Docket

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

March 8, 1989

Docket No. 50-382

Mr. J. G. Dewease
Senior Vice President - Nuclear Operations
Louisiana Power and Light
317 Baronne Street, Mail Unit 17
New Orleans, Louisiana 70160

Dear Mr. Dewease:

SUBJECT: COMMENTS ON THE LOUISIANA POWER AND LIGHT RESPONSE TO GENERIC LETTER 88-17 FOR THE WATERFORD UNIT 3 FOR EXPEDITIOUS ACTIONS FOR LOSS OF DECAY HEAT REMOVAL (TAC NO. 69791)

The NRC staff has reviewed the Louisiana Power and Light (LP&L) letter of December 23, 1988 in response to Generic Letter (GL) 88-17. We find that LP&L appears to meet the intent of the generic letter with respect to expeditious actions.

The LP&L response includes some indication on scheduling, however, all expeditions actions addressed by GL 88-17 are to be implemented in advance of any requirement for part loop operation. We note that the next anticipated requirement for part loop operation at Waterford 3 should not occur before the refueling outage in October 1989.

Your overall response is generally complete and more detailed than the average response we have reviewed. However, in a few areas, your response is sufficiently vague that we cannot fully understand your actions taken in response to GL 88-17. You may wish to consider several observations in order to assure yourselves that the actions are adequately addressed:

1. You mention discussion of the Diablo Canyon event with operations personnel and training for specific mid-loop operation and cooldown/draindown with your staff. It is not specifically stated that maintenance personnel are also included. The item was intended to include all personnel who can affect reduced inventory operation and preventive as well as mitigative training.

2. Your training program includes a review of the previous Waterford mid-loop events of 7/86 and 5/88. There are also a number of other mid-loop events that occurred at other plants that would be beneficial for review such as Arkansas Nuclear One, Unit 1 (October 26, 1988), Surry Unit 2 (September 19, 1988), and Sequoyah (May 23, 1988).

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3. You have identified penetrations of concern in Section 3.1 as those "providing direct access from the containment atmosphere to the outside atmosphere...." However, we are concerned with all containment penetrations that could cause a release (e.g., penetrations from the containment into a fuel handling or auxiliary building).

4. You have not addressed problems associated with remaining in containment once boiling initiates with large openings in the RCS pressure boundary. Loss of shutdown cooling (SDC) could lead to boiling in 30 minutes and core uncovery in 3 hours. All personnel may have to leave containment or don special gear 30 minutes after the loss because of steam inside of containment. If you are assuming 3 hours in which to work inside containment, then this may require special equipment.

5. In your addressing of containment closure, no information is provided regarding how you will keep track of and control the many potential openings which may have to be closed simultaneously. Your procedures and administrative controls should address this topic.

6. In Section 3.1.1 you have stated that "if the RCS is open on the cold leg side due to a major disassembly or removal of an RCP, the pressure increase in the upper plenum (hot side) will depress the water level in the core and the steam generator outlet pipe. This will force water out of the RCS through the RCP opening." You further state that "vent paths are available but not credited to equalize pressure between the hot and cold sides of the RCS - e.g., leakage paths around the hot leg nozzles and other in-vessel leakage paths." Although these paths exist, they provide minimal pressure equalization.

7. In Section 3.1.1 you state that if the RCS is closed and a steam generator (SG), initially at 70% wide range level for secondary side inventory, is available it should be able to cool for more than 6 hours before boiling away the secondary side inventory (assuming no credit for makeup). You have not identified a requirement that SGs be maintained filled during mid-loop nor is provision for SG steaming addressed. You do state that one SG will be available if SG maintenance is not being performed. The dynamics of steam boiling in the SG and the effects on the RCS temperature, pressure, and level are not addressed although some assumption is made that the RCS pressure shall not exceed 35 psig.

   The methods to be used for low pressure secondary side steaming to maintain RCS pressure less than 35 psig have not been discussed. Analyses and procedures should be in place which justify any methods you choose.

8. In Section 3.1.1 you also stated that steam exiting the SG tubes would be vented through the loop seal and condensed by water in the vertical suction leg between the RCP and loop seal. We assume that you have performed analyses which demonstrates this condensation process as well as determining the amount of water which would remain under various allowed system configurations.

9. In Section 3.3.1 you state that "The critical path to closing containment is closure of the equipment hatch." You say that "Conservatively, 2 hours is needed to adequately close the hatch (closure can actually be effected in 1-1.5 hours)." This is based on Figure 2 which shows the time after initiation of a loss of SDC by which containment closure activities must begin, as a function of time after reactor shutdown. Has the possibility of large quantities of steam in the containment, from boiling in the reactor with large openings in the RCS pressure boundary, been factored into the time to close the equipment hatch? See also number 4 above.

10. In Section 5.1.1 you discuss the features of the refueling water level indicating system (RWLIS) for which a diagram is given in Figure 3. The RWLIS system uses stainless steel piping and has narrow and wide range pressure transmitters. As shown in Figure 3 these pressure transmitters show a common top on the drain line below hot leg #1 in the vicinity of the shutdown cooling suction line. Also, the pressure transmitters share the common reference high point tap near the top of the pressurizer. Therefore, if a comparison is made for a region where the wide and narrow range readings overlap, precautions must be taken in justifying the accuracy because of the dependence on common taps.

11. In Section 5.1.1, Figure 3, the RWLIS system shows downward slopes for the lower top horizontal runs but no slope is indicated for the upper top horizontal runs. It may not be practical for slopes in the upper horizontal runs. However, there should be means addressed for insuring that there is no water in these upper reference legs. Also, Figure 3 shows closed valves RC-215A and RC-215 leading to the boron management system to which the lower reference leg for the RWLIS is connected to. What would be the effect of opening these valves on the accuracy of the RWLIS readings?

12. In Section 5.1.2 the refueling level indication system (RLIS) is described as consisting of one inch rubber (ortac) tubing including a length of hardened tygon tube as a sight glass. The schematic is given in Figure 4. You state that the tubing runs from the bottom of hot leg #1 (from the same tap-off as the RWLIS), through the sight glass, and into the top of the pressurizer. No mention is made of cross checks between the RLIS and RWLIS level systems. This would be desirable. However, since both have the same bottom tap, care would be needed to avoid a common error. You do mention the ability to check the RLIS level measurement where it overlaps a pressurizer level indication prior to draining below the pressurizer. There is no indication of a potential level problem if the pressurizer surge line is not empty and pressurizer

air pressure is not equilibriated with the remainder of the RCS. Also, you later indicate in Section 5.1.3 a check against the HJTC system at several discrete elevations which is desirable as a cross check.

13. Figure 4 of Section 5.1.2 shows clear hose below the level of the hot leg. You indicate that there is a wide range of measurement from the bottom of the hot leg to an elevation overlapping the bottom of the pressurizer. It is not clear what you consider the actual lower end of the range. A value below the bottom of hot leg would be misleading.

14. In Section 5.1.2 you mention that the rubber hose for RLIS is rated for a working pressure of 300 psig at 180°F and the sight glass is rated for a working pressure of 15 psig at 180°F. If the system were to reach boiling, it would appear that these properties would not be sufficient.

15. Walking the rubber/tygon tube following installation to verify lack of kinks or loop seals is necessary. Experience shows that periodic walkdowns are needed after installation. We recommend daily walkdowns when the rubber/tygon tube is in use, with an additional walkdown immediately prior to its being placed in use. Your preventive training for all affected personnel should address this, as well as procedures, to avoid the reoccurrence of the May 1988 events.

16. The HJTC method for level measurement is described in Section 5.1.3 with a schematic showing the eight discrete elevations for a probe in Figure 5. You state that two independent and redundant probe assemblies are installed. Three of the elevations are located at heights approximately equivalent to the bottom, middle and top of the hot leg. This system is only effective for reduced inventory conditions when the reactor vessel head is in place and the HJTC instrumentation is connected. You state that the HJTC system can be utilized for cross checks with the RWLIS and RLIS systems within the resolution capability of the HJTC system and that the sensor located at the hot leg centerline provides some indication of potential LPSI pump cavitation. Also, you indicate that the HJTC can be used as a backup in the event of the loss of the other level measurement capability. The HJTC should never be used as the primary level detection system. The HJTC uses discrete points which are too widely separated to be useful for lowered inventory operation in any capacity other than for cross checking of other instruments.

17. In Section 5.2 you discuss the November 1988 draindown in which you state that the RLIS and HJTC systems were designated as the primary level measurement instruments. The RWLIS system was available but undergoing further acceptance tests. The operators were instructed to predicate any actions based on the lowest level indicated by the RWLIS/RLIS/HJTC combination which is a good conservative approach. This instruction should be part of the procedures and/or training.

18. In Section 5.3 you state that you are evaluating the degree of independence of the RWLIS and RLIS systems since they have a common tap-off from the RCS hot leg. We will accept a common tap for instrument systems which have already been installed. You also state that you are making an evaluation to determine the extent to which the RLIS system, a rubber hose/tygon tube sight glass combination, can be credited in the long term. Rubber hose/tygon tube will not be acceptable for the long term instrumentation needs. For the long term enhancements and because you have common taps for the RLIS and RWLIS, provision should be made for testing the taps before each use to assure they are open and free of restrictions.

19. In Section 7.3 you state that when in a reduced inventory condition that 2 of the 3 HPSI pumps will be operable and available for hot and cold leg injection in addition to the SDC (LPSI) pumps. Also you state that "While the SDC pump may be unavailable for SDC purposes (e.g., pump cavitation, inadvertent SDC valve isolation, etc.) the pump will still function to restore RCS level through an alternate valve lineup and appropriate startup procedure." You indicate that OP-901-046 will be amended to credit a LPSI (SDC) pump as a second alternate means of RCS addition. This is not responsive to GL 88-17 if this action is taken for alternate lineup after one of the SDC pumps fails since a failure due to vortexing of one LPSI pump could easily affect the other LPSI pump. However, if the second LPSI pump is aligned up as a second available means before entering a reduced inventory condition it would be acceptable. Alternately it would be desirable to have other sources of RCS water make-up pumps lined up in preparation for SDC purposes if effective.

20. In Section 8.2.1 (page 24) related to nozzle dams you state that "if a steam generator was not blocked or did not have a manway open it was assumed to be available as a heat sink for steam condensation." There is no follow-up in your discussion to indicate that there would be provisions for making sure water was in the SG and that steam could be relieved on the secondary side (see Item 7). A steaming path is mentioned later on page 25 but the means are not provided.

21. In Section 8.2.1 you mention a review in which a pressurizer manway (a relief area of 1.40 $ft^2$) is open. We note that relatively large hot side openings in the RCS, such as a pressurizer manway, can still lead to a pressure of several psi. The large steam flow rate in combination with flow restrictions in the surge line and lower pressurizer hardware may lead to pressurization. Accurate calculations should be performed to verify the effectiveness of the opening.

22. It is noted that in many of your responses you have a section called "Long-Range Expeditious Actions." The Generic Letter 88-17 does not have such a category in expeditious actions. As we noted above, all expeditions actions should be implemented in advance of any requirement for part loop operation.

23. You appear to be attempting to work within existing technical specifications in meeting the generic letter recommendations. We note that technical specification changes will be considered if existing specifications are overly restrictive.

There is no need to respond to the NRC on the above observations at this time. As you are aware, the expeditious actions you have described are an interim measure to achieve an immediate reduction in risk associated with reduced inventory operation, and these will be supplemented and in some cases replaced by programmed enhancements. We intend to audit both your response to the expeditious actions and your programmed enhancement program. The areas where we do not fully understand your responses as indicated above may be covered in the audit of expeditious actions.

If there are any questions on the above observations or the intent of GL 88-17 and expected actions, please let us know.

Sincerely,

ORIGINAL SIGNED BY JOSE A. CALVO

Jose A. Calvo, Director
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