

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

November 29, 1991

NRC INFORMATION NOTICE 88-92, SUPPLEMENT 1: POTENTIAL FOR SPENT FUEL POOL
DRAINDOWN

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this supplement to Information Notice (IN) 88-92 to inform addressees of additional information regarding the potential for spent fuel pool draindown. 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 supplement are not NRC requirements; therefore, no specific action or written response is required.

Background

The NRC issued IN 88-92 to alert addressees to problems that could result from the failure of pneumatic-type boot seals used to separate the spent fuel pool (SFP) from other cavities such as the fuel transfer canal and the refueling cavity. IN 88-92 described events involving the loss or potential loss of this type of seal that occurred at Surry Power Station, Unit 1, and Arkansas Nuclear One (ANO), Unit 2. A description of a recent event and two potential scenarios with safety significance follows.

Description of Circumstances

On September 23, 1991, Wolf Creek Generating Station (WCGS) was in cold shut-down in preparation for refueling when it experienced a SFP draindown. The gate between the SFP and the fuel transfer canal was in place with the dual boot seals inflated (Figure 1). The fuel transfer canal was partially filled (about half full) with borated water and the fuel transfer tube which connects to the refueling cavity was closed. The air supply for the SFP gate seals comes from the nonsafety-related service air system. The event was initiated by the loss of a nonsafety-related electrical bus which caused the service air to isolate from its source. The loss of this bus also caused a loss of the instrumentation that provided SFP level indication. The SFP gate seals subsequently depressurized through leaks in the service air system (Figure 2). The leaks occurred at isolation valve packings, check valves, and at "Chicago" quick-connect fittings that were not in accordance with design drawings.

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The SFP level decreased as water passed through the seals and into the fuel transfer canal. Finally, cooling to the SFP was lost when the SFP circulating pump tripped on low level. The operators were not alerted to the loss of SFP water in the early part of the event, because the SFP low-level alarm had previously annunciated three days earlier indicating that the SFP level was lower than normal. However, it was still above technical specification (TS) requirements. At that time, the operators did not refill the SFP because of the need for adding makeup water to the reactor coolant system as cooldown progressed. By the time the operators recognized that the SFP gate seals had failed and they had completed actions to repressurize the seals, the SFP level had dropped about 44 inches. This was about 16 inches below the TS required level of 23 feet above the top of the spent fuel. An NRC Augmented Inspection Team (AIT) was dispatched to WCGS to evaluate the event. The results of the inspection and further details of the event may be found in AIT Inspection Report 50-482/91-28.

Discussion

During the AIT site visit, the NRC identified two additional scenarios of safety significance that applied to WCGS.

The first scenario involved possible failure of the SFP gate seals while performing preventive maintenance on the fuel transfer system with the fuel transfer tube open. The licensee did not have established administrative controls over the refueling cavity drains or over the reactor vessel-to-cavity seal for this activity. Under the above conditions, the licensee estimated that, without operator intervention, the failure of the SFP gate seals could have allowed the level in the SFP to drop to about 1 foot above the top of the spent fuel assemblies. The level in the SFP would have dropped to about 9 feet above the spent fuel assemblies with the reactor vessel-to-cavity seal installed and the refueling cavity drains closed.

The second scenario involved possible failure of the SFP gate seals during the periodic inspection or reconstitution of fuel assemblies performed in the SFP or the cask loading pool with the fuel transfer canal drained. At WCGS, the SFP is connected to both the fuel transfer canal and the cask loading pool through removable gates with pneumatic-type seals. The licensee indicated to the AIT that the gate between the SFP pool and the cask loading pool was seldom used. The licensee estimated that without operator intervention, the failure of the SFP gate seals could have allowed the level in the SFP and the cask loading pool to drop enough to uncover a fuel assembly held by the fuel handling bridge crane or in the fuel inspection stand.

To mitigate the risk of the first scenario, the licensee committed to perform the following whenever the fuel transfer tube is open and the refueling cavity and the fuel transfer canal are drained: (1) have a backup gas supply in place to repressurize the boot seals if service air is lost, (2) have a dedicated operator in place to install the backup gas supply and close the fuel transfer tube gate valve, and (3) have the reactor vessel-to-cavity seal in place and the refueling cavity drains blanked or sealed.

To mitigate the risk of the second scenario, the licensee committed to either have all three fuel building cavities i.e. the SFP, the cask loading pool, and the fuel transfer canal, full or to notify management and establish other compensatory measures when performing fuel inspections or reconstitutions.

This information notice supplement requires no specific action or written response. If you have any questions about the information in this supplement, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.



