March 1, 1994

Docket No. 50-302

Mr. Percy M. Beard, Jr.
Senior Vice President,
Nuclear Operations
Florida Power Corporation
ATTN: Manager, Nuclear
Licensing (NA2I)
Crystal River Energy Complex
15760 W Power Line Street
Crystal River, Florida 34428-6708

Dear Mr. Beard:

SUBJECT: RESOLUTION OF COMMENTS ON 1992 ACCIDENT SEQUENCE PRECURSOR (ASP) ANALYSES

By letter dated June 22, 1993, you provided comments to our draft 1992 ASP analyses. Our ASP contractor, Oak Ridge National Laboratory (ORNL), has reviewed your comments. ORNL's resolution of comments and the rationale for their resolution is enclosed. For further information, please refer to NUREG/CR-4764, Volumes 17 and 18.

If you have any questions, please call me at (301) 504-1471.

Sincerely,

L. Raghavan, Project Manager
Project Directorate II-2
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
ORNL resolution of comments

cc w/enclosure:
See next page

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Florida Power Corporation

Crystal River Unit No.3
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**ASP Analysis of LER 302/92-001, 002**

Reference 1: Letter from P. M. Beard, Jr., Florida Power Corporation to the U.S. Nuclear Regulatory Commission, dated June 22, 1993, 3F0693-12.

*Comment 1:* The comment indicates that the wording of the present summary does not imply that EDG 3B ran for 2.5 h before being declared inoperable.

*Response 1:* The summary states that the EDG was declared inoperable after the partial restoration of emergency power. As stated in the text, partial restoration occurred after 2.5 h. Therefore, the summary provides a brief and accurate description of the event.

*Comment 2:* The licensee states the length of time between the shutdown of the 3B EDG and the time when it was declared inoperable was inappropriately rounded.

*Response 2:* The licensee method of rounding values is unclear. 2330 hours - 1538 hours = 7 h and 52 minutes. It does not seem appropriate to round this value to 7 h. The description was modified to state the length of time in hours and minutes (7 hrs and 52 min) rather than the approximate value of 8 h.

*Comment 3:* The licensee states that they have run three cases which they believe are similar to the three cases shown in the ASP report (see table below for a comparison of ASP and licensee conditional core damage probability values). They state the ASP and licensee values for the best estimate (from the DRAFT report) and upper bound cases are "roughly comparable." However, for the lower bound the licensee calculates a value "approximately an order of magnitude less