

Licensee/Facility:

Public Service Electric & Gas Co.
Salem 1 2
Hancocks Bridge, New Jersey

Notification:

MR Number: 1-93-0045
Date: 05/06/93
SRI PC

Dockets: 50-272,50-311
PWR/W-4-LP,PWR/W-4-LP

Subject: FUEL ROD DEFECTS

Reportable Event Number: N/A

Discussion:

PSE&G informed the resident inspectors that the licensee detected Salem Unit 2 fuel rod defects during the current 7th refueling outage. During the previous cycle, Salem Unit 2 operated with a higher than expected dose equivalent iodine (DEI) value of about 4.0 E-03 microcurie per gram. Normal DEI is approximately 1.0-2.0 E-03 microcurie per gram. The licensee expected to find one or two fuel rod defects. However, after completing core fuel assembly/rod inspections (UT and visual), the licensee noted 13 fuel rod defects in 8 assemblies. All 13 rods had open defects, caused by fretting (wear) damage.

The affected fuel type was Westinghouse Vantage 5H. This was the second cycle of core exposure. Most failures occurred on fuel rods located in the core periphery near the assembly grid area. An apparent grid-to-rod fretting failure was caused by grid design changes combined with flow instabilities in this core baffle and periphery region. Similar failures

es

(35 fuel rod defects) were noted at Beaver Valley during their current outage. Westinghouse and the licensee are currently considering a 10 CFR 21 notification.

PSE&G reconstituted the Salem Unit 2 fuel, and replaced the affected rods with stainless steel pins. The Salem Unit 2 core was reloaded in the vessel this week. The unit remains in Mode 6. Salem Unit 1 is currently operating at power with a similar value for DEI (5.0 E- 03 micrcurie per gram) and an expectation of one or two rod failures. The licensee intends to inspect Salem Unit 1 fuel during its upcoming 11th refueling outage scheduled for October 1993. The licensee is pursuing a safety evaluation for both Salem units in view of this recent finding. Westinghouse continues to support the licensee's fuel inspection and analysis efforts.

Regional Action:

This matter is currently under review by Region I, the NRC resident office, and NRR technical staff.

Contact: John White (215)337-5114

PRIORITY ATTENTION REQUIRED MORNING REPORT - REGION I MAY 21, 1993

Licensee/Facility:

Notification:

Duquesne Light Co.
Beaver Valley 1
Shippingport, Pennsylvania

MR Number: 1-93-0051
Date: 05/20/93
RI PC

Dockets: 50-334
PWR/W-3-LP

Subject: VANTAGE 5 (H) FUEL ROD DEFECTS

Reportable Event Number: N/A

Discussion:

Beaver Valley Unit 1 has identified a higher than expected number of fuel rod defects during the current (9th) refueling outage. Based on reactor coolant system activity, the licensee estimated there were at least 8 failed rods. Westinghouse Nuclear Fuels Group estimated 4 failed rods based on the same data. Ultrasonic (UT) examination of the offloaded core discovered a total of 11 failed fuel assemblies, consisting of 35 individual failed rods. A failed fuel rod is identified by the presence of reactor coolant between the fuel pellet and cladding since water within fuel rod reduces the UT signals transmitted through the cladding. All of the failed rods were found in the 'K' fuel assemblies which have experienced two reactor cycles (18 months per cycle) of exposure. All of the 'K' fuel assemblies are of the Westinghouse 17 X 17 Vantage 5 Hybrid (V5H) design. This design is characterized by the use of zircaloy grid straps vice Inconel-718. The springs on the zircaloy grid straps have a diagonal orientation vice vertical in the inconel straps. Of the 35 failed rods, 30 were located within fuel assemblies adjacent to the core baffle assembly. One fuel assembly in particular, "K-16," was found to contain 18 failed fuel rods.

High magnification visual inspection of individual fuel rods by

Westinghouse is in progress. Cladding breeches due to grid-to-rod fretting have been identified. Fretting was evident on multiple grid elevations of the failed rods. Several rods which passed the UT exam also showed indication of fretting but no cladding breach. The inspectors have been informed that the wear pattern was identical to those recently identified at Salem Unit 2 (see morning report 1-93-0045). Boroscopic inspection of the fuel assembly grid straps also revealed several damaged and missing/worn grid springs. The root cause remains under investigation; however, the fretting failure appears to be due to a combination of grid design and flow induced vibration in the core baffle area.