UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

January 24, 1990

MEMORANDUM FOR: CRGR Members

FROM: Denwood F. Ross, Jr., Deputy Director
for Research
Office of Nuclear Regulatory Research

SUBJECT: GENERIC LETTER ON ACCIDENT MANAGEMENT

NRR is sponsoring a generic letter, Supplement No. 2 to GL-88-20 (the IPE letter) which would also provide a NUREG/CR with more details on the strategies for accident management. The CRGR chair sent this package around for negative consent by memo dated January 19, 1990. I believe, for the reasons stated below, that CRGR must review this package.

The draft generic letter, page 2 (middle), notes that in the fall of 1990 the NRC will be sending guidance on development of an accident management "framework." The proposed letter before us covers accident management "strategies." What is the difference, if any? If a utility devotes considerable effort to understanding the strategies, will they have to redo the work when the framework emerges? Is this effort consistent (or coherent) with Commission policy with regard to NUMARC?

From my reading, the insights report covers only the front end; containment accident management insights come later. Can these be logically separated?

Externally-initiated core damage sequences do not appear to be covered; thus there is reference to alternate equipment that may well be inoperative due to the external trauma.

In some strategies there seems to be an attempt to expand the design basis for the plant; I am prepared to go into detail during the (proposed) CRGR review.

Big picture: After seeing all of these insights, and noting that the list will be expanded when the back end is included, I am concerned that the work load on the plant operating staff is being so greatly enlarged for these postulated events that there is little likelihood of success, absent some smart diagnostic aids. Of course, the report is labeled "draft for comment;" yet, the overall tone of the letter is that the report is guidance. I wonder if, synergistically, what we are suggesting is capable of implementation, given control rooms and operating staff as we know them. For example, under the stress of the event, we are suggesting multiple jumpers and

bypasses of trips which were put on equipment for a purpose. Overall, is there a commensurate enhancement in safety? It seens to me that a better approach would be to send this report to NUMARC and propose a workshop wherein directors of operator training (plus INPO) and our systems types plus training and operator licensing staff get together and see if we are really heading in the right direction.

original signed by:

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Memorandum to CRGR Members dated January 24, 1990

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Some Specific Comments on the Draft NUREG/CR on Accident Management

Strategy 2.1(p8): Throttling CS will prolong the time that there is injection from RWST, but the achieved delay will not be dramatic. Typically the CS is less than half of the LP injection rate. Recall that when the CS was activated at TMI(following the H2 burn) the CS was secured completely in a few minutes. However this does not avoid, nor much delay, the need to go into recirculation, following a design basis LOCA. I believe that recirculation would be called on when RWST is at low level, regardless of containment sump inventory. For some small breaks, and for some designs, it may be necessary to "piggy back" HPI via the LP system, recirculating from the sump through the heat exchangers. The overall tone of this writeup is that recirculation may never work; is that the intent? There is a sentence about recirculation of CS discharge back to the RWST; why would you want to recirculate possibly contaminated fluid back to the vented RWST?

Strategy 2.2(p10): There is talk of a decreasing RWST level; is there a concept that LP systems start and run, but inject at the presumed ISLOCA break? What benefit would it be to spray externally a concrete auxiliary building? Is more to come from the ISLOCA generic study? Why is SGTR termed an intersystem loca; I do not see this classification. Seems like the practice of opening and closing isolation valves might contribute to the probability of ISLOCA, rather than diagnose it.

Strategy 2.3.1(p12): For the first time I have seen the concept of using HPI after the batteries have exhausted(thus no idea of vessel inventory). This raises the question of vessel overfill and PTS(note that maintaining the pressure boundary was not one of the objectives of this AM report). The impact of suppression pool on containment venting was not mentioned; existing procedures have an inhibit on venting if the pool exceeds a prescribed level(to avoid liquid in the vent path).

Strategy 2.3.2(p 14): The description states that the water may be required to respond to certain sizes and types of LOCAs; is this not a challenge to the design basis of the plant? If all redundant recirculation trains were inoperable, then for the design basis LOCA we are in a heap of trouble. To require a solution is certainly a challenge to the design basis. One situation is listed as a break large enough that the RWST is in jeopardy of being emptied while still needed for emergency injection(this is not the ISLOCA; that comes next). What break could produce this? Such breaks were in fact part of the design basis.The statement on p15 regarding tech specs for the good unit would have a chilling effect on the operating staff and have no place in this report. The operator might consider the use of unborated water? K-effective could be as much as 6%.

Strategy 2.4(p16): This strategy seems more like a description of the design basis and does not seem to add much. Why would one suggest an adverse effect in switchover to recirculation from the

control room, after all we did to get this feature? However, it also suggests that recirculation of sump water may not be the preferred long-term mode of heat removal. For the design basis LOCA, is there an alternative? If not, why raise the point?

Strategy 3.2.1(p20): This strategy lists a large number of emergency bypass or change of protective trips. On the whole, knowing when it is a good idea to bypass a protective pump trip is a good idea. One concern is that is training or in redesign to facilitate this, such trips or bypasses would inadvertently be left in. I suppose that we would have to live with this type of error, and try to minimize it. However, this strategy would take a lot of effort on the part of the utility by way of preplanning, and would take a lot of effort on the part of the operating staff during the evolution itself. The possible adverse effects is just vague motherhood and does not help this writeup.

Strategy 3.3.1(p 24): This is a challenge to the design basis. It suggests that it would be prudent to reflood with borated water. Where is the operator going to get the several tons of boron for this purpose? Are we suggesting a RWST to be built for this purpose? This could not be done on the spot. If what is meant that the operator should actuate the SLCS for certain design basis LOCAs, then say so(even though this goes beyond the current design basis). Note that this particular sequence is a very delicate one in terms of time. The core heats up just enough to damage the B4C rods, but not enough to destroy the fuel pin geometry. The notion that CRD pumps can be used for level and power control seems fanciful; is not that the role of the turbine driven HP systems? Can CRD furnish flows in the needed range? The possible adverse effects seem like sailing twixt Scylla and Charybydis(sp).

Strategy 6.1(p43): Again we see the notion of boron injection for a BWR, and independent power thereto, for a SBO.

Strategy 6.2(p 45): This also is a strategy for assuring boron to be injected in a BWR for severe accidents. It states that it would be prudent to reflood using borated water. Since the current design basis calls for reflood from the SP, I guess that it follows that the SP must be reflooded; who wants to tell the BWR owners this? Also, it states that the vessel must not be overfilled; for the design basis LOCA, where the vessel refills to the 8 foot level, how does one not overfill(out the presumed break via the jet pumps)? It also suggests that during a design basis LOCA, and presuming the control rods have melted(but not the core) that one might have to throttle the LP to control power. But the design basis for the LOCA requires refill to the 8 foot level; what is the poor operator supposed to do?