

February 14, 2000

MEMORANDUM TO: Arthur T. Howell III, Director
Division of Reactor Safety, Region IV

FROM: Suzanne C. Black, Deputy Director
Division of Licensing Project Management /RA/
Office of Nuclear Reactor Regulation

SUBJECT: TASK INTERFACE AGREEMENT (TIA) 99TIA017 - ADEQUACY OF
METHOD USED TO CALCULATE RELEASE FROM HIGH-PRESSURE
CORE SPRAY VALVES AT WNP-2 (TAC NO. MA5408)

By memorandum dated June 23, 1999, Region IV requested NRR assistance in determining, what was the appropriate release fraction to use for iodine entrained in water that is subsequently exposed to the atmosphere. The licensee had used General Electric Report 22A5718, "Mark III Containment Dose Reduction Study," to justify the reduction of the iodine release fraction beyond what is suggested in the Standard Review Plan (SRP). Specifically NRR was asked the following questions:

1. Has the General Electric study adequately justified the reduction of the iodine release fraction over what is suggested in the SRP?
2. For WNP-2, what is the correct release fraction to use for iodine entrained in water?

In response to your request, NRR has determined that:

1. The General Electric study does not adequately justify the reduction of the iodine release fraction over what is suggested in the Standard Review Plan
2. Until WNP-2 justifies a smaller value, the correct iodine release fraction for WNP-2 is the 10 percent value given in the SRP.

Our safety evaluation is attached. This completes our action on TIA 99-017 and TAC No. MA5408.

Docket No. 50-397

Attachment: Safety Evaluation

cc w/att: W. Lanning, Region I
B. Mallett, Region II
J. Grobe, Region III

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METHOD USED TO CALCULATE RELEASE FROM HIGH PRESSURE CORE SPRAY
VALVES AT WNP-2 (TAC NO. MA. 5408)

Dated February 14, 2000

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGION IV TASK INTERFACE AGREEMENT (99TIA017)

ENERGY NORTHWEST

WNP-2

DOCKET NO. 50-397

1.0 INTRODUCTION

The Probabilistic Safety Assessment Branch has reviewed the subject Region IV task interface agreement request (TIA). This TIA was transmitted to NRR by memorandum dated June 23, 1999. In the TIA, Region IV requested assistance in determining the adequacy of the method used to calculate an iodine release rate from high pressure core spray valves at WNP-2. Specifically, the following two questions were asked:

1. Has the General Electric study (Report #22A5718, Mark III Containment Dose Reduction Study) adequately justified the reduction of the iodine release fraction over what is suggested in the Standard Review Plan?
2. For WNP-2, what is the correct release fraction to use for the iodine entrained in the water?

2.0 BACKGROUND

During an inspection at WNP-2 (Inspection Report [IR] 50-397/98-15), the inspectors identified a concern with what was the appropriate release fraction to use for iodine entrained in water that is subsequently exposed to the atmosphere.

As noted in NRC IR 50-397/98-15, inspectors initially questioned the inservice test (IST) classification of several safety-related isolation valves in systems that terminate outside containment. The inspectors were concerned that the valves should be leak tested. These valves are in the high-pressure core spray, residual heat removal, low-pressure core spray, fuel pool cooling, and reactor core isolation cooling system and essentially perform a containment boundary function during the recirculation phase. For example, some of these systems have connections into the suppression pool and the condensate storage tanks (CSTs), and the CSTs are vented to atmosphere.

The licensee analyzed this situation informally, and concluded that they could have a leakage rate of 100 gpm through all the valves and still be under regulatory limits. They further surmised that the ability to observe increasing CST level would allow leakage of 100 gpm to be easily identified and corrected. As a result, the licensee determined that leak testing was not required.

When looking at the impact of this potential leakage, the value of 100 gpm as the point where regulatory limits might be challenged was determined to be highly dependent on the assumptions and modeling used to characterize the release of iodine. Revision 1 of Standard Review Plan (SRP), Section 15.6.5, Appendix B, stated that, if the calculated release fraction is less than 10 percent or if the water is less than 212°F, 10 percent of the iodine in the effluent should be assumed to become airborne unless a smaller amount could be justified based on actual sump pH history and ventilation rates. In this case, the licensee did not assume that 10 percent of the iodine in the liquid leakage would become airborne; instead, the assumed release fraction was based on a proprietary General Electric study (22A5718, Mark III Containment Dose Reduction Study), which determined that the release fraction would be less than 10^{-3} (0.1 percent) with 185°F suppression pool water.

The inspectors were not able to verify the validity of the General Electric study or the applicability of the study to WNP-2 during the inspection. Consequently, the inspectors could not determine if the licensee's choice of a 0.1 percent release fraction was valid. The numerical value chosen as the release fraction significantly affects the analysis results and, subsequently, the determination of whether or not leak rate testing is required.

3.0 NRR RESPONSE

The NRR responses to the two questions asked by the region are given below.

1. Has the General Electric study (Report #22A5718, Mark III Containment Dose Reduction Study) adequately justified the reduction of the iodine release fraction over what is suggested in the Standard Review Plan?

A review of General Electric Report (GER) #22A5718 was conducted. It was found that the report does not adequately justify the reduction of the iodine release fraction over what is suggested in the SRP. The release fraction was calculated using partition coefficients. The GER does not discuss how the partition coefficients were derived. Per sheet number 37 of the report, the values appear to be taken from a phone conversation cited as Reference 13¹. No discussion of this reference is given. In addition the licensee was contacted on December 1, 1999, and again on January 19, 2000. They were unable to provide adequate justification for the partition coefficients utilized. They also stated that General Electric is unable to locate the Reference 13 document. Therefore, the GER does not adequately justify the reduction of iodine release over what is in the SRP.

¹ Reference 13 - Phone Talk DRS/P-49, J.C. Wood and A.N. Tschaeche to T.C. Gillett, December 1976.

2. For WNP-2, what is the correct release fraction to use for the iodine entrained in the water?

The release fractions for WNP-2 for iodine entrained in the water during an accident would change as a function of time. A detailed analysis would generally look at plant specific information such as the following time dependent parameters.

- Concentration and chemical form of iodine in the water
- PH of the back-leakage to the CST and the mixture of water in the CST
- Temperature of the back-leakage and mixture of water in the CST
- Water/air interface properties (such as surface area)

Typically, as is done in the SRP Section 15.6.5, a limiting value for such physical phenomenon is used instead of calculating a detailed time dependent value. As stated in SRP 15.6.5, 10 percent of the iodine in the leakage is assumed to become airborne unless a smaller amount is justified. Until WNP-2 justifies a smaller value, NRR recommends that the 10 percent value given in the SRP be used.

Principal Contributor: W. Mark Blumberg

Date: February 14, 2000