UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

December 12, 1990

NRC INFORMATION NOTICE NO. 90-77: INADVERTENT REMOVAL OF FUEL ASSEMBLIES FROM THE REACTOR CORE

Addressees:

All holders of operating licenses or construction permits for pressurized-water reactors (PWRs).

Purpose:

This information notice is intended to alert addressees to potential problems pertaining to the removal of nuclear fuel from the reactor core. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On October 4, 1990, Indian Point Nuclear Generating Unit 3 was in a refueling outage. The licensee was removing the upper core support structure (upper internals) from the reactor vessel in preparation for refueling the core. Upon initiating a lateral move of the upper core support structure, crane movement was stopped upon the discovery that two peripheral fuel assemblies were attached to the bottom of the upper core plate, which is part of the upper internals package. An underwater camera inspection had been conducted after vertically lifting the upper core support structure from the reactor vessel. This inspection was prompted by earlier analysis of noise diagnostics data, confirming the existence of a loose part which resembled a fuel assembly locating pin in the steam generator channel head. Due to poor camera location and lighting, the attached fuel assemblies were not recognized during the initial camera inspection.

The licensee's fuel assembly retrieval procedure developed to facilitate their recovery included: (1) performing a static lift (no lateral movement) of the upper internals package until the fuel assemblies were approximately 1 foot above the vessel flange, (2) rotating the upper internals package so that the fuel assemblies would pass over the cavity seal one at a time, and (3) positioning the assemblies such that they could be lowered into specially fabricated steel baskets, which were located in the deep end of the refueling cavity. During retrieval activities, one of the assemblies inadvertently dropped into its basket when the brakes on the overhead crane were applied with the assemblies positioned over their baskets. The licensee lowered and

IDVR-11C

freed the remaining assembly without incident. No radiological release or breach of fuel integrity resulted from dropping the fuel assembly.

Discussion:

The licensee was using a 350,000 lb-capacity polar crane with a Dillon load cell to lift the upper core internals package (weighing approximately 119,800 lbs). The suspended fuel assemblies together weighed approximately 2600 lbs. During the lift, the licensee did not detect the additional weight because the weight of the upper internals (with suspended fuel assemblies) was within the maximum allowable weight of 125,800 lbs, as specified by the licensee's refueling procedure.

Each of the two assemblies were attached to the upper core plate by bent fuel assembly guide pins as shown in Attachment 1. These guide pins extend downward from the upper core plate and insert into two holes in the upper nozzle of the fuel assembly when the upper core internals structure is properly aligned over the top of the core. For each of the suspended fuel assemblies, the licensee found that one guide pin was bent and not inserted into the top nozzle hole (upper nozzle S-hole on Attachment 1) of the fuel assembly, with the other guide pin bent and wedged into the assembly. In this condition, the guide pin suspended the assembly at an angle of approximately 7 degrees. The licensee has determined that the fuel assembly guide pins were damaged during the previous refueling outage when the upper internals package was being removed from the upper internals storage stand.

Similar problems involving suspended fuel assemblies have occurred previously. Information Notice 86-58, "Dropped Fuel Assembly," describes a similar situation at the Haddam Neck Generating Station in which the licensee inadvertently lifted an assembly when removing the upper internals. In this situation, the assembly dropped 2 to 4 feet onto the reactor core when the upper internals were moved laterally. The dropped assembly and the two assemblies it impacted were damaged; however, no radiological release occurred.

Another similar event occurred at the Palisades Nuclear Power Station (a Combustion-Engineering plant) on September 3, 1988. At Palisades, the licensee was removing the upper guide structure (UGS) from the vessel and discovered a fuel bundle attached to the bottom. The licensee freed the fuel bundle using a J-hook manipulated by a worker supported in a JIB crane while the fuel bundle was suspended over the reactor core. The root cause of the fuel bundle becoming attached to the UGS was attributed to the bundle adhering to the UGS bundle guide pins.

Other licensees have identified fuel assembly guide pins that were bent for a variety of reasons. At Byron Station, Unit 2, on October 8, 1990, the licensee inadvertently bent approximately 8 guide pins due to an error of a polar crane floor director. The crane floor director gave a hand signal to lower the upper internals package prematurely, while approximately 1/4 of the upper internals were still over the upper internals storage stand. As a result, the upper internals package impacted the storage stand and bent the guide pins.

