



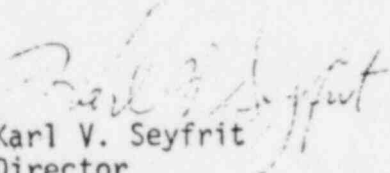
UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
811 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76011

September 3, 1981

Gentlemen:

The enclosed IE Information Notices are provided as an early notification of potentially significant matters. It is expected that recipients will review the information for possible applicability to their facilities. No specific action or response is requested at this time. If further NRC evaluations so indicate, an IE Circular or Bulletin will be issued to recommend or request specific licensee actions. If you have questions regarding this matter, please contact this office.

Sincerely,


Karl V. Seyfrit
Director

Enclosures:

1. IE Information Notice No. 81-27
2. IE Information Notice No. 81-28
3. List of Recently Issued
IE Information Notices

8110260179 810903
PDR ADOCK 05000267
G PDR

IE 31
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IE INFORMATION NOTICE NO. 81-27 & 81-28

Licensee

Arkansas Power and Light Company
Little Rock, Arkansas

Nebraska Public Power District
Columbus, Nebraska

Omaha Public Power District
Omaha, Nebraska

Public Service Company of Colorado
Denver, Colorado

Gulf States Utilities
Beaumont, Texas

Houston Lighting & Power Company
Houston, Texas

Kansas Gas & Electric Company
Wichita, Kansas

Louisiana Power & Light Company
New Orleans, Louisiana

Texas Utilities Generating Company
Dallas, Texas

Facility/Docket Number

Arkansas Nuclear One, Unit 1 & 2
50-313; 50-368

Cooper Nuclear Station
50-298

Fort Calhoun Station
50-285

Fort St. Vrain Generating Station
50-267

River Bend
50-458; 50-459

South Texas Project
50-498; 50-499

Wolf Creek
STN 50-482

Waterford-3
50-382

Comanche Peak Steam Electric Station
50-445; 50-446



IE 81
5.11

SSINS No.: 6835
Accession No.:
8103300415
IN 81-27

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

IE Information Notice No. 81-27
September 3, 1981
Page 1 of 2

FLAMMABLE GAS MIXTURES IN THE WASTE GAS
DECAY TANKS IN PWR PLANTS

Description of Circumstances:

In July 1981, hydrogen ignition occurred in one gaseous waste decay tank at San Onofre, Unit 1, while the plant was in cold shutdown. This resulted in a release of about 8.8 curies of noble gases and minor tank damage. The cause of the hydrogen ignition was air contamination of the inert nitrogen system which is used to control the hydrogen-oxygen concentrations in the tank.

The source of air was identified as instrument air leaking through check valves at the cross connections between instrument air and nitrogen lines. Under normal operating conditions, the pressure in the instrument air system is higher than that of the nitrogen system. These cross connections had been installed in response to TMI Action Plan requirement item II.E.1.2 of NUREG-0737. The nitrogen system provided a backup gas supply to the air-operated steam supply valve for the steam-driven auxiliary feedwater pump. This backup was installed to provide a "safety grade" auxiliary feedwater system that satisfies the single-failure criteria. Other cross connections, which apparently did not leak air into the nitrogen system, had been previously installed in response to TMI Action Plan requirement II.G.1 of NUREG-0737 to provide a redundant gas supply to the air-operated pressurizer relief valves and the associated block valves.

Following the occurrence, the licensee sampled all potentially affected tanks and determined that most of the tanks had oxygen levels above 10 to 15 percent. Generally, the gas in pressurized water reactor (PWR) waste gas systems is hydrogen rich and the oxygen concentration is controlled to prevent flammable gas mixtures. Flammable concentration of gas mixtures can be prevented by limiting either the hydrogen or the oxygen concentration to less than 3 percent.

To eliminate the possibility of recurrence, the licensee has now completely separated those portions of the nitrogen system that are a backup supply to the air system from the balance of the nitrogen system that supplies cover gas. Bottles of compressed nitrogen are now used to provide the backup to the air system.

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We are aware of another instance of flammable mixtures in waste gas tanks.

In August 1980, Arkansas Power and Light Company (AP&L) discovered flammable concentrations of hydrogen and oxygen in the waste gas decay tanks at Arkansas Nuclear One, Unit 1. The flammable gas mixtures were created after the primary coolant picked up oxygen from the air during refueling and maintenance. No ignition or explosion was reported.

It appears that licensees need to devote more attention to the potential effects of nitrogen-air system cross connections when systems are modified to use nitrogen as a backup to air systems. If cross connections exist, the potential for the formation of flammable gas mixtures should be evaluated. A sampling program to assure that flammable gas mixtures do not exist in tanks should be considered.

No written response to this information notice is required. If you need additional information with regard to this subject, please contact the Director of the appropriate NRC Regional Office.