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

Technical contact: Dr. Dale A. Powers, RIV
(817) 860-8195

Attachments:

1. Figure 1. Fuel Transfer System
2. Figure 2. Spent Fuel Pool Gate Seal Air Supply Lines
3. List of Recently Issued NRC Information Notices

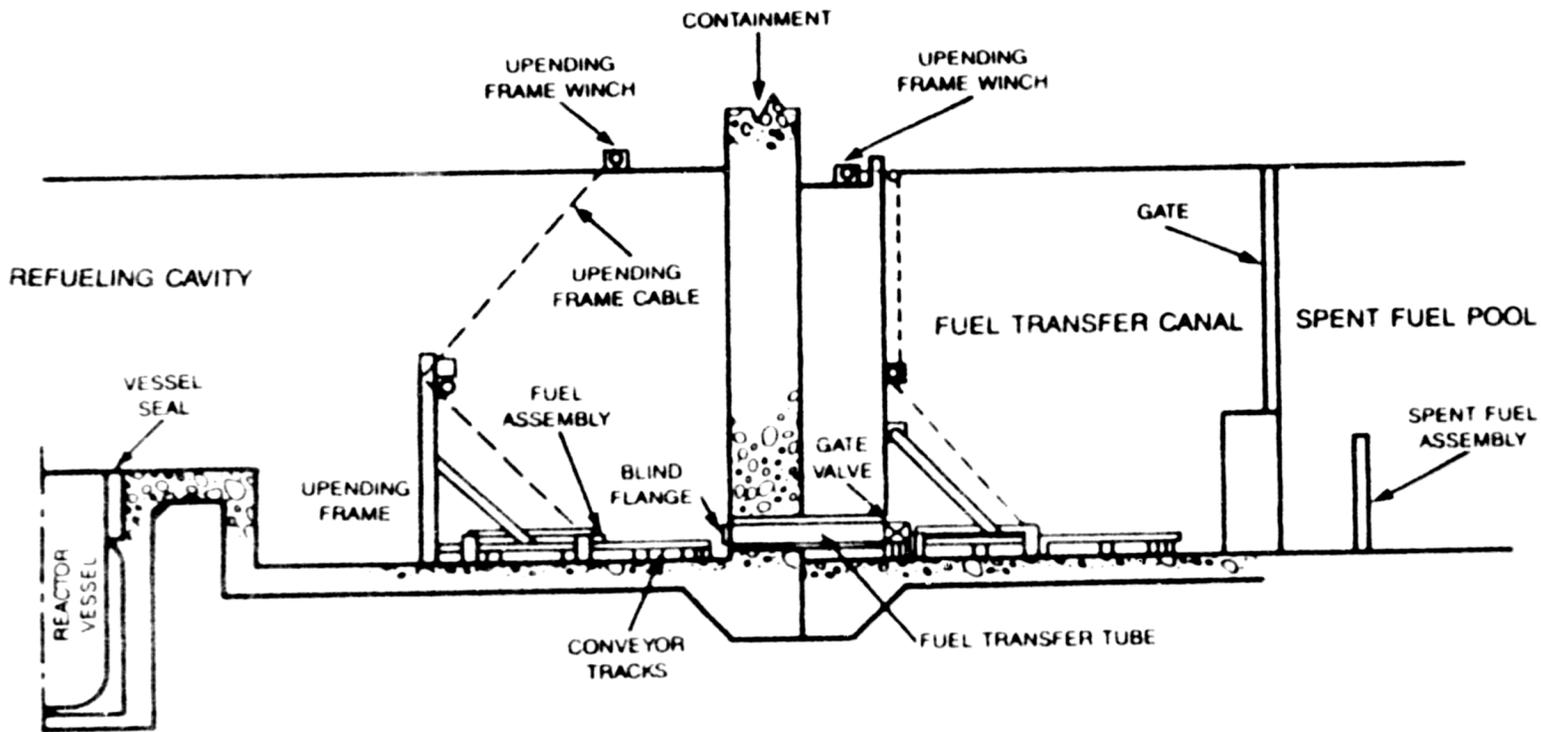
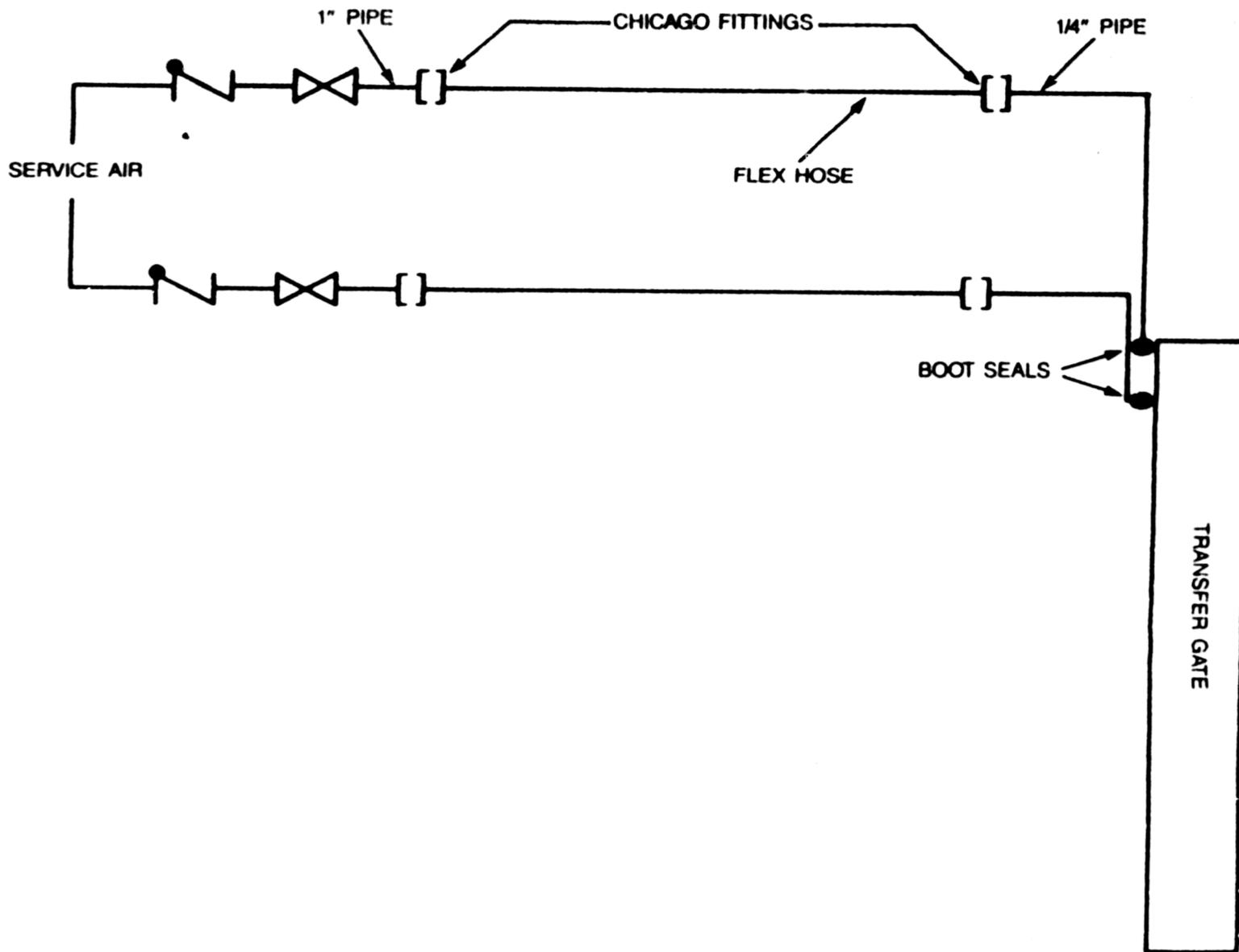


Figure 11

FUEL TRANSFER SYSTEM



Attachment 2
 IN 88-92, Supplement 1
 November 29, 1991
 Page 1 of 1

Figure 2: SPENT FUEL POOL GATE SEAL AIR SUPPLY LINES

LIST OF RECENTLY ISSUED
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-78	Status Indication of Control Power for Circuit Breakers Used in Safety-Related Applications	11/28/91	All holders of OLs or CPs for nuclear power reactors.
90-57, Supp. 1	Substandard, Refurbished Potter & Brumfield Relays Represented as New	11/27/91	All holders of OLs or CPs for nuclear power reactors.
91-77	Shift Staffing at Nuclear Power Plants	11/26/91	All holders of OLs or CPs for nuclear power reactors.
91-76	10 CFR Parts 21 and 50.55(e) Final Rules	11/26/91	All holders of OLs or CPs and vendors for nuclear power reactors.
91-75	Static Head Corrections Mistakenly not Included in Pressure Transmitter Calibration Procedures	11/25/91	All holders of OLs or CPs for nuclear power reactors.
91-74	Changes in Pressurizer Safety Valve Setpoints Before Installation	11/25/91	All holders of OLs or CPs for nuclear power reactors.
91-73	Loss of Shutdown Cooling During Disassembly of High Pressure Safety Injection System Check Valve	11/21/91	All holders of OLs or CPs for nuclear power reactors.
91-72	Issuance of a Revision to the EPA Manual of Protective Action Guides and Protective Actions for Nuclear Incidents	11/19/91	All holders of OLs or CPs for nuclear power reactors.
91-71	Training and Supervision of Individuals Supervised by an Authorized User	11/12/91	All NRC medical licensees.

OL = Operating License
 CP = Construction Permit

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