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NOTE TO: T. M. Novak, Chief, Reactor Systems Branch, DSS

FROM: C. C. Graves, Reactor Systems Branch, DSS

SUBJECT: REVIEW OF REGULATORY GUIDE 1.139

Introduction

I have reviewed Revision 1 of Regulatory Guide 1.139, "Guidance for Residual Heat Removal to Achieve and Maintain Cold Shutdown." My comments and comments from several other people in DSS will be ready to be sent to SD next week.

There are a number of changes which are improvements to the original version. However, the revisions involving consideration of accidents in general and highly radioactive fluids raise questions concerning issuance of the guide in its present general form and the need for further staff reviews and preparation of other guides.

Background

The major goal of Branch Technical Position RSB 5-1, which formed the basis for the original version of R.G. 1.139, is expressed in the functional requirements section of the position. It was required that the plant design be such that the plant could (if necessary) be taken from normal power operation to cold shutdown within a reasonable time using only safety-grade systems, assuming the availability of either offsite power alone or onsite power alone and considering the effect of the worst single failure. Credit for operator action (inside or outside of containment) to counteract the effects of single failures could be taken, if suitably justified. This position was in conflict with the standard industry position that hot standby was a safe endpoint and resulted in a number of adverse industry reactions to the R.G. 1.139 version issued for public comment in 1978.

It should be emphasized that BTP RSB 5-1 was meant to address situations which did not involve LOCAs or degraded core conditions resulting in highly radioactive fluids. The estimates of the cost impact resulting from the position were for PWRs only and were concerned, for example, with increased capacity of the condensate storage tank and with upgrading of atmospheric dump valves and some small valves in the CVCS. In the implementation of the position with respect to operator actions, the problem of highly radioactive fluids was not considered. Estimates of the cost impact for BWRs were not made since they were considered to be minimal.

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The present version of the guide involves functional requirements dealing with accidents in general and with the postulated existence of highly radioactive fluids (e.g., TMI-2). The cost impact resulting from this new position would be much larger than those presented previously to the RRRC. The new position should also have a significant impact on both BWRs and PWRs.

The design and testing requirements of many systems and components besides the RHRS could be affected by the new functional requirements (e.g., ECCS, CVCS, auxiliary building shielding, ventilation systems and exhaust filters, pressurizer heaters, spray and relief valves, steam generator instrumentation and controls, radwaste and service water systems). Some of these are covered briefly in the position section. However, three-quarters of the position section of the guide is concerned with detailed requirements for the RHR system.

It is also noted, for example, that the integrity and accessibility requirements applied specifically to the RHR system in this guide should also apply to other portions of the ECCS. However, there are no other guides or branch positions setting such requirements for the ECCS.

Recommendations

The problem arises because a general position on plant design to permit recovery from accidents, including those resulting in highly radioactive fluids, has been put only in a guide which keys on a single system. It would seem preferable to prepare a general guide which defines the type of accidents to be considered and gives broad functional requirements involving all required systems. The guide should include consideration of system interaction effects. Preparation of this type of guide would require a team effort involving a number of branches in DSS and probably should be made after information from implementation of the recommendations of the Lessons Learned Task Force is digested. R.G. 1.139 could then refer to this general guide.

If it is decided to continue work on the present version of R.G. 1.139, it is noted that the changes to the previous version are so large that the package should be resubmitted to the RRRC with new cost-benefit and implementation packages and go out again for public comment. The guide could still benefit from a team review in addition to the limited individual reviews already completed.

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