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SUBJECT: Responds to request for justification for not including containment radiation monitor in procedure for estimating core damage.Correlation of monitors to amount of core damage impractical.Justification provided.

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JUL 31 1985

Director of Nuclear Reactor Regulation
Attention: Mr. W. R. Butler, Chief
Licensing Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
ADDITIONAL INFORMATION ON ESTIMATING
CORE DAMAGE PROCEDURE
ER 100450 FILE 841-2 Docket Nos. 50-387
PLA-2502 50-388

Dear Mr. Butler:

This letter is in response to a request by your Staff for the justification for not including the containment radiation monitors in our procedure for estimating core damage.

The use of information from the containment radiation monitors is not included in the procedure for estimating core damage since it is impractical to correlate this information to the amount of core damage. Assumptions concerning the chemical form of the source and its ultimate location, the location and response characteristics of the detector, and the shield material between the detector and the emitting source would have to be made when developing a correlation.

Specifically the following items will have dramatic impact on the radiation levels in the vicinity of the containment high radiation monitors, and were used in the evaluation of not including the containment monitors in our procedure for estimating core damage.

1. The sequence of events that leads to core damage determines the form and location of the radiation source. Fission products from a transient induced core melt will be transported to the suppression pool through the vessel internals and the SRV tails pipes. Much of the less volatile fission products will condense on the cooler vessel and internal surfaces or be scrubbed in the pool. The noble gases will also be discharged into a subcooled pool where their evolution will be diffusion limited.

   A LOCA induced core melt, however, will discharge directly to the drywell. The noble gases will remain airborne in the drywell, but the soluble fission products such as the halogens, cesium, tellurium and others, will

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[illegible]

be swept into the suppression pool. A pool of fission product contaminated water will form on the diaphragm floor that will represent a disk source.

2. The dose at the detector is a function of the shielding between the source and the detector. There are two types of shield material in the drywell: the structural components and the gas.

   The drywell is densely populated with pumps, pipes and structural supports. These components are made of stainless steel and will provide shielding between the emitting source and the detector.

   The stopping power of the drywell gas is, to the first order, directly proportional to the gas density. The containment pressurization during an accident is largely due to the increased water vapor in the air, which implies an increase in the gas density. This phenomenon can increase the drywell density by a factor of 6, which implies an equivalent decrease in the detector dose.

3. The detector response function is a function of gamma ray energy. Proper calibration of these detectors to the possible spectrum of fission products would require exposing the detector to an equivalent source which is impractical.

The purpose of intergrating other plant parameters such as, water level, containment hydrogen concentration, containment radiation levels and less volatile fission products was to corroborate and refine estimates based on PASS samples of iodine, cesium and noble gas. As discussed above the containment radiation monitors do not perform this function, and may even have a deleterious effect on the ability to estimate core damage. The use of the containment radiation monitors have therefore not been included in the PP&L procedure.

If you have any additional questions, please contact us.

Very truly yours,

N. W. Curtis
Vice President-Engineering & Construction-Nuclear

cc: M. J. Campagnone USNRC
R. H. Jacobs USNRC