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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Description

On September 3, 1988 at 1103 an Unusual Event was declared when a fuel bundle was observed to be hanging from the bottom of the upper guide structure (UGS). The UGS was being removed per routine refueling practices. The fuel bundle was visually observed by the vendor personnel supporting refueling when the bottom of the UGS was approximately 15 inches above the reactor vessel flange. After several restraining devices were installed, the fuel bundle was separated from the UGS and set in a restrained configuration atop the core. The UGS was then removed and set in its standard reactor cavity location. On September 7, 1988 at 1904 the fuel bundle was removed from the reactor vessel and placed into the fuel transfer carriage. Subsequently, the Plant secured from the Unusual Event. Details regarding this evolution are chronologically provided below:

September 3, 1988

- 1040 While removing the UGS from the reactor vessel, a fuel bundle was visually observed to be hanging from the bottom of the UGS. The bottom of the UGS was approximately 15 inches above the reactor vessel flange.
- 1103 Unusual Event was declared. Evaluated all penetrations to ensure containment isolation would be achieved if required.
- 1201 Augmented shift with selected Plant personnel to assist in development of fuel bundle recovery plan.
- 1225 Shift Supervisor relieved of Site Emergency Director responsibilities.
- 1315 Containment equipment access hatch secured.
- 2150 Completed placing three cables under UGS into the reactor vessel. The cables were placed in a crossing pattern on one side of the fuel bundle to prevent the fuel bundle from falling into a horizontal position on top of the reactor core if it were to become disengaged from the UGS.

September 4, 1988

- 0245 A visual inspection of the UGS and fuel bundle configuration was completed. This inspection confirmed that the upper tie plate of the fuel bundle was accessible through flow holes on the bottom of the UGS. This access would allow the fuel bundle to be grappled and secured vertically from the containment jib crane.
- 0930 The Plant Review Committee (PRC) reviewed and approved Special Operating Procedure FHSO-14, "Recovery of Bundle K-28". This

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procedure provided direction as to vertically grappling the fuel bundle, separating the fuel bundle from the UGS, removing the UGS and transferring the fuel bundle from the reactor vessel to the normal fuel transfer system.

1540 The fuel bundle was successfully grappled and vertically secured from the containment jib crane. To complete this evolution, a workman was suspended over the UGS in a basket. He then utilized a "j"-hook, which was fabricated and tested for this operation, to grapple the fuel bundle upper tie plate via access provided through a flow hole on the bottom of the UGS. The cable attached to the "j"-hook was then attached to the jib crane and approximately 1250 pounds tension as measured by a load cell was applied.

2341 An additional restraining device was placed around the fuel bundle to hold it vertical once freed from the UGS, thereby allowing the "j"-hook" to be ungrappled so that UGS removal could be completed. The restraint was placed parallel to the reactor cavity floor and perpendicular to the fuel bundle. This specifically fabricated restraint was a horseshoe shaped tool designed to surround three sides of the fuel bundle. After surrounding the bundle, two water actuated hydraulic cylinders on the two leading tines were engaged to provide support on the fourth side of the fuel bundle.

### September 5, 1988

1045 The fuel bundle was separated from the UGS by applying a vertical force to the bundles upper tie plate with a slide hammer. Tension was maintained on the "j"-hook" cable during the operation to prevent a sudden drop of the bundle. Once separated, the bundle was set on top of the reactor core.

1449 The vertical cable connecting the fuel bundle to the jib crane was removed to prevent UGS removal. The bundle was resting on top of the reactor core while being restrained by the hydraulic horseshoe.

1515 The UGS was removed from its position above the reactor vessel and placed in its normal reactor cavity location using routine lifting practices.

1700 The vertical restraint was re-installed by connecting the fuel bundle to the jib crane with the "j"-hook.

1850 The containment equipment access hatch was opened to allow personnel to move the auxiliary hoist fuel handling tool into containment. This is the tool routinely used to transfer fuel to and from the north tilt pit storage area to the main pool.

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1930 The equipment access hatch was closed.

