TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

SEP 30 1987

Docket Nos. 50-259

50-260

50-296

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

Gentlemen:

In the Matter of the Tennessee Valley Authority

BROWNS FERRY NUCLEAR PLANT (BFN) UNITS 1, 2, AND 3 - NRC OIE INSPECTION REPORT NOS. 50-259/87-29, 50-260/87-29, AND 50-296/87-29, - NONFUEL SPECIAL NUCLEAR MATERIAL RECORDS SEARCH PROCESS

In a letter from TVA to NRC dated September 22, 1987, TVA committed to perform a nonfuel Special Nuclear Material (SNM) records search, reconcile differences between the records search and the SNM physical inventory, and submit a report to NRC by September 30, 1987. That report is enclosed.

Please refer any questions to M. J. May at (205) 729-3566.

To the best of my knowledge, . declare the statements contained herein are complete and true.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

M. J. Ray, Deputy Director Nuclear Licensing and and Regulatory Affairs

Enclosures cc: See page 2

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SEP 30 1987

U.S. Nuclear Regulatory Commission

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cc (Enclosure): Mr. G. G. Zech, Assistant Director Regional Inspections Division of TVA Projects Office of Special Projects U.S. Nuclear Regulatory Commission Region II 101 Marietta St., NW, Suite 2900 Atlanta, Georgia 30323

> Mr. J. A. Zwolinski, Assistant Director For Projects Division of TVA Projects Office of Special Projects U.S. Nuclear Regulatory Commission 4350 East-West Highway EWW 322 Bethesda, Maryland 20814

Browns Ferry Resident Inspector Browns Ferry Nuclear Plant P.O. Box 311 Athens, Alabama 35611

ENCLOSURE 1

SUPPLEMENTAL RESPONSE NRC INSPECTION REPORT NOS. 50-259/87-29, 50-260/87-29, 50-296/87-29 LETTER FROM G. G. ZECH TO S. A. WHITE DATED AUGUST 10, 1987

BACKGROUND

This report is the result of a commitment made in a letter from TVA to NRC dated September 22, 1987, to report to NRC the results of the nonfuel SNM records search at BFN. Based on this search and additional physical inventories, an item balance for nonfuel SNM items was prepared.

For the purposes of this report, an item balance is defined as a comparison of the total number of nonfuel SNM items that have been or are believed to have been on the BFN site to the total number that is on the site plus any items known to have been shipped offsite. Any difference resulting from this comparison is the number of items unaccounted for at the time of the comparison. It is important to note that this does not mean that a specific item was never accounted for while onsite, but only that its present location cannot be positively determined.

Efforts to perform an item balance of nonfuel SNM items were initially made as a result of the Fuel Loading Chamber (FLC) event (NRC Violation 86-38). This effort produced limited success because of unexpected difficulty in accumulating related records, competing priorities for the time and resources available to produce the most accurate assessment of the situation (60 days following the NRC Enforcement Conference of November 4, 1986), and confidence in the physical inventories performed following the FLC event.

Efforts continued to obtain a more accurate item balance following the issuance of TVA's response to NRC Violation 86-38. However, because of the high level of confidence placed in the physical inventories performed following the FLC event, this item balance was not completed in time to prevent the IRM event. The June 1987 IRM shipping event reemphasized the need to define as accurately as possible the history specific to each item of nonfuel SNM that had been or was thought to have been on the BFN site.

DESCRIPTION OF THE NONFUEL SNM RECORDS SEARCH PROCESS

The source of information and types of documents used to develop a history specific to each item of nonfuel SNM that has been or believed to have been on the BFN site are as follows:

1. Power Stores organization:

Receiving reports, shipping papers for items sent to BFN, TVA Form 575 for items issued from Power Stores, TVA Form 575 credit for items placed back in Power Stores, miscellaneous information on items loaned to other licensees, and shipping papers for items shipped by BFN were obtained. 2. Planning and Scheduling organization:

Computer generated summaries of Maintenance Requests (MRs) sorted by system number and key words applicable to the nonfuel SNM area were reviewed. This information was used to focus efforts in the MR review.

3. Document Control organization:

MRs for the installation of Source Range Monitor (SRM) and Intermediate Range Monitor (IRM) detectors, Maintenance Instructions for the installation of Transversing Incore Probe (TIP) detectors and workplans for the installation of Local Power Range Monitors (LPRMs) were reviewed.

