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

January 3, 1992

NRC INFORMATION NOTICE 92-02: RELAP5/MOD3 COMPUTER CODE ERROR ASSOCIATED WITH THE CONSERVATION OF ENERGY EQUATION

Addressees

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

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees of an error in the RELAP5/MOD3 computer code associated with the conservation of energy equation. The computer codes in the RELAP5 Series are general purpose, thermal hydraulic system codes used to simulate the response of systems such as the reactor coolant system (RCS) to transients and accidents. 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 are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On November 25, 1991, Northeast Utilities forwarded the enclosed 10 CFR Part 21 initial notification to the NRC Operations Center, regarding an error in the RELAP5/MOD3 simulation of the response of the Haddam Neck Plant terry turbine room to a postulated steam line break. The equipment environmental qualification (EEQ) profile for the room would have been nonconservative by approximately 100°F had the simulation been accepted. Although the error in determining the environmental conditions could be significant, the effect of the error on the evaluation of the nuclear steam supply system (NSSS) response to a loss-of-coolant accident (LOCA) and steam line break has been determined to be negligible. Appropriate corrections in the code are the responsibility of the Idaho National Engineering Laboratory (INEL).

Codes in the RELAP5 Series are not intended to be used as containment analysis codes. Containment analysis specific codes exist for that purpose. The primary purpose of the RELAP5 codes is analysis of the response of the NSSS to accident and transient conditions.

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 Office of Nuclear Reactor Regulation (NRR) project manager.

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

Technical contact: Nancy Campbell, NRR
(301) 504-2836

Attachments:
1. Northeast Utilities 10 CFR Part 21 Notification
2. List of Recently Issued NRC Information Notices

NORTHEAST UTILITIES

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(203) 665-5000

Nov. 25, 1991

NRC Operations Center
Fax. #(301) 492-8187

SUBSTANTIAL SAFETY HAZARD 10CFR21

The purpose of this facsimile is to inform the NRC that on November 25, 1991, at 1605 hours, J.F. Opeka, Executive Vice President of Northeast Utilities (NU) determined that a substantial safety hazard (SSH) exists.

During an in-house engineering evaluation of the response of the Haddam Neck Plant Terry Turbine room to a postulated steam line break, an error was discovered in the RELAP5/MOD3 simulation. It was determined that the code was not conserving energy, and thereby had significantly under predicted the temperature in the Terry Turbine room. Had the simulation been accepted, the EEQ profile for the room would have been non-conservative by approximately 100° F..

The RELAP5 series of computer codes are general purpose, thermal hydraulic systems codes which are used to simulate the response of systems such as the RCS to transients and accidents. The codes are written to solve the equations of conservation of mass, energy and momentum within the system being modeled. The code solves for the system response by modeling the system as a series of control volumes connected by junctions and solving the conservation equations simultaneously in each volume and junction using a finite difference numerical scheme. The error appears to be associated with the conservation of energy equation.

While the error in determining environmental conditions can be significant, the impact of the error on evaluations of the NSSS response to LOCA and steam line break has been determined to be negligible. NU has made a tentative correction to its version of RELAP5/MOD3. A permanent correction of the error will be made to other NU codes, which are based on RELAP5, when the Idaho National Engineering Laboratory (INEL) provides the appropriate corrections. The impact of the error on licensing calculations will be formally assessed and reported via 10CFR50.46, if necessary.

According to 10CFR21.21(c)(3) ii, written notification to the NRC will be forthcoming within 30 days.

If you have any questions regarding this matter please call Bryan W. Cook at (203) 665-3718.

Bryan W Cook 11/25/91

Bryan W. Cook

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LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
92-01	Cable Damage Caused by Inadequate Cable Installation Procedures and Controls	01/03/92	All holders of OLs or CPs for nuclear power reactors
91-87	Hydrogen Embrittlement of Raychem Cryofit Couplings	12/27/91	All holders of OLs or CPs for nuclear power reactors
91-86	New Reporting Requirements for Contamination Events at Medical Facilities (10 CFR 30.50)	12/27/91	All licensees authorized to use byproduct materials for human use.
91-85	Potential Failures of Thermostatic Control Valves for Diesel Generator Jacket Cooling Water	12/26/91	All holders of OLs or CPs for nuclear power reactors
91-84	Problems with Criticality Alarm Components/Systems	12/26/91	All Nuclear Regulatory Commission (NRC) fuel cycle licensees, interim spent fuel storage licensees, and critical mass licensees.
91-83	Solenoid-Operated Valve Failures Resulted in Turbine Overspeed	12/20/91	All holders of OLs or CPs for nuclear power reactors
91-18, Supp. 1	High-Energy Piping Failures Caused by Wall Thinning	12/18/91	All holders of OLs or CPs for nuclear power reactors
91-82	Problems with Diaphragms in Safety-Related Tanks	12/18/91	All holders of OLs or CPs for nuclear power reactors
91-81	Switchyard Problems that Contribute to Loss of Offsite Power	12/16/91	All holders of OLs or CPs for nuclear power reactors

= Operating License
= Construction Permit