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

January 28, 1991

NRC INFORMATION NOTICE NO. 91-04: REACTOR SCRAM FOLLOWING CONTROL ROD WITHDRAWAL ASSOCIATED WITH LOW POWER TURBINE TESTING

Addressees:

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

Purpose:

This information notice is provided to alert licensees to an event involving a reactor scram at low power following control rod withdrawal during a turbine test at the Commonwealth Edison Company's Quad Cities Station.

This event demonstrates the need for careful planning, increased awareness, training, proper review and use of procedures, and good communications when a plant is placed in a non-typical mode of operation because of special testing or other unusual conditions. 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 27, 1990, Quad Cities, Unit 2, scrammed on a hi-hi intermediate range scram signal, when the operator withdrew rods to increase reactor pressure without recognizing the need to follow the normal procedures for re-establishing reactor criticality. The operator focused on controlling reactor pressure and did not adequately monitor reactivity.

In preparation for performing a turbine torsional test with the reactor at low power and with the plant not supplying the grid, reactor power and pressure were reduced to close the turbine bypass valves and thereby allow the electro-hydraulic control (EHC) oil pumps to be secured and test equipment to be connected. The procedure specified that reactor power and pressure be increased after the temporary alterations were made. However, the licensee provided no special training for performing the turbine torsional test and the plant staff was unaware that the plant conditions required by the test were difficult to maintain. In addition, the licensee's procedures were not sufficiently comprehensive to ensure stable plant operation during installation or removal of the test equipment.

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The Shift 1 crew inserted control rods to decrease reactor power and pressure to permit installation of the test equipment. At the end of Shift 1, the crew reported to the Shift 2 nuclear station operator (NSO) that they had experienced high rod notch worth (i.e., large reactivity changes with relatively small amounts of rod movement) during these manipulations. However, the information was not recorded in the Unit 2 log book. During Shift 2, the testing was not performed because of problems in controlling the turbine acceleration rate. The information on high rod notch worth that was received by Shift 2 was not relayed to Shift 3.

Shortly after the start of Shift 3, the testing was aborted, and the shift engineer (SE) told the shift control room engineer (SCRE) to return to power operation. The SCRE instructed the Unit 2 NSO to decrease reactor pressure to approximately 800 psig to ensure that the turbine bypass valves would be closed and to permit the securing of the EHC system and the removing of the test equipment. The SCRE then became preoccupied with other activities such as reinerting the drywell and did not supervise the NSO's actions. The NSO failed to use the procedure for going from power to hot standby. The NSO monitored pressure as he inserted rods, but failed to stop when the reactor power dropped below the point of adding heat and went subcritical. When all bypass valves were closed and reactor pressure was approximately 805 psig and decreasing, the NSO attempted to withdraw control rods to stabilize pressure, but was prevented because of a rod block caused by a low count rate on the source range monitor (SRM). After clearing the rod block by inserting the SRMs and as the NSO began withdrawal of control rods, the reactor became supercritical and scrammed on hi-hi intermediate range flux. A complete discussion of this event may be found in the Public Document Room in a memorandum dated December 28, 1990, from Jack E. Rosenthal, Division of Safety Programs, Office for Analysis and Evaluation of Operational Data, to Thomas M. Novak, SUBJECT: HUMAN FACTORS STUDY REPORT - QUAD CITIES 2 (10/27/90).

Discussion:

The safety significance of this event is that the plant was placed in a non-typical mode of operation without adequate planning, awareness, training, review and use of procedures, and communications. Factors that contributed to the event included the following:

1. Lack of awareness by the plant staff that the reactor conditions required for the torsional test were difficult to maintain,

2. Insufficient comprehension of written procedures regarding reactivity control,

3. Lack of specific training for the performance of the torsional test and for achieving and maintaining the reactor conditions required,

4. Failure to communicate valuable information from previous shifts, and

5. Lack of adequate supervision of the nuclear operator.

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

Charles E. Rossi

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

Technical Contacts: E. Trager, AEOD
(301) 492-4496

B. Kaufer, AEOD
(301) 492-4544

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-03	Management of Wastes Contaminated with Radioactive Materials ("Red Bag" Waste and Ordinary Trash)	01/07/91	All medical licensees.
91-02	Brachytherapy Source Management	01/07/91	All Nuclear Regulatory Commission (NRC) medical licensees authorized to use byproduct material for medical purposes.
91-01	Supplier of Misrepresented Resistors	01/04/91	All holders of OLs or CPs for nuclear power reactors.
90-82	Requirements for Use of Nuclear Regulatory Commission-(NRC-)Approved Transport Packages for Shipment of Type A Quantities of Radioactive Materials.	12/31/90	All registered users of NRC-approved packages.
90-81	Fitness for Duty	12/24/90	All U.S. Nuclear Regulatory Commission (NRC) material and non-power reactor licensees.
90-80	Sand Intrusion Resulting in Two Diesel Generators Becoming Inoperable	12/21/90	All holders of OLs or CPs for nuclear power reactors.
90-79	Failures of Main Steam Isolation Check Valves Resulting in Disc Separation	12/20/90	All holders of OLs or CPs for nuclear power reactors.
90-78	Previously Unidentified Release Path from Boiling Water Reactor Control Rod Hydraulic Units	12/18/90	All holders of OLs or CPs for boiling water reactors (BWRs).
90-77	Inadvertant Removal of Fuel Assemblies from the Reactor Core	12/12/90	All holders of OLs or CPs for pressurized-water reactors (PWRS).

OL = Operating License
CP = Construction Permit

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Original Signed by
Charles E. Rossi

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The final info notice was sent to Region 3 for comments. W. Shafer of Reg 3 indicated he had no comments in a telephone call on 1/24/91. H. Bailey

SEE PREVIOUS CONCURRENCES.

OFC	:OEAB	:TechEd	:SC:OEAB	:C:OEAB	:C:OGCB	:D:DOEA:NRR	:
NAME	:*TGreene	:*JMain	:*HBailey	:*AChaffee	:*CBerlinger	:CRossi	:
DATE	:01/15/91	:01/15/91	:01/16/91	:01/17,18/91	:01/22/91	: 1/24-91	:

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OFC	OEAB		SC:OEAB	C:OEAB	C:OGCB	D:DOEA:NRR
NAME	TGreene	Tech Ed	HBailey	AChaffee	CBerlinger	CRossi
DATE	01/15/91	01/15/91	01/16/91	01/17/91	01/22/91	/ /

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