4. Instrument Maintenance section:

Miscellaneous files for records or information concerning LPRMs, SRMs, and IRMs were reviewed.

5. RADCON organization:

Radiation work permits and special work permits associated with the installation or removal of nonfuel SNM items were obtained.

6. Radwaste section:

Shipping records which would indicate the shipment of nonfuel SNM items were obtained.

7. Reactor Engineering section:

Plant Monthly Operating Reports for documentation of maintenance activities associated with nonfuel SNM items were reviewed. Miscellaneous files associated with nonfuel SNM items, and previous nonfuel SNM control and accountability records were obtained.

In addition to the above, General Electric (GE) was contracted to perform a search of their records to determine the serial number and shipping date of all nonfuel SNM items purchased for use at BFN. This was to include items purchased from Reuter Stokes before GE's acquisition of Reuter Stokes.

The initial plan for performing the item balance was to use the existing nonfuel SNM custodian records as a starting point, use other TVA documents to confirm and/or correct the existing nonfuel SNM records, and then use the GE obtained information to verify or check the resulting records.

It soon became apparent that this method would not work as intended because:

 Several of the documents dated before 1978 are difficult if not impossible to obtain. (Based on the completeness and high level of confidence of TI-14 records before that date, it was determined that further effort for this period was not warranted. The accuracy of records in this time period was subsequently confirmed by GE records.) The initial information furnished by GE was incomplete. GE subsequently indicated that they would be unable to identify all items shipped to BFN without input from TVA.

Therefore, the plan for performing the item balance was revised to use the existing nonfuel SNM custodian records as a starting point and use all acquired documents to confirm and/or correct the nonfuel SNM records on the basis of correlating information from the various sources.

During the review of documents associated with the time period from 1981 to the present, problems were encountered regarding some of the specific historical details of material loaned to other licensee, installation records, and identification of individual items presently in Radwaste. A brief discussion of each of these problem areas and the resolution method used follows.

Material loaned to other licensees:

Records were reviewed that indicate the following nonfuel SNM items have been shipped offsite for use at other licensed facilities:

Date:	Item:	Quantity:	
05-15-80	SRM	1	
10-30-81	SRM	1	
02-15-82	TIP	1	
04-06-82	IRM	1	
06-13-83	SRM	2	
06-13-83	IRM	2	
06-16-87	IRM	6	

Of these items, the serial number of two SRMs and two IRMs could not be directly determined from records. The licensed facilities associated with these shipments were contacted. The identity of one of the IRMs was determined. For the remaining items, the method used to determine the specific serial numbers was to determine the serial numbers of items that were available to be shipped (spares in warehouse), then determine if any of these items had a later record of installation at BFN. An exact correlation between the number of items shipped and the number of items available to be shipped was obtained by this method. No subsequent record of use for any of these items at BFN was found. This issue was, therefore, considered to be satisfactorily dispositioned.

Installation records:

In an effort to reduce any uncertainty associated with installation records, it was decided to perform a physical inventory of installed SRMs and IRMs in the three reactors. Based on an exact correlation of information obtained from physical inventories of the warehouse SNM storage area, it was thought that the serial numbers located on the upper part of the connector and also etched on the connector pin were identical. To avoid excessive radiation exposure which would result from attempting to obtain the serial number from both locations (when installed the upper part of the connector is particularly difficult to access) it was decided to obtain the serial number from the connector pin only.

It was observed during the first inventory of a reactor by this method that several of the serial numbers recorded did not correlate to those expected. TVA learned from GE that the serial number etched on the connector pin is actually that of the detector and that it is not always the same serial number used to identify the instrument assembly (detector, cable, and connector). The data obtained from this inventory process was, therefore, not as completely definitive as anticipated and is summarized as follows:

Unit 1:

- Four installed SRMs three from instrument serial number (ISN); one from detector serial number (DSN).
- Eight installed IRMs six from ISNs; one from DSN; and one could not be determined.

Unit 2:

- 1. Four installed SRMs all from ISNs.
- 2. Eight installed IRMs two from ISNs; six from DSN.

Unit 3:

- Four installed SRMs three from DSNs; one from an inventory performed on January 22, 1987.
- 2. Eight installed IRMs three from ISNs; five from DSNs.