NOTE: From September 5, 1988 at 2000 until September 7, 1988 at 0030, recovery efforts were stopped while repairs were made on the normal fuel transfer system.

September 7, 1988

0030 The "j-hook" was removed to allow grappling of the fuel bundle with auxiliary hoist fuel handling tool. This tool suspended from the containment polar crane allowed bundle transfer from the reactor vessel to the fuel transfer system by means routinely employed in the spent fuel pool.

0700 The three restraining cables initially installed on September 3, 1988 and the hydraulic horseshoe were removed to permit a final inspection of the fuel bundle prior to placing it in the normal fuel transfer system.

1130 The visual inspection of the fuel bundle revealed no significant damage had occurred to the bundle which would prohibit placement in the fuel transfer system.

1904 The fuel bundle was transferred from the reactor vessel to the fuel transfer system. The Site Emergency Director secured from the Unusual Event.

2020 The fuel bundle was transferred to its storage location in the spent fuel pool.

The fuel bundle involved with this event is designated as K-28.

Cause Of The Event

The cause of the fuel bundle K-28 being extracted from the reactor core when the UGS was removed has been attributed to the bundle adhering to UGS guide pins. The cause of the adherence has not been determined to date. Potential causes under investigation include:

- a. Bent UGS guide pins. These pins are rigidly mounted on the bottom of the UGS and fit into locating holes on the fuel bundle upper tie plate.
- b. Debris present on the guide pin or within the locating hole when the UGS was returned to its reactor vessel location after refueling in 1985.
- c. Manufacturing deviation of fuel bundle K-28's upper tie plate.

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Correction Action

After recovery efforts were completed, the tops of the remainder of the fuel bundles in the core were visually inspected to assure that no other fuel bundles had been moved from their normal position when the UGS was pulled. Logbooks from the 1985 Refueling Outage were reviewed to determine if any abnormalities were noted which could have attributed to this event and none were noted.

A gauge has been obtained from the fuel vendor to verify tie plate locating hole center to center spacing and inner diameter bore. Preliminary inspections have determined center to center spacing to be satisfactory. Inspections for locating hole bore preliminarily indicate two of the four holes may be slightly snug. Further inspections are necessary to verify the preliminary data. Additional visual inspections of the K-28 bundle and eddy current testing of one of its fuel rods did not identify any usage prohibitive defects or damage.

Additional currently planned corrective actions yet to be taken include:

- a. Inspect UGS guide pins for damage and alignment with other pins in the same row.
- b. Inspect the seating area on the core support plate at the location of K-28 for anomalies.
- c. Prior to placing UGS back into its operating location after core reload, perform an inspection of all bundles for proper alignment and the presence of foreign material.
- d. A sample lot of other fuel bundles from batch K will be inspected for manufacturing abnormalities.

Other corrective actions may be performed dependent upon the final root cause determination.

Analysis Of The Event

The events detailed within the Description Section did not result in any unplanned radiation exposures nor was there any abnormal radioactivity released to the containment atmosphere or refueling water. Had the fuel bundle become disengaged during this event, no threat would have been posed to the public as containment isolation logic was maintained intact and all personnel and equipment access hatches were secured except for the period when the auxiliary hoist fuel handling tool was moved into containment. At the time of this opening, K-28 was secured both vertically and horizontally, thereby minimizing the potential for fuel bundle damage. Calculations performed to determine the potential internal and external dose to individuals inside containment, had the

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fuel bundle dropped, show that adequate time was available for personnel to exit the Containment Building before an overexposure would result.

This Licensee Event Report is being voluntarily submitted due to the nature of the event.



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Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT -  
LICENSEE EVENT REPORT 88-015 - FUEL BUNDLE REMOVED FROM CORE DURING UPPER  
GUIDE STRUCTURE LIFT.

Licensee Event Report (LER) 88-015, (Fuel Bundle Removed From Core During  
Upper Guide Structure Lift) is attached. This event is not reportable to the  
NRC per 10CFR50.73 but is submitted as an informational LER.

Brian D Johnson  
Staff Licensing Engineer

CC Administrator, Region III, USNRC  
NRC Resident Inspector - Palisades

Attachment