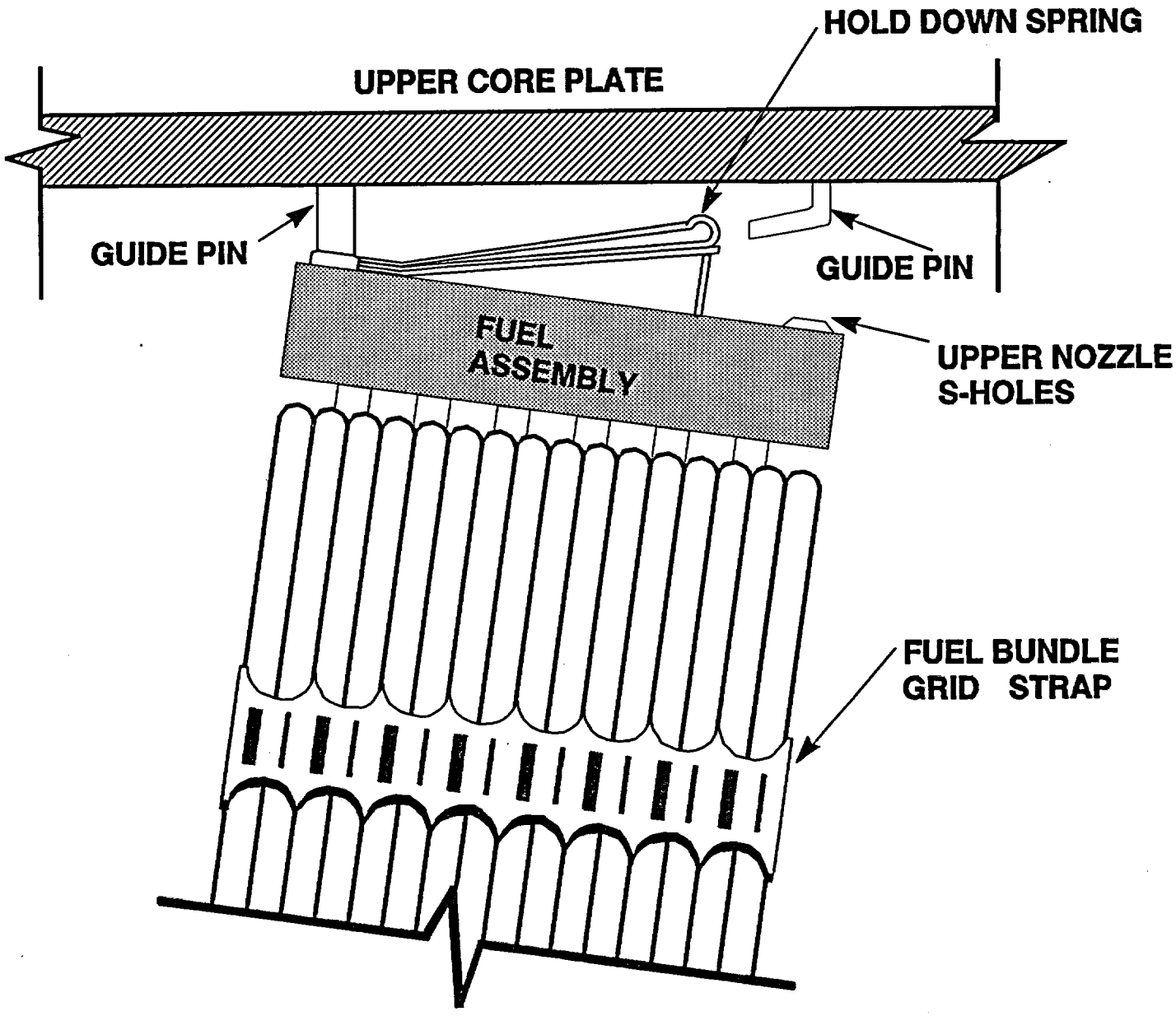
Licensees may wish to consider reviewing their procedures and equipment prior to performing activities which may lead to inadvertent damage to fuel assembly guide pins and inspecting the guide pins before reinstallation of the upper internals package into the reactor vessel. When reviewing their procedures (to assure the ability of the reactor cavity seal to withstand the mechanical, thermal, and radiation impacts from a dropped fuel assembly) licensees may also wish to consider the need to carefully inspect the upper core support structure as it is initially raised from the reactor vessel to ensure that no core components are suspended.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: John Thompson, NRR
(301) 492-1171

Attachments:
1. Indian Point 3 Detailed View Showing Suspended Fuel Assembly from Bottom of Upper Internals Package
2. List of Recently Issued NRC Information Notices



INDIAN POINT 3

Detailed View Showing Suspended Fuel Assembly from Bottom of Upper Internals Package

LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-23, Supp. 3	Potential for Gas Binding of High-Pressure Safety Injection Pumps During A Loss-Of-Coolant Accident	12/10/90	All holders of OLs or CPs for pressurized-water reactors (PWRs).
90-76	Failure Of Turbine Overspeed Trip Mechanism Because Of Inadequate Spring Tension	12/7/90	All holders of OLs or CPs for nuclear power reactors.
90-75	Denial Of Access To Current Low-Level Radioactive Waste Disposal Facilities	12/5/90	All Michigan holders of NRC licenses.
90-74	Information on Precursors To Severe Accidents	12/4/90	All holders of OLs or CPs for nuclear power reactors.
90-73	Corrosion Of Valve-To-Torque Tube Keys In Spray Pond Cross Connect Valves	11/29/90	All holders of OLs or CPs for nuclear power reactors.
90-72	Testing of Parallel Disc Gate Valves In Europe	11/28/90	All holders of OLs or CPs for nuclear power reactors.
90-71	Effective Use of Radiation Safety Committees to Exercise Control Over Medical Use Programs	11/6/90	All NRC licensees authorized to use by-product material for medical purposes.
90-70	Pump Explosions Involving Ammonium Nitrate	11/6/90	All uranium fuel fabrication and conversion facilities.
90-38, Supp. 1	License and Fee Requirements for Processing Financial Assurance Submittals for Decommissioning	11/6/90	All fuel facility and materials licensees.
89-30, Supp. 1	High Temperature Environments At Nuclear Power Plants	11/1/90	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

Licensees may wish to consider reviewing their procedures and equipment prior to performing activities which may lead to inadvertent damage to fuel assembly guide pins and inspecting the guide pins before reinstallation of the upper internals package into the reactor vessel. When reviewing their procedures (to assure the ability of the reactor cavity seal to withstand the mechanical, thermal, and radiation impacts from a dropped fuel assembly) licensees may also wish to consider the need to carefully inspect the upper core support structure as it is initially raised from the reactor vessel to ensure that no core components are suspended.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

Original Signed by
Charles E. Rossi
Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: John Thompson, NRR
(301) 492-1171

Attachments:
1. Indian Point 3 Detailed View Showing Suspended Fuel Assembly from Bottom of Upper Internals Package
2. List of Recently Issued NRC Information Notices

See previous concurrences.

OFC	:*OEAB:DOEA	:*SL:OEAB:DOEA	:*D:PD1-1	:*RI	:*C:OEAB:DOEA	:*RPB:ADM
NAME	:JThompson	:DCFischer	:RCapra	:PWEselgroth	:AChaffee	:Tech Ed
DATE	:11/19/90	:11/11/90	:11/21/90	:11/21/90	:11/21/90	:11/12/90

OFC	:*D:DST:NRR	:*RI	:*RI	:*C:OGCB:DOEA:NRR	:D:DOEA:NRR
NAME	:ACThandani	:WHodges	:BKEapen	:CBerlinger	:ERossi
DATE	:11/27/90	:11/27/90	:11/27/90	:12/03/90	:12/7/90

OFFICIAL DOCUMENT NAME: IN 90-77

Licensees may wish to carefully review their procedures and inspect equipment prior to performing activities which may lead to inadvertent damage to fuel assembly locating pins, and inspect the locating pins before reinstallation of the upper internals package into the reactor vessel. The procedures to assure the ability of the reactor cavity seal to withstand the mechanical, thermal, and radiation impacts from a dropped fuel assembly may also need careful review. In addition, licensees may wish to carefully inspect the upper core support structure as it is initially raised from the reactor vessel to ensure that no core components are suspended.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: John Thompson, NRR
(301) 492-1171

Attachments:
1. Figure of fuel assembly showing locating pins
2. List of Recently Issued NRC Information Notices

See previous concurrences.

OFC	:*OEAB:DOEA	:*SL:OEAB:DOEA	:*D:PD1-1	:*RI	:*C:OEAB:DOEA	:*RPB:ADM
NAME	:JThompson	:DCFischer	:RCapra	:PWEselgroth	:AChaffee	:Tech Ed
DATE	:11/19/90	:11/11/90	:11/21/90	:11/21/90	:11/21/90	:11/12/90

OFC	:*D:DST:NRR	:C:OGCB:DOEA:NRR	:D:DOEA:NRR
NAME	:ACThandani	:CBerlinger	:ERossi
DATE	:11/27/90	:12/3/90	:12/ /90

OFFICIAL DOCUMENT NAME: INDIANPT

while the upper internals were being moved back to the reactor vessel. The hand signal was given prematurely, with approximately 1/4 of the upper internals still over the upper internals support stand. As a result, the upper internals package impacted the support stand, bending the locating pins. Locating pins may also become bent when the upper internals package is positioned onto the support stand. If there is little space between the locating pins and the refueling cavity floor, debris on the cavity floor under the upper internals stand can also bend the locating pins.

Licensees may wish to carefully review their procedures and inspect equipment prior to performing activities which may lead to inadvertent damage to fuel assembly locating pins, and inspect the locating pins before reinstallation of the upper internals package into the reactor vessel. In addition, licensees may wish to carefully inspect the upper core support structure as it is initially raised from the reactor vessel to ensure that no core components are suspended.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate NRR project manager.

Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: John Thompson, NRR
(301) 492-1171

Attachments: (1) Figure of fuel assembly showing locating pins
(2) List of Recently Issued NRC Information Notices

See previous concurrences.

OFC	:OEAB:DOEA	:SL:OEAB:DOEA	:D:PD1-1	:RI	:C:OEAB:DOEA	:RPB:ADM
NAME	:JThompson	:DCFischer	:RCapra	:PWEselgroth	:AChaffee	:Tech Ed
DATE	:11/19/90	:11/11/90	:11/21/90	:11/26/90	:11/21/90	:11/12/90
OFC	:D:DST:NRR	:D:DOEA:NRR	:RI	RI		
NAME	:ACThandani	:ERossi	:WHodges	BK Eapen via		
DATE	:11/ /90	:11/ /90	:11/27/90	11/27/90		

OFFICIAL DOCUMENT NAME: INDIANPT