All 19 of the detectors that were identified by instrument serial numbers confirmed data resulting from the records search. GE was requested to determine if a correlation between detector serial numbers and instrument serial numbers could be made. They were able to do this for five of the remaining 16 instruments for which detector serial numbers were known. These five detectors also confirmed data resulting from the records search. Based on confidence gained in the installation records by the above correlations, the records of the remaining 12 instruments (11 for which the serial number correlation could not be performed and one for which a serial number could not be determined) were assumed to be correct. Identification of specific items presently in Radwaste:

From inventories performed as a result of the FLC event, the following items were known to be in Radwaste:

4 SRMs by serial number

6 IRMs by serial number

17 SRM or IRM items (serial numbers unknown)

13 TIPs (serial numbers unknown)

Using the reasoning that all items which have been removed from the reactor and do not have documentation of shipment offsite should still be in Radwaste, the number of items in each category which should be in Radwaste is as follows:

SRM - 13

IRM - 25

TIP - 16

Historical information developed during this investigation supports the assumption that the items presently in Radwaste are those most recently removed from the three reactors. Based on this, the following distribution of items which are presently in Radwaste can be determined:

SRM - 8

IRM - 19

TIP - 13

ITEM BALANCE RESULTS:

From the records search efforts, the quantity of nonfuel SNM items that have been or are believed to have been at the BFN site at any time is:

	SRM	IRM	TIP	LPRM	FLC	SOURCES
	42	76	67	449	5	26
The quantity	of items	known to	have been	shipped is:		
	SRM	IRM	TIP	LPRM	FLC	SOURCES
Quantity Shipped	8	12	31	36	0	5

SOURCES TIP LPRM FLC SRM IRM Warehouse Refuel Floor Installed

From physical inventories and information known about installed instrumentation the current location and quantity of nonfuel SNM items now onsite is:

	SRM	IRM	TIP	LPRM	FLC	SOURCES
Warehouse	9	15	5	0	0	0
Refuel Floor	0	0	0	24	0	0
Installed	12	24	15	129	0	0
Radwaste	8	19	13	0	0	0
SFSP 1	0	0	0	68	0	0
SFSP 2	0	0	0	77	0	0
SFSP 3	0	0	0	115	0	0
Chemical Lab	0	0	0	0	0	4
RADCON Lab	_0_	_0	_0_	0	<u>o</u>	17
TOTAL	29	58	33	413	0	21

The location and quantity of nonfuel SNM items that should currently be at BFN is therefore:

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Radwaste

SFSP 1

SFSP 2

SFSP 3

Chemical Lab

TOTAL

RADCON Lab

The number of items unaccounted for by type are:

SRM	IRM	TIP	LPRM	FLC	SOURCES
5	6	3	0	5	0

As previously discussed, the SRMs, IRMs, and TIPs that are unaccounted for are thought to have once been located in Radwaste and were most likely inadvertently shipped. The unaccounted for SRMs and IRMs are all from a time period prior to 1981. The unaccounted for TIPs are all from a time period before 1980. All Radwaste disposal shipments before July of 1982 were to the Barnwell, South Carolina, facility. It is assumed that these items are located thers.

The results of the record search and receipt physical inventory efforts have not revealed new information on the location of the five fuel loading chambers that resulted in NRC Violation 86-38. As stated in our January 10, 1987 response to that violation, they are assumed to be at the U.S. Ecology, Richland, Washington, facility.

In summary, the total number of items unaccounted for is 19 as opposed to 18 which was previously reported. The total quantity of enriched uranium (U235) that cannot be accounted for is:

Type	Each Item	Number of	Total Wt.	Assumed Location
FLC	2.000gm	5	10.000gm	U.S. Ecology Richland, WA
SRM	0.003gm	5	0.015gm	Barnwell, SC
IRM	0.001gm	6	0.006gm	Barnwell, SC
TIP	0.001gm	3	0.003gm	Barnwell, SC

The total weight of U235 unaccounted for is 10.024gm.

While the distribution of nonfuel SNM items in some categories changed and the total number of items unaccounted for increased by one, the end result of this process is not significantly different from that previously reported and the total weight of unaccounted for enriched uranium is well within the range that was previously estimated and reported to NRC.