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SUBJECT: Summarizes observations during annual emergency exercise on 900917.

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November 5, 1990

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Washington, D.C. 20555

Mr. John B. Martin, Administrator
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Gentlemen:

Subject: **Docket No. 50-361**
Observations Concerning Annual Emergency Exercise
San Onofre Nuclear Generating Station, Unit 2

On October 17, 1990, Southern California Edison (SCE) conducted the annual emergency exercise at the San Onofre Nuclear Generating Station. The exercise scenario was based on simulated accident conditions primarily affecting Unit 2, but also including effects involving the offsite power supplies to Unit 1 and Unit 3. The NRC was a major participant in the exercise. As Emergency Coordinator (EC) for much of the exercise, I had an opportunity to discuss our actions with both of you at various times.

The purpose of this letter is to summarize my evaluation of actions taken by SCE to mitigate simulated conditions "beyond the design basis" of the plant's Engineered Safety Features (ESF). As an individual participant with EC responsibilities at the Emergency Operations Facility (EOF), I was not able to fully evaluate these actions during, or immediately following the conduct of the exercise.

Emergency Centers Involved In Mitigation Development

Those of us at the EOF are primarily focused on evaluating current and potential future plant conditions requiring notification and possible Protective Actions (PA) by offsite agencies. (This is especially the case during the compressed time period for most exercises.) Although development of mitigation measures was also considered within the EOF, primary efforts involved the Headquarters Support Center (HSC), the Technical Support Center (TSC) and the Operations Support Center (OSC).

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The course and status of these efforts was not closely followed in the EOF, although those proposed for implementation were, of course, known to the EOF. Subsequent evaluation indicates that the following occurred.

Loss of Offsite Power

The emergency scenario involved loss of offsite power to the plant as a result of combined highway and aircraft accidents causing severe damage to its switchyard. This occurred concurrent with outages of Emergency Diesel Generators (EDG) at both Unit 2 and Unit 3. The TSC promptly provided direction to the OSC for cross-tie of Units 2 and 3 electrical systems at the 480v level, restoring a charging pump to operation for mitigation of the Unit 2 Loss of Coolant Accident (LOCA).

The TSC also pursued establishment of a cross-tie at the 4kv level, but this was not implemented due to:

- Concern with jeaprodizing the single source of AC power to Unit 3, due to a ground on the Unit 2 bus.
- Determination by the exercise controllers that appropriate cable to bypass the grounded buss was not immediately available.

In parallel with this, the HSC located a portable emergency diesel generator and simulated its transport to the site. The HSC also identified cable that would have permitted establishing an electrical supply to Unit 2 from the Unit 1 Dedicated Shutdown Diesel. Finally, the HSC evaluated the ability to establish other electrical supplies to Unit 2, but it was unable to identify a configuration with acceptable electrical characteristics.

Loss of Unit 2 ECCS Functions

The loss of AC power resulted in the loss of active Emergency Core Cooling System (ECCS) functions during the simulated Unit 2 LOCA. Charging flow was restored by the 480v cross-tie from Unit 3 discussed above, however this was insufficient to maintain RCS inventory.

The OSC initially evaluated providing temporary power to a Low Pressure Safety Injection (LPSI) pump, but made the decision to focus its resources instead on restoring an EDG to service. The TSC pursued transfer of electrical power for the "swing" High Pressure Safety Injection (HPSI) pump from Train B to Train A. High dose rates in the preferred location for this transfer

required that an alternative be devised, and it was in the process of being implemented when the exercise ended.

Diversion of Containment Spray to Safety Injection (SI) service (possible in the C-E ECCS design) was widely identified as an important mitigation measure early in the scenario, but its use was precluded by the exercise controllers. (The simulator, which was in use throughout the exercise, may not accurately model use of this improvised flow path.)

During the exercise, I was asked by the NRC if use of the diesel-driven fire water pump had been evaluated for SI use, and I indicated that I did not then know. The TSC did pursue diverting both (gravity-fed) condensate and (diesel-driven) fire water to SI service at various times, but did not implement the actions required due to concern with local dose rates.

Meanwhile, the HSC undertook development of a number of mitigation measures. These included:

- Cross-tie of Units 2 and 3 charging headers via currently abandoned, 2-inch, high pressure connections and a short length of fire hose. This was not implemented, owing to the electrical cross-tie noted above.

- Possible disassembly of a check valve which would permit cross-tie of Units 2 and 3 SI via the charging flow path above. This action was not implemented due to termination of the exercise.

- Addition of boric acid from Unit 1 to the fire water supply and injection by the diesel-driven pump into Unit 2 via the 2-inch connection above. This action was not implemented due to termination of the exercise.

Containment Leakage

The TSC, OSC and HSC each considered reducing the simulated containment leakage by pressurizing the leaking penetration. Action was not implemented due to the relatively small source term and the relatively high worker doses that would have been required. Other measures, such as a patch and use of a fire hose spray to "wash out" iodine and particulates from the release were also considered.

Conclusions

In evaluating the actions summarized above, I conclude that they represent an adequate development of measures to mitigate the extensive beyond-design-basis conditions simulated in the

exercise scenario. However, it is obvious that it would have been possible to take action more quickly if plans had been developed ahead of time.

The pre-established ability to cross-connect ESF systems between dual units, such as Units 2 and 3, would appear to be an obvious means to significantly mitigate the consequences of beyond-design-basis conditions. Also, support from adjacent units may be practical, as discussed for Unit 1 above. However, provisions for such support should be developed in accordance with guidance which has had the benefit of thorough consideration of all potential safety consequences and which weighs the extremely low probability of actual need against the potential that these measures might worsen, or even cause, the development of an accident or unwarranted personnel hazard. (Beyond-design-basis measures such as these will be considered in conjunction with ongoing IPE activities.)

Finally, I conclude that the attention of the EC must necessarily remain focused primarily on the functions of offsite assessment, notification and PA recommendations. In performing these functions, we deliberately do not normally take "credit" for actions to mitigate beyond-design-basis conditions, unless we have very high confidence that they will be successful. This is essential because we believe that onsite and offsite evacuation is the preferred PA and that it should commence, if time permits, whenever conditions exist which are likely to lead to significant releases of radioactivity due to loss of minimum design ESF function.

If you have any questions or comments concerning the above, or if you would like additional information, please let me know.

Sincerely,

Harold B. Ray

cc: Mr. Ross Scarano, USNRC, Region V
Mr. Greg Yuhas, USNRC, Region V
Mr. C. W. Caldwell, USNRC Senior Resident Inspector, SONGS