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O. O'Brien

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Lynnette Hendricks
DIRECTOR,
PLANT SUPPORT
NUCLEAR GENERATION

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RULES & DIR. BRANCH
US NRC

Mr. David L. Meyer
Rules and Directives Branch
Division of Administrative Services
Office of Administration
Mail Stop T-6 D59
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Revised Criteria for Post Accident Sampling Systems
November 24, 1999, 64 Fed. Reg. 66213

On behalf of the nuclear energy industry, the Nuclear Energy Institute is please to provide comments on the "Revised Criteria for Post Accident Sampling Systems," published November 24, 1999 (64 Fed. Reg. 66213). The industry supports the actions taken by both the Westinghouse Owners Group and the Combustion Engineering Owners Group for the elimination of the current requirements for Post Accident Sampling System (PASS).

The PASS system is currently installed in each plant to enable sampling of the reactor coolant system and containment following an accident in which major core damage has occurred. PASS was originally intended to be used to provide information (primarily regarding fission product inventories) for offsite emergency planning purposes. PASS is a supplement to the normal plant sampling system and is only intended to be used in the event of a major core damage accident.

The technical basis for elimination of the PASS at plants is multi-fold:

- The current offsite emergency-planning basis does not rely on the PASS. The declaration of Emergency Actions Levels (EALs) and the determination of appropriate Protective Action Recommendations (PARs) are based on indications from plant instrumentation and offsite radiological field surveys using a methodology that has been reviewed and approved by the NRC.

- The determination of the occurrence of and degree of core damage during an accident does not rely on the PASS. The determination of the occurrence of core

Add:
J. O'Brien

1776 I STREET, NW SUITE 400 WASHINGTON, DC 20006-3708 PHONE 202.739.8000 FAX 202.785.4019 www.nei.org

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damage and the subsequent assessment of the degree of core damage during an accident is based on indications from fixed in-plant instrumentation using a methodology that has been reviewed and approved by the NRC.

Based on the current knowledge of the progression and consequences of accidents that can result in damage to the reactor core and potential releases of fission products to the offsite environs, the original technical basis of the PASS which was formulated shortly after the Three Mile Island accident in 1979 has been shown to be inappropriate. Application of the results from 20 years of severe accident research reveals a number of fundamental problems with reliance on sampling for making offsite emergency response decisions:

- In an accident sequence where core damage occurs, the core damage progresses at a much faster rate than samples can be obtained and analyzed. Assuming that the PASS is perfect in all other respects, the PASS results can only provide an indication of potential fission product releases several hours earlier. The results of research have shown that fission product inventories can change in either direction by one or more orders of magnitude in this same time frame. Thus the PASS is not very useful in making current emergency planning decisions.

- Containment atmosphere samples may not reflect the actual airborne fission product inventories in the plant. Research has shown that the physical and chemical nature of airborne fission products in a post accident environment may result in significantly less fission products in a collected sample compared to the plant fluid being sampled. Such phenomena as plateout and deposition play a role in reducing the concentration of fission products between the in-plant sample point and the collected sample. Thus the PASS may underpredict the fission product inventories that are potentially available for release to the environs. Design changes in the PASS cannot prevent the occurrence of these phenomena; only in very tightly controlled experiments can sampling provide an accurate portrayal of airborne fission product inventories.

- Airborne fission product inventories may not accurately reflect the potential magnitude of releases to the plant environs in the event that the integrity of one of the plant fission product boundaries is lost. Research has shown that fission product behavior during a core damage accident may result in significant differences in either direction between the airborne inventories and released inventories. Such phenomena as entrainment, deposition, revaporization, and re-entrainment may contribute to the differences, depending on the accident scenario. Thus the PASS cannot accurately predict potential fission product releases to the offsite environs.

- While containment sump and reactor coolant samples may accurately portray the source fission product inventories, they are not directly usable in predicting potential releases to the environs if a fission product barrier is lost. Research has identified a number of phenomena, such as volatilization and entrainment that can contribute to uncertainties in correlating fission product liquid inventories to actual releases.

- After PASS is first used, additional restrictions would be placed on access to portions of the plant auxiliary building due to routing of the PASS lines. These restrictions are a result of direct radiation from the PASS lines as well as leakage of radioactive fluids from the lines. These restrictions may complicate recovery activities and add unnecessary radiation exposures to the plant staff.

The issues above directly address the basis for eliminating the PASS as a tool for providing information for offsite emergency planning decisions in the short term following an accident that involves damage to the reactor core.

The technical basis for eliminating the PASS developed by both the WOG and the CEOG underwent extensive regulatory review by the NRC. The Advisory Committee on Reactor Safeguards (ACRS), which is an independent regulatory review group, also reviewed the technical basis developed by both the WOG and the CEOG. At the conclusion of their review, the ACRS recommended that the NRC eliminate the regulatory requirements for the PASS.

As noted in the NRC's request for comments (Federal Register Vol. 46, No. 226 at page 66213), there are some that believe the PASS may be useful in the longer term after a core damage accident to provide information related to offsite emergency activities during the subsequent recovery and cleanup phases. Both the WOG and the CEOG have determined that these opinions are not well founded:

- The accuracy of the PASS in providing information to assess the magnitude of potential fission product releases to the environs in the longer term is still impacted by the same physical and chemical phenomena that impact the short term predictions as described above. The phenomena (e.g., deposition, plateout, vaporization, entrainment, etc.) are not diminished in the longer term.

- In the longer term after an accident involving damage to the reactor core, the need to take actions that might result in fission product releases to the environs (e.g., venting small quantities of fission products from confined spaces) is not critical with respect to time. Sufficient time would be available to assess the potential for fission product releases and the available emergency response actions based on all of the available information.

- If sampling of plant fluids is determined to be desirable during recovery and/or cleanup, time and manpower is available to take remedial actions to permit use of the normal sampling system (e.g., temporary shielding). Sample analysis can be accommodated by a number of means including (but not limited to) shipment to offsite facilities.

- In the longer term, as well as part of the immediate/short term response radiological survey teams would be in-place with equipment to readily and accurately monitor actual releases and rapidly communicate the field survey results to the appropriate emergency response experts.

- The emergency response organization would be augmented in the longer term by additional resources from both the industry and the regulatory community. These augmented resources, together with the relaxed urgency for decision making, would permit the consideration and assessment of all information from plant instrumentation to assess and validate possible emergency response options.

- Any radionuclide information that would be available as a result of long term sampling is quite likely to be incongruous with other available information. In this case, the emergency planning focus could become diluted as the emergency response staff investigates and attempts to reconcile these differences.

- Finally, any offsite radiological protection decisions are likely to be made based on worst case expectations. These decisions would not be impacted by the presence or lack of results of samples of plant fluids and containment atmosphere.

Thus, the industry, the WOG and the CEOG, as well as the ACRS, have determined that there is no decrease in emergency planning effectiveness as a result of eliminating the regulatory requirements to maintain a dedicated PASS at each plant. As a result, the information available to state and local emergency response organizations for formulating offsite radiological protection activities will not be adversely impacted by the elimination of the PASS.

We appreciate the opportunity to comment on the "Revised Criteria for Post Accident Sampling Systems." If you have any questions please contact me at (202) 739-8110 or by e-mail (lxh@nei.org), or Alan Nelson (202) 739-8110 or by e-mail (apn@nei.org).

Sincerely,

Lynnette Hendricks