SSIN No.: 6835
Accession No.:
8103300413
IN 81-28

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

IE Information Notice No. 81-28
September 3, 1981
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FAILURE OF ROCKWELL-EDWARD MAIN STEAM
ISOLATION VALVES

Description of Circumstances:

There have been several recent mechanical failures of the "Rockwell-Edward Flite Flow Stop Valve," a "Y" pattern globe valve made by Rockwell International, used for main steam isolation valves (MSIV) at some BWR facilities. Operating BWR facilities using this valve include Brunswick, Units 1 and 2; Cooper; Duane Arnold; Fitzpatrick; Hatch, Unit 2; and Vermont Yankee. Of the seven total reported mechanical failures, five occurred at Brunswick, Unit 2, and one each occurred at Brunswick, Unit 1, and Hatch, Unit 2.

The valve components that have failed are shown in Figure 1. The piston assembly is attached to the main disk (2) by thread engagement and then restrained from unwinding by pin (4). The stem disk (1) is also attached to the stem (6) by thread engagement tightened to 1050 ft-lb torque specifications with an anti-rotation restraint provided by pin (3). The valve is closed primarily by spring forces. The valve is installed so that reactor steam pressure works to seat the main disk. The stem disk provides pressure equalization action to reduce over-seat load for opening the main disk against system pressure.

The failures that have occurred involved a mechanical separation of valve internals. This separation was either at the stem-to-stem-disk threaded connection or at the main-disk-to-piston threaded connection. Either failure permits the main disk to be free of the stem. The failure in either mode results from failure of the threaded connection, which in some cases is caused by vibration-induced rotation of the disk so that it becomes disconnected from its threaded mate. Such rotation is believed to be caused by or aided by the propensity of steam flow to produce vibration and to create turning forces on valve internal components when antirotation restraint is inadequate due to a failed or missing pin. Other contributing causes are believed to result from reassembly of the valve after disassembly at the site; such reassembly may have included inadequately torqued connections and failure to properly install the pins. Also, an examination of spare parts at the Brunswick site showed that the thread dimensions on the stems and stem disks did not meet drawing tolerances.

The individual failures are described below in chronological order.

1. In January 1976, the Brunswick, Unit 2, "D" steam line inboard valve main disk separated from the piston. There was no evidence that pin (4) was installed.
2. On January 30, 1979, the Brunswick, Unit 2, "A" steam line inboard valve stem disk separated from the stem. A square pin was used in the round hole at point (3). The corners of the pin experienced high stress, thereby causing cracking of the pin.
3. On January 15, 1981, the Brunswick, Unit 2, "C" steam line outboard valve main disk separated from the piston. There was no evidence that pin (4) was ever inserted. This was deduced from finding the hole not deformed and no sign of a plug weld.
4. On March 5, 1981, the Hatch, Unit 2, "A" steam line inboard valve stem disk separated from the stem. Pin (3) was not fully inserted.
5. On March 30, 1981, the Brunswick, Unit 1, "C" steam line outboard valve stem disk separated from the stem. Pin (3) failed and was not recovered.
6. On July 2, 1981, the Brunswick, Unit 2, "C" steam line inboard valve stem disk separated from the stem. Pin (3) was not properly installed.
7. On July 18, 1981, the Brunswick, Unit 2, "D" steam line inboard valve main disk separated from the piston. Pin (4) was not fully inserted.

These failures have raised concerns regarding (1) the capability of the valve to perform its required safety function, and (2) increased challenges to safety systems. However, it is noted that the failures to date have resulted in the main disk going closed (i.e., not cocking open) with some uncertainty only as to its leak tightness.

Detailed investigation of the July failures at Brunswick, Unit 2, led to the preliminary findings of possible excessive vibrations on valve internals from steam flow turbulences created by the piping direction changes. In addition, there was evidence of loose thread connections. Further investigations and evaluations are currently in progress. Preliminary corrective actions by the licensee include increasing the stem pin size from 5/16-inch to 3/8-inch, using three pins instead of one or two pins, and increasing the hole depth 1/8-inch into the stem. In addition, corrective actions for the main-disk-to-piston connection include adding an extra pin (of the same 1/2-inch size) and increasing the hole depth by 1/8-inch.

This information is provided as notification of a potentially significant matter that is still under review by the NRC staff. In case the continuing NRC review finds that specific licensee actions would be appropriate, an IE circular or bulletin may be issued. In the interim, we expect that licensees will review this information for applicability to their facilities.

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No written response to this information is required. If you need additional information regarding this matter, please contact the Director of the appropriate NRC Regional Office.

