SSINS No.: 6835
IN 86-77

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

August 28, 1986

IE INFORMATION NOTICE NO. 86-77: COMPUTER PROGRAM ERROR REPORT HANDLING

Addressees:

All nuclear power reactor facilities holding a construction permit or an operating license and nuclear fuel manufacturing facilities.

Purpose:

This notice is to alert addressees that errors are being identified in computer programs used during safety-related design activities. These design activities, including facility modifications and reload calculations, may be invalidated by errors found in computer programs used to support safety-related design calculations. While these errors are contained in error reports prepared by computer service bureaus, licensees using the program as a basis for safety-related activities may not be aware that a significant number of errors are being identified. It is expected that recipients will review the information for applicability to their quality assurance programs and consider actions, if appropriate, to preclude similar problems from occurring at their facilities. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of the Circumstances:

During reviews of the implementation of computer program error report handling procedures at various architect engineering companies (A/Es), nuclear steam supply system companies (NSSS), and nuclear fuel manufacturing facilities, the NRC has learned that there are a significant number of errors being found in computer programs used for safety-related design. Further, users (Licensees, A/E's) may not be implementing appropriate measures to ensure that these errors do not invalidate safety-related calculations already completed, in progress, or to be conducted at a future date.

The computer program errors have usually been found by individual program users and reported to the computer service bureaus which subsequently report these errors to all customers using the program, provided that the requirements of 10 CFR 21 are specified in contracts between the service bureaus and affected customers.

Discussion:

A computer program is a basic component as defined in 10 CFR 21 when used in safety-related design activities. In addition, control measures are required to prevent the use of incorrect or defective material, parts, and components as discussed in Criterion VIII of Appendix B to 10 CFR 50. Similarly, measures are required to ensure that conditions adverse to quality, such as deficiencies and nonconformances, are promptly identified and corrected as discussed in Criterion XVI, Appendix B, 10 CFR 50.

Utilities holding a CP or OL have the primary responsibility to ensure that computer code errors are adequately reviewed and their impact on past and present safety-related design calculations are evaluated.

As an example, a recent 10 CFR 21 report to the NRC identified an error in the Rayleigh frequency calculation contained in the GT STRUDL computer code which resulted in numerous safety-related systems having to be reanalyzed. The error was found during performance of an analysis check on a previously completed Duct Support and was related to the method used by the program to select seismic design loads. The code, marketed by the Control Data Corporation (Service Bureau) and technically supported by its author, Georgia Institute of Technology, is used throughout the nuclear industry, primarily in the analysis and design of pipe supports and general building structural design. A thorough review and evaluation of affected designs, in addition to applicable vendors that may have used GT STRUDL in safety-related applications, is currently being performed by several CP holders. One CP holder recently reported that this error affected 960 calculations. However, program users and Service Bureau subscribers such as Licensees, A/E's and NSSS organizations who did not specify the requirements of 10 CFR 21 in their contract with the service bureau may not be aware of this error.

Another example involved the discovery by a nuclear fuels manufacturer of an input error in a loss-of-coolant-accident (LOCA) code used to calculate the effects of fuel rod heatup. This computer code error was identified during performance of a fuel reload analysis. The error resulted in the value of fuel rod decay heat generation being too low, causing the calculated peak cladding temperature (PCT) to be unconservative. Corrected calculations showed that the value of PCT exceeded 2200°F, resulting in several licensees having to reduce power to comply with the provisions of 10 CFR 50.46.

Several documents are available which may be useful to licensees when reviewing computer code controls used by vendors engaged in safety-related activities. NUREG-0040, "Licensee Contractor and Vendor Inspection Status Report," published quarterly by the NRC provides a detailed, technical and programmatic review of organizations engaged in supplying safety-related equipment or services to licensed facilities. This NUREG discusses important plant safety elements, including computer code usage, maintenance, and error report handling, for firms such as NSSSs, AEs, and nuclear fuel suppliers. Documents that also may be

useful include IE Information Notices Nos. 85-52, "Errors In Dose Assessment Computer Codes and Reporting Requirements Under 10 CFR Part 21" (July 10, 1985) and 83-31, "Error in the ADLPIPE Computer Program" (May 19, 1983). These two notices focus primarily on computer code errors and 10 CFR 21 reporting responsibility.

No specific action or written response is required by this information notice. If you have any questions regarding this matter, please contact the Regional Administrator of the appropriate NRC regional office or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

Technical Contact: R. Pettis, Jr., IE
(301) 492-9039

Attachment: List of Recently Issued IE Information Notices

Attachment 1
IN 86-77
August 28, 1986

LIST OF RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
86-76	Problems Noted In Control Room Emergency Ventilation Systems	8/28/86	All power reactor facilities holding an OL or CP
86-75	Incorrect Maintenance Procedure On Traversing Incore Probe Lines	8/21/86	All power reactor facilities holding an OL or CP
86-74	Reduction Of Reactor Coolant Inventory Because Of Misalignment Of RHR Valves	8/20/86	All BWR facilities holding an OL or CP
86-73	Recent Emergency Diesel Generator Problems	8/20/86	All power reactor facilities holding an OL or CP
86-72	Failure 17-7 PH Stainless Steel Springs In Valcor Valves Due to Hydrogen Embrittlement	8/19/86	All power reactor facilities holding an OL or CP
86-71	Recent Identified Problems With Limitorque Motor Operators	8/19/86	All power reactor facilities holding an OL or CP
86-70	Spurious System Isolation Caused By The Panalarm Model 86 Thermocouple Monitor	8/18/86	All GE BWR facilities holding an OL or CP
86-69	Scram Solenoid Pilot Valve (SSPV) Rebuild Kit Problems	8/18/86	All BWR facilities holding an OL or CP
86-68	Stuck Control Rod	8/15/86	All BWR facilities holding an OL or CP
86-67	Portable Moisture/Density Gauges: Recent Incidents And Common Violations Of Requirements For Use, Transportation, And Storage	8/15/86	All NRC licensees authorized to possess, use, transport, and store sealed sources

OL = Operating License
CP = Construction Permit