



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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NOTE TO: Lester S. Rubenstein
FROM: John C. Voglewede
SUBJECT: CORE PERFORMANCE BRANCH/REACTOR FUELS SECTION INVOLVEMENT
IN TMI-2 TASK ACTION PLAN

Enclosed are some of my comments on the proposed involvement of the Reactor Fuels Section in the TMI-2 Task Action Plan. I am providing this material at the request of Ralph Meyer.

I have reviewed Draft 3 of the Task Action Plan and listed all items in which some CPB/fuels involvement may be required. A rough ranking of our proposed involvement is also given. I have expanded several of the higher ranking items into a format more in keeping with Ralph's request. In no case do I foresee lead responsibility for any item with CPB/fuels. There are a number of areas, however, where I believe CPB/fuels should remain informed of current activity.

A handwritten signature in cursive script, reading "John C. Voglewede".

John C. Voglewede
Reactor Fuels Section
Core Performance Branch
Division of Systems Integration

II.B.5 Research on Degraded or Melted Cores

Primary Review Responsibility - RES

Secondary Review Responsibility - CPB/Fuels + other NRR branches

As part of the action plan, RES will be conducting major research programs to support the basis for rulemaking and to confirm certain licensing decisions regarding degraded or melted cores. The programs fall into three broad categories; (1) behavior of severely damaged fuel (in-pile experiments, hydrogen studies, post-accident coolant chemistry and modeling of severe fuel damage), (2) behavior of core melt (fuel debris, fuel interaction with coolant, structure and soil, radiological source term, system codes, and mitigation features) and (3) effect of hydrogen burning and explosions.

It is clear that active NRR monitoring of these RES programs will be necessary in order to consider degraded or melted cores in the safety review. However, it is also clear that neither the general task (II.B. Degraded or Melted Cores) nor this specific task (II.B.5 Research) should be followed by a single NRR branch. The Core Performance Branch/Fuels Section should be responsible for NRR monitoring of those research programs related to fuel behavior. Containment Systems Branch should be responsible for NRR monitoring of hydrogen burning and explosions. AAB and RSB should also be involved.

Because this task is primarily an RES responsibility, CPB/fuels involvement will be limited to NRR monitoring and technical support on licensing issues.

11.E.2.3 Uncertainties in ECCS Performance Predictions

Primary Review Responsibility - RES

Secondary Review Responsibility - CPB

SBLOCA analyses will be performed by LWR Vendors to evaluate uncertainties in ECCS performance calculations. NRR will evaluate these uncertainties and, if changes are needed in the present analysis methods to properly account for these uncertainties, recommendations will be made to the Commission to address such changes.

Reactor Systems Branch should have lead responsibility for this task, including requirements for vendors and overall evaluation of the submittals. Previous work in this area indicates the major role of heat sources in ECCS performance calculations. These include stored energy and metalwater reaction (CPB/fuels) and decay heat (CPB/physics). Recent 10 CFR 50, Appendix K proposed rulemaking revisions were limited to these areas.

Because uncertainties in ECCS performance analysis must be based on the overall calculation, lead responsibility for this task should be held by the Reactor Systems Branch. Strong technical support should be expected from the Fuels, Physics and Thermalhydraulics Section of Core Performance Branch.

II.F.2 Inadquate Core Cooling Instruments

Primary Review Responsibility: ICSB

Secondary Review Responsibility: CFB, RSB

NRR has developed requirements for specific equipment to detect and aid in recovery from conditions of inadequate core cooling. The specific instruments are primary coolant saturation meters in PWR's and unambiguous indicators of inadequate core cooling, such as coolant level in the reactor vessel.

Because the analytical basis and functional design of the proposed inadequate core cooling indicators have not yet been established, the initial review responsibility for this item should be with the Core Performance Branch. The thermal, neutronic and hydraulic conditions of inadequate core cooling are the responsibility of the Fuels, Physics and Thermalhydraulics Sections of this branch. When the function design concepts of the instruments are established, review of the proposed hardware should be performed by the Instrumentation and Controls Systems Branch. Mitigation of inadequate core cooling conditions should then be reviewed by the Reactor Systems Branch.

Core Performance Branch has been historically involved with the core instrumentation issue. The containment pressure, water level and hydrogen concentration requirements, as well as the inadequate core cooling section of the Lessons Learned Short Term Report (NUREG-0578) were written by Voglewede. These items were also reviewed on a lead plant (TMI-1) by Voglewede. The NRR analyses of TMI-2 neutronics and the relation to reactor coolant was written by Richings. A Commission letter on core exist thermocouples was written by Dunenfeld. Input to Revision 2 of Regulatory Guide 1.97 was supplied by various members of the Branch in several areas, including coolant activity monitoring, BWR thermocouples and boron concentration measurements. Although this level of involvement may not be continued in the future, it does indicate a significant historical contribution to this area.

SUMMARY

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