Attachment:
Figure 1

1. STEM DISK
2. MAIN DISK
3. ANTIROTATION PIN - STEM DISK TO STEM
4. ANTIROTATION PIN - MAIN DISK TO PISTON
5. STELLITED DISK GUIDES, 3 RIBS, 120° APART (OUT OF SHOWN VIEW)
6. STEM

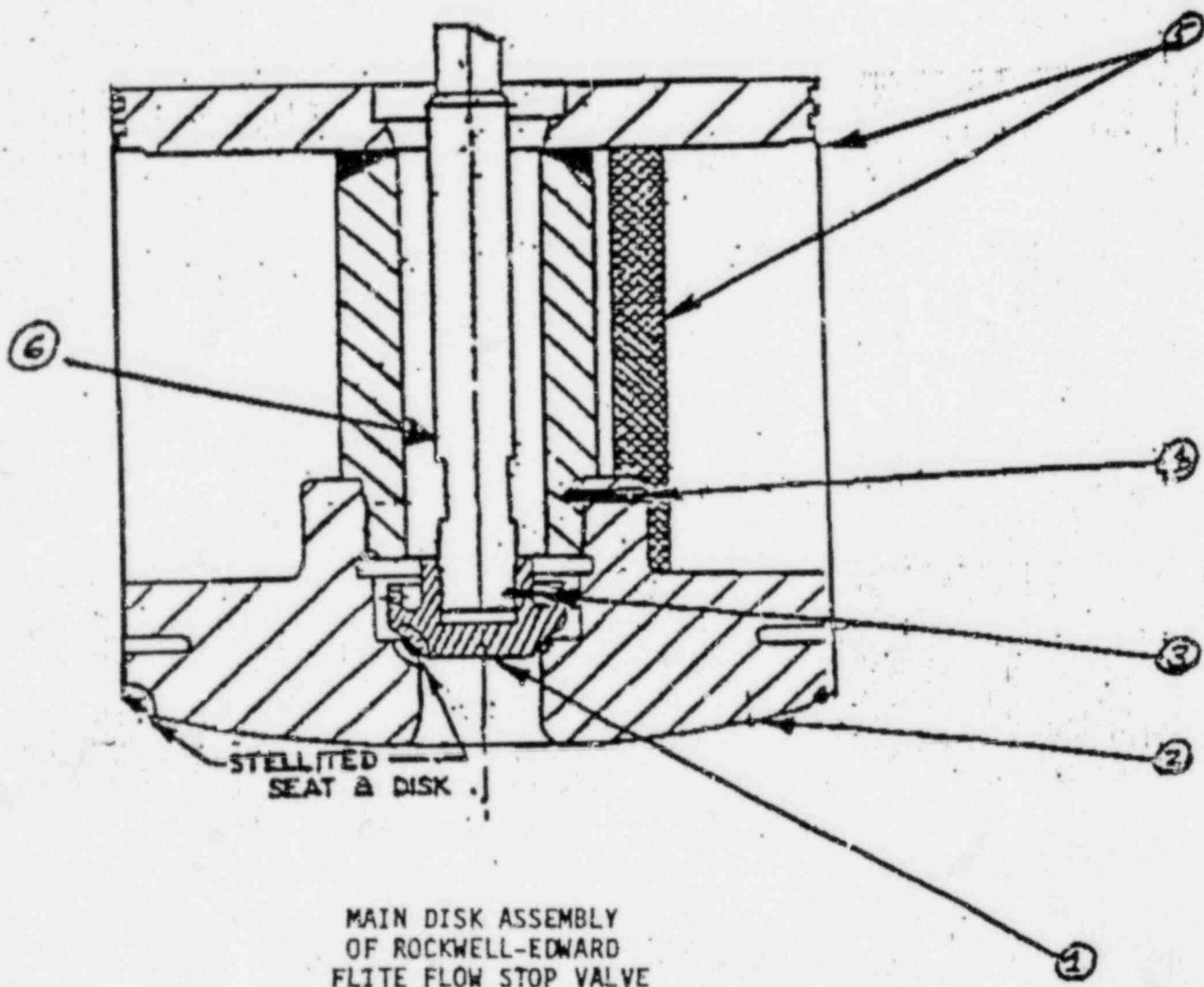


FIGURE 1

LISTING OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date Issued	Issued To
81-19	Lost Parts in Primary Coolant System	7/6/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-20	Test Failures of Electrical Penetration Assemblies	7/13/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-21	Potential Loss of Direct Access to Ultimate Heat Sink	7/21/81	All power reactor holding an Operating License (OL) or Construction Permit (CP)
81-22	Section 235 and 236 Amendments to the Atomic Energy Act of 1954	7/31/81	All power research reactor, fuel fabrication and reprocessing, and spent fuel storage licensees and applicants
81-23	Fuel Assembly Damaged due to Improper Positioning of Handling Equipment	8/4/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-24	Auxiliary Feed Pump Turbine Bearing Failures	8/5/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-25	Open Equalizing Valve of Differential Pressure Transmitter Causes Reactor Scram and Loss of Redundant Safety Signals.	8/24/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)
81-26	Compilation of Health Physics Related Information Items	8/28/81	All power reactor facilities with an Operating License (OL) or Construction Permit (CP)

Enclosure