



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

SAFETY EVALUATION BY OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO MODIFICATION OF POST ACCIDENT SAMPLING SYSTEM
OMAHA PUBLIC POWER DISTRICT
FORT CALHOUN STATION, UNIT 1
DOCKET NO. 50-285

1.0 INTRODUCTION

By letters dated July 30, 1991, and June 12, 1992, Omaha Public Power District (the licensee) submitted a request to delete credit for the post-accident sampling system (PASS) automated dissolved gas analysis sequence and retain only the ability to obtain an undiluted pressurized reactor coolant grab sample for offsite dissolved gas analysis following an accident. The licensee justified the request by claiming that the results obtained by analyzing reactor coolant samples after an accident serve only to complement and confirm other, more valuable sources of information. There is no need, therefore, to obtain these results by an automated gas analysis, since the offsite analysis of grab samples would provide needed information in an adequate time frame.

2.0 EVALUATION

In the existing PASS at the Fort Calhoun plant, an automated dissolved-gas analysis is used as a primary method for determining dissolved gases in the reactor coolant. However, this method was subject to numerous operational problems and was found to be not very reliable during accident conditions. The licensee requested, therefore, to delete the automated dissolved gas analysis sequence and rely on grab sample analysis, which is a backup method in the current PASS systems.

The licensee does not have the capability to analyze reactor coolant samples at the site and has to send them to Argonne National Laboratory (ANL). The licensee estimated that it will take about 48 hours to get back results, once a decision has been made to take the first sample. This time includes taking the sample, shipping it to ANL, and performing the analysis. For subsequent samples there will be less of a delay (about 37 hours), because the laboratory can use the same setup of the analytical equipment.

The licensee justified the delays between taking coolant samples and performing gas analyses by claiming that the information from these analyses would be used only to confirm the findings on possible core damage obtained from other sources that could provide faster and more complete data on

post-accident core conditions. For example, the potential interference of non-condensable gas voids with core cooling could be satisfactorily evaluated by several methods such as pressurizer level increase, reactor vessel level monitoring, or erratic steam generator pressure drop.

The staff position on PASS, specified by Criterion 1 in II.B.3 of NUREG-0737, requires that the combined time allotted for sampling and analysis should be 3 hours or less from the time a decision is made to take a sample. This requirement was formulated based on the lessons learned from the TMI-2 accident. An extension of the time interval for taking dissolved gas samples to 24 hours after the accident is currently under consideration. However, it would become a valid criterion only if approved by the Commission.

After reviewing the licensee's justifications for replacing the automated gas analysis sequence by a grab samples analysis, the staff concludes that the information on the amounts of dissolved gases in the reactor coolant is an important factor in evaluating post-accident conditions existing in the reactor vessel since the presence of hydrogen can affect flow of coolant. The only direct means of determining this quantity is to measure dissolved gas in the primary coolant. Even with a vented reactor vessel, there are some postulated accident sequences in which the reactor coolant system is intact at reduced pressure, and heat is being removed by subcooled decay heat removal. For these cases, it will not be possible to evaluate concentrations of the dissolved gases in the reactor coolant from their concentrations measured in the containment. It is, therefore, pertinent to be able to measure this variable in the shortest possible time in order to confirm the in-vessel conditions estimated by indirect means. Since the time required for analysis of the reactor coolant grab samples, proposed by the licensee, considerably exceeds the time limits specified by the NRC, the staff considers the proposed deletion of the automated sampling sequence not acceptable.

3.0 CONCLUSIONS

The staff has reviewed the licensee's request for deletion of the credit for the PASS automated dissolved gas analysis sequence and reliance only on the grab samples analyses. The licensee supported its request by claiming that the information obtained from the PASS analyses of dissolved gas serves only to complement and confirm other, more valuable sources of information. The time frame required for obtaining this information could, therefore, be extended. Based on the review, the staff finds that there are circumstances where the information provided by the PASS analyses of dissolved gases is of significant importance and that the time frame proposed by the licensee for obtaining the results from the grab sample analyses is not adequate. The staff concludes, therefore, that the modification of the PASS by deleting of the credit for the automated dissolved gas analysis sequence is not acceptable.

Principal Contributor: K. Parczewski

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