ACRSR-1856

October 8, 1999

The Honorable Greta Joy Dicus
Chairman
U.S. Nuclear Regulatory Commission
Washington D.C. 20555

Dear Chairman Dicus:

SUBJECT: COMBUSTION ENGINEERING OWNERS GROUP (CEOG) APPLICATION TO ELIMINATE THE POST-ACCIDENT SAMPLING SYSTEM FROM THE PLANT DESIGN BASES FOR CEOG UTILITIES

During the 466th meeting of the Advisory Committee on Reactor Safeguards, September 30-October 2, 1999, we reviewed the CEOG proposal to eliminate the Post-Accident Sampling System (PASS) from the plant design and licensing bases for CEOG plants. Our Subcommittee on Severe Accident Management reviewed this matter during its September 16-17, 1999 meeting. During these meetings, we had benefit of discussions with representatives of the NRC staff, the CEOG, and of the documents referenced.

RECOMMENDATIONS

- The staff should approve the CEOG proposal to eliminate the PASS from the plant design and licensing bases.

- The staff should evaluate the need for new generic requirements on post-accident measurement of in-containment fission products and sump water pH.

DISCUSSION

The PASS regulatory requirements were established after the Three Mile Island, Unit 2 (TMI-2) accident and were provided in Section II.B.3 of NUREG-0737, in 10 CFR 50.34(f)(2)(viii), and in various Generic Letters (Generic Letter (GL) 82-05; GL 83-36; GL 83-37). Regulatory Guide 1.97 describes an acceptable method for compliance.

In general, the requirements stipulate that the licensee shall establish an onsite radiological and chemical analysis capability to provide quantification of the following within a 3-hour period:

- specific radionuclides in the reactor coolant and containment atmospheres,

- hydrogen concentration in the containment atmosphere,

- dissolved gases (e.g., hydrogen), chloride, and boron concentrations in liquids,
- pH in the reactor coolant system (RCS), and
- boron, pH, chlorides, and radionuclides in the containment sump.

In 1993, the staff reviewed and approved the deletion of certain PASS requirements for CEOG plants: (1) pH measurement in the containment sump, (2) hydrogen sampling of the containment atmosphere, (3) sampling for iodine, and (4) oxygen analysis of the reactor coolant. The current proposal is to eliminate the PASS from the plant design and licensing bases for CEOG plants.

In general, the PASS measurements have been required to provide post-accident information to guide decisionmaking with respect to:

- Possible void production due to noncondensable gases in the RCS (the measurement of RCS dissolved gases).
- Achieving cold shutdown (the measurement of RCS boron concentration).
- The needs for emergency response actions – including an estimate of the extent of core damage and fission product release (the measurement of hydrogen and fission products in RCS and containment).
- Re-evolution of gaseous iodine from containment sumps (the measurement of sump water pH).
- Post-accident stress corrosion cracking in the RCS (the measurement of RCS oxygen, chloride, and pH).
- Hydrogen deflagration in containment (measurement of hydrogen and oxygen in containment).
- Stress corrosion cracking of recirculation systems (measurement of containment sump chlorides).
- Assurance of subcriticality should sump water be used in the recirculation mode to cool the core (measurement of sump water boron concentration).

The CEOG has made a persuasive case that the PASS measurements are not needed and can be eliminated without undue increase in risk because each of the requirements is being satisfied by other information sources. We concur with this assessment. It is also our view, however, that the current post-accident sampling systems are poorly designed and poorly configured to provide the information for the needs listed above. This is the primary reason that other information sources are used for accident management and emergency response purposes.

We believe that there would be significant post-accident management benefit in having timely measurement of sump pH and fission product concentrations in the containment. Information on concentrations of krypton and cesium in containment can provide direct indications of fission product release and core damage that are difficult to infer from total radiation, temperature, and hydrogen concentration measurements.

We also believe that sump radiochemistry under post-accident conditions cannot be predicted to a level of accuracy that would provide the required assurance that buffered sumps will inhibit the re-evolution of gaseous species of iodine. The actual measurement of pH will be necessary to assess the pH status of sumps and to guide post-accident decisions related to the need for additional emergency response, accident management, containment venting, or ingress into containment in the long term.

We believe, however, that the value of these measurements does not warrant continuation of the current methods for implementation of the PASS requirements through grab sampling in the containment atmosphere and from the containment sump. On the other hand, we believe there is technology available with which this information could be obtained on a continuous basis by the use of tuned gamma monitors in containment and pH instrumentation in the sump. Therefore, we recommend that the staff evaluate the need for generic requirements for timely post-accident measurements of sump pH and fission product concentrations in the containment.

Sincerely,

/s/

Dana A. Powers,
Chairman

References:

1. U. S. Nuclear Regulatory Commission, “Safety Evaluation Report by the Office of Nuclear Reactor Regulation Related to the Technical Basis for Allowing Combustion Engineering Pressurized Water Reactors to Change Commitments Related to Post Accident Sampling,” undated draft, received September 21, 1999.
2. Combustion Engineering Owners Group, CENPSD-1157, “Technical Justification for the Elimination of the Post-Accident Sampling System from the Plant Design and Licensing Bases for CEOG Utilities,” dated May 1999.
3. U. S. Nuclear Regulatory Commission, “Safety Evaluation Report by the Office of Nuclear Reactor Regulation Related to the Technical Basis for Allowing Westinghouse Pressurized Water Reactors to Change Commitments Related to Post Accident Sampling,” undated, draft.
4. U.S. Nuclear Regulatory Commission, NUREG-0737, “Clarification of TMI Action Plan Requirements,” dated November 30, 1980.
5. U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Subject: NUREG-0737 Technical Specifications (Generic Letter No. 83-36), to all Boiling Water Reactor Licensees, dated November 1, 1983.

6. U.S. Nuclear Regulatory Commission, Subject: NUREG-0737 Technical Specifications (Generic Letter 83-37), to all Pressurized Water Reactor Licensees, dated November 1, 1983.
7. U.S. Nuclear Regulatory Commission, Generic Letter 82-05, Subject: Post-TMI Requirements, dated March 17, 1982.
8. U.S. Nuclear Regulatory Commission, Regulatory Guide 1.97, “Instrumentation for Light Water Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident,” Revision 3, dated May 1983.