

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

REPORT/DOCKET NOS. 50-277/93-35
50-278/93-35

LICENSE NOS. DPR-44
DPR-56

LICENSEE: Philadelphia Electric Company (PECo)
P.O. Box 195
Wayne, Pennsylvania 19087-0195

FACILITY: Peach Bottom Atomic Power Station (PBAPS) Units 2 & 3

INSPECTION AT: Delta, Pennsylvania

INSPECTION DATES: December 13 - 17, 1993

INSPECTOR: *C. D. Beardslee* *1/14/94*
C. D. Beardslee, Reactor Engineer Date
Materials Section, Engineering Branch
Division of Reactor Safety

APPROVED BY: *M. C. Modes* *1/14/94*
M. C. Modes, Chief, Materials Section Date
Engineering Branch
Division of Reactor Safety

AREAS INSPECTED: The inspection dealt with nuclear fuel reliability, accountability and control. The areas examined were the performance of new fuel receipt inspections, the control of fuel transfer and storage, the different types of fuel failure mechanisms experienced at PBAPS, and the methods used to trend fuel performance and integrity.

RESULTS: No violations or deviations were identified.

DETAILS

1.0 OVERALL SCOPE

The inspection dealt with nuclear fuel reliability, accountability and control. The areas examined were the performance of new fuel receipt inspections, the control of fuel transfer and storage, the different types of fuel failure mechanisms experienced at PBAPS, and the methods used to trend fuel performance and integrity.

2.0 NEW FUEL RECEIPT, TRANSFER, AND INSPECTION

The receipt, transfer and inspection of new fuel should be controlled in a manner such that the fuel's integrity is protected. PBAPS Procedure M-018-003, "New Fuel Receipt and Inspection," Rev. 3, dated 7/22/93, is the controlling document for these activities. The sections of this procedure reviewed by the inspector were: new fuel receipt and transfer to the fuel floor; unpacking of new fuel; and new fuel inspection, channeling, and placement into the fuel pool. In conjunction with the review of this procedure, the inspector reviewed the completed work order, #R0478183, which controlled these activities for Unit 3's recent receipt of new fuel.

Examinations are required, by procedure, to be performed on equipment used for the transportation and inspection of the fuel to determine the equipment's reliability. Fuel serial numbers have to be verified several times throughout the transfer and inspection process to maintain control of fuel location. Personnel performing inspections on the fuel, channels and channel fasteners are required to be qualified by the fuel vendor. As part of the receipt inspection, it is required that all foreign material be removed from the fuel bundles. Foreign material could cause debris induced fretting and damage the fuel cladding. These activities are required by procedure, and are beneficial in maintaining fuel integrity. The NRC inspector verified, by reviewing the completed work order, that these activities had been completed and appropriately documented. The inspector also performed a walkdown of the route the fuel takes when transferred to the fuel floor. No deviations or concerns were identified.

Audits of this process are currently performed by the Nuclear Quality Assurance (NQA) group in conformance with procedure NQA-21, "NQA Audits," Rev. 5, dated 2/25/93. The inspector reviewed several of these audits and found them to be comprehensive. The inspector also noted that emphasis was placed on foreign material exclusion (FME) awareness. This has been given attention due to a number of fuel failures, in the past, at Unit 3 caused by debris induced fretting.

3.0 FUEL MOVEMENT, STORAGE, AND ACCOUNTABILITY

The control of fuel movement in the core, the spent fuel pool, and between the core and spent fuel pool is important to assure that fuel bundles are placed in the correct locations. This is essential in maintaining the core in the correct configuration. Fuel movements are controlled by a Core Component Transfer Authorization Sheet (CCTAS), which is an approved listing of the sequence to be followed when performing core component transfers. PBAPS procedure RE-43, "Generation and Control of Core Component Transfer Authorization Sheets," Rev. 1, dated 9/18/92, and actual CCTAS' were reviewed by the inspector and found acceptable. The computer program which creates a CCTAS also creates a map of the core and the spent fuel pool. The map lists the fuel bundles by serial number and the location of each fuel bundle. The bundles in the core were not accessible at the time of the inspection, so the inspector verified a group of bundles in the spent fuel pool by comparing the serial numbers on the map and the actual numbers on the bundles.

RE-44, "Reactor Engineering Guidance for Special Nuclear Material Accountability," Rev. 0, dated 11/13/90, is the procedure that provides the guidance for Reactor Engineering personnel to update and maintain accurate Special Nuclear Material (SNM) accountability records, which is an NRC requirement. This procedure requires a "Special Nuclear Material Status Sheet - Fuel" to be generated when new fuel is brought on site, and manually updated each time the fuel location is changed. These records are the permanent accountability records, whereas the CCTAS can only serve as temporary accountability records. From the information on the SNM Status Sheets, fuel location was accurately verified against the above mentioned maps.

4.0 FUEL PERFORMANCE AND INTEGRITY

The inspector reviewed PBAPS' history of fuel failures and degradation mechanisms, the methods of monitoring and trending leakage, and actions taken as a result of the failures. In the more recent fuel cycles, Unit 3 has experienced an increased number of fuel failures. The degradation mechanisms have been crud induced localized corrosion (CILC) and debris induced fretting. Following the identification of approximately thirteen leaking assemblies, due to debris induced fretting, a full core inspection and cleaning was performed as well as full core sipping. Currently, Unit 3 has no leaking assemblies identified.

Early detection of fuel failures is advantageous because it can prevent fuel discharge, increased radiation exposures of plant personnel, and increased difficulties with spent-fuel storage and disposal. The predominant method of monitoring and trending fuel failures is through analysis of offgas samples. RE-32, "Fuel Integrity Monitoring," Rev. 2, dated 8/10/92, is the procedure used by reactor engineers to monitor and trend nuclear fuel performance and integrity. The procedure defines action levels, based on deviations from

steady state offgas activity levels, for performing fuel failure related analysis. These levels are well below the Technical Specification action levels. Actions which are required due to increased offgas activity levels range from increasing offgas sampling frequency, to plant shutdown.

The inspector concluded that a concerted effort has been made to limit the number of fuel failures and, when detected, to control the degree of failure.

5.0 EXIT MEETING

The inspector met with licensee representatives, denoted in Attachment 1, at the conclusion of the inspection on December 17, 1993. The inspector summarized the scope and findings of the inspection. The licensee acknowledged the inspector's remarks with no further comments.

Attachments:

1. Persons Contacted

ATTACHMENT 1

PERSONS CONTACTEDPhiladelphia Electric Company

- * H. Abendroth, Atlantic Electric - Site Representative
- * J. Armstrong, Senior Manager - Plant Engineering
- * J. Carey, PSE & G - Site Representative
- * F. Cook, Senior Manager - Design Engineering
- * J. Guzejko, Assessor/NQA
- * J. Jordan, Manager - Engineering Training
- * D. McGinnis, Reactor Engineer - Plant Engineering
- * T. Niessen, Director - Site Engineering
- * F. Polaski, Manager - ISEG
- * R. Smith, Regulatory - Experience Assessment
- * T. Wasong, Manager - Experience Assessment

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R. Fernandes, Reactor Engineer

* Denotes those attending the exit meeting