tracking of parts of fuel rods in the SNM inventory. The applicable plant procedure has been revised to prevent the recurrence of this problem.

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

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor
 Energy Industry Identification System codes appear in the text as (EIS Code XX).

DESCRIPTION OF EVENT

At approximately 1528 EST, on November 10, 2005, with Unit 1 in Mode 4, a notification was made to the Nuclear Regulatory Commission (NRC) of a Special Nuclear Material (SNM) accounting discrepancy. This was a non-emergency event notification, made in accordance with 10 CFR 20.2201(a)(1)(ii) and 10CFR50.72(b)(2)(xi), to inform the NRC of an SNM accounting discrepancy. The discrepancy resulted from segments of five (5) rods from five (5) fuel bundles/assemblies, amounting to, in the aggregate, less than one half of a spent fuel rod, which were not tracked in physical inventory. Additionally, a sixth broken rod had some -missing fuel pellets or pellet fragments, some of which, based on inspection, have been attributed to washout during reactor operation. In the process of reviewing records and physically verifying the contents of the Spent Fuel Pools (SFPs), as part of activities associated with corrective action [Condition Report 2005105177] and preparing Southern Nuclear Operating Company's response to NRC Bulletin 2005-01, material control and accounting discrepancies related to fuel segments/fragments located in the SFP and physical inventories records were identified. Based on record reviews and bundle inspections, the segments/fragments are believed to have originated during fuel reconstitution and inspection activities in the early 1980s. Previous physical inventory procedures performed at the plant did not track individual fuel rod segments/fragments that were separated from fuel bundles, although Condition Reports were issued for some of the fuel rod segments that had separated from their original bundles.

Physical searches of the SFPs in the Summer and Fall of 2005 identified individual fuel rod segments in the SFPs separate from their original bundles. Most of these were retrieved and quantified during that effort; however, some potential SNM was observed in areas of the pools that required the development of special retrieval equipment and techniques. Efforts to retrieve these potential short segments and pellet fragments continued into the Summer of 2006, and additional special nuclear material was retrieved from these areas.

After a review of all actions taken to locate and retrieve special nuclear material, it was determined by 8/21/2006 that not all SNM could be located. Based on this determination, a follow-on notification was made to the NRC on that date, pursuant to 10 CFR 20.2201(a)(1)(ii), 10 CFR 50.72(b)(2)(xi), and 10 CFR 74.11(a).

Final inventory verification, in response to NRC Bulletin 2005-01, is now complete.

10 CFR 20.2201(b) requires a written report within 30 days after the initial notification for the occurrence of any lost, stolen, or missing licensed material that was reported under 10 CFR 20.2201(a)(1)(ii) for licensed material in a quantity 10 times greater than the quantity specified in Appendix C to Part 20. The following topics are required to be addressed:

- (i) A description of the licensed material involved, including kind, quantity, and chemical and physical form:
 Segments/fragments of irradiated fuel rods, approximately 1/2 inch in diameter, consisting of fuel pellets and pellets contained within metal cladding. Some of the irradiated pellet material is in the form of fragments, chips, or small, sand-like fines. The fuel material is irradiated, low-enrichment uranium dioxide.

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(ii) A description of the circumstances under which the loss or theft occurred:

Some fuel rods broke during inspection and reconstitution activities in the early 1980s. The resulting segments/fragments were allowed to remain in the pool; however, their locations were not recorded in the SNM inventory records. The possibility exists that some of this material was inadvertently included in waste shipments to a facility licensed to receive radioactive waste.

The possibility of theft or diversion is not plausible because of the plant's radiation monitoring instrumentation, physical security measures, and the size and type of container required for transporting nuclear material of this nature.

(iii) A statement of disposition, probable disposition, of the licensed material involved:

SNC identified and retrieved, during the physical searches, numerous fuel rod segments, cladding pieces, and pellet fragments. Fuel and cladding segments have been placed in water rods of selected fuel bundles for permanent storage. Small pieces of fuel pellets and cladding were stored in special capsules that also were stored in water rods or empty fuel locations in selected bundles. These segments are now part of the selected bundles and will not be tracked separately in the physical inventory records, but they are tracked in associated inventory records. The isotopics of these bundles will be adjusted appropriately to account for the added special nuclear material.

In addition, one SNM fragment, defined as "Item 30," had been characterized and quantified and was dropped in the SFP during handling. A physical search in the SFP was performed to look for Item 30, but the intact segment was not found. During this search, a cladding fragment with no appreciable SNM inside was located and identified as Item 32. It may be a portion of Item 30. Item 30's fuel length of 4.5 inches is included in the total amount of SNM characterized as unaccounted for. With respect to SNM quantities not identified to date in the SFP searches, SNC currently believes that the fragments and pellets remain in the SFP, were washed out during reactor operation, or were mistakenly shipped to a facility licensed to receive low level radioactive waste material. The possibility of theft or diversion is not plausible because of the plant's radiation monitoring instrumentation, physical security measures, and the size and type of container required for transporting nuclear material of this nature.

(iv) Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas:

No unauthorized exposure to radiation occurred to the plant staff or members of the public, since the fuel fragments and pellets either remain in the SFPs; were washed out during reactor operation and captured on demineralizers; and/or were mistakenly shipped in a licensed, shielded container to a facility licensed to receive low level radioactive material. This facility possesses monitoring equipment to prevent unauthorized exposure.

(v) Actions that have been taken, or will be taken, to recover the material:

A team has completed a detailed, physical inspection of the SFPs, and has retrieved numerous items that have been determined to be SNM, including material in the form of rod segments, pellet fragments, cladding pieces, and "fines" (particulate material) in the locations from which the pellet fragments were retrieved. The retrieved material has been characterized and the amount of SNM quantified, and the fuel, cladding fragments, and fines have been permanently stored in water rods or capsules in selected bundles.

The following specific actions have been performed:

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- (1) Visual inspection of accessible areas of the SFPs. Special cameras and robotic equipment were used to perform these inspections.
 - (2) Review of selected vendor fuel and shipping records.
 - (3) Review of selected SNC fuel and shipping/receipt records. No waste shipments containing SNM were identified, but the possibility of inadvertent inclusion in a waste shipment could not be eliminated.
 - (4) Inspection of selected fuel assemblies in the SFP.
 - (5) Review of records to identify any information which might be pertinent to the on-site investigation.
 - (6) Verification of the number of fuel bundles/assemblies within the SFP.
 - (7) Review of the records of offsite shipments to hot cells to determine if any fragments were inadvertently sent directly to off-site locations for analysis or testing. None were identified.
 - (8) Retrieval, characterization, and quantification of SNM from selected previously identified cells in fuel racks.
 - (9) Inspection of baskets, pails, and other containers within the SFPs.
 - (10) Additional inspection of open spaces and filter can during June and July of 2006.
 - (11) Notification of the State of Georgia and South Carolina representatives and the operator of the Barnwell facility of the loss of SNM.
- (vi) Procedures or measures that have been, or will be, adopted to ensure against a recurrence of the loss or theft of licensed material:
- (1) The site procedure for inventory and control of SNM has been revised to require that segments/pieces of fuel rods be included in the inventory records and be counted during the physical inventory.
 - (2) Future plant activities and preparations for low-level waste shipments will take into account the possibility of SNM's presence in the SFPs, and any residual amount will be retrieved when the plant is decommissioned.

CAUSE OF EVENT:

The root cause of this event was an inadequate procedure. The procedure for the physical inventory of SNM did not contain instructions regarding inclusion of less than whole SNM units in the SNM physical inventory records.

CORRECTIVE ACTIONS:

- All located SNM-bearing fragments and pieces were included in the physical inventory records.
- The special nuclear material physical inventory procedure was revised, effective 10/25/2005, to include instructions on the administrative handling of SNM fragments and pieces.
- Personnel assigned to SNM accounting activities have been trained on the new requirements for tracking and inventorying SNM and SNM-bearing fragments and pieces. A program is in place to ensure personnel assigned to SNM accounting activities in the future will be trained on the new tracking and inventorying requirements.

REPORTABILITY ANALYSIS AND SAFETY ASSESSMENT

This additional report is required by 10 CFR 74.11 and 10 CFR 20.2201(b)(1) because special nuclear material equivalent to approximately 18 inches of fuel rod has been determined to be lost. Portions of six (6) spent fuel rods, amounting to approximately 18 inches of a fuel rod (in the aggregate), could not be located during the SNM inventory performed in response to Bulletin 2005-01. The fuel material is irradiated, low-enrichment uranium dioxide. The LER originally reported that a discrepancy existed between the amount of spent fuel that exists in the

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SFP and the amount recorded within the SNM physical inventory records. This was reported as NRC Event Number 42135 on November 10, 2005, pursuant to 10CFR20.2201(a)(1)(ii) and 10CFR50.72(b)(2)(xi).

Some of the SNM, identified as a discrepancy in the SNM inventory in the original LER, could not be located during the SFP inspection performed by both plant and contractor personnel. Fuel bundles were inspected, inspections were performed at the bottom of the SFPs, storage containers were emptied and items inspected, and fuel rack flow holes were checked for particles of fuel pellets and small fragments of fuel rods. This material is now considered to be unaccounted for.

The possibility of theft or diversion is not plausible because of plant radiation monitoring instrumentation, the plant's physical security measures, and the size and type of container required for transporting nuclear material of this nature.

No unauthorized exposure to radiation occurred to plant staff or to the public as a result of these events since the fuel fragments either remain in the SFPs or were shipped to a facility licensed to receive low level radioactive material.

It is believed that some fuel segments/fragments may still reside within the SFP. Although small portions of the unaccounted for material may have been inadvertently shipped to a licensed waste disposal facility, SNC believes that the balance of the unaccounted-for material remains in the SFPs in areas that are either not readily observable by camera or are otherwise inaccessible.

Based upon the preceding analysis, it is concluded that this event had no adverse impact on nuclear safety. The analysis is applicable to all power levels.

ADDITIONAL INFORMATION

No systems other than those already mentioned in this report were affected by this event.

This LER does not contain any permanent licensing commitments.

LER 50-321/1982-097, dated November 30, 1982, reported the separation of a fuel rod into two (2) segments/fragments during fuel rod inspection.

NRC Inspection Report 50-321/88-10, dated April 27, 1988, addressed material accountability and control procedures at Plant Hatch. NRC Inspection Report 50-321/87-27, dated November 18, 1987, includes an NRC finding related to material control and accountability. NRC Inspection Report 50-321/83-31, dated December 9, 1983, includes NRC observations of fuel bundle reconstitution activities. NRC Inspection Report 50-321/2005-001 and 50-366/2005-001, dated January 17, 2006, identified the results of Phase III of Temporary Instruction 2515/154, "Spent Fuel Material Control and Accounting at Nuclear Power Plants." One Unresolved Item (URI), with -respect to unaccounted-for spent fuel rod pieces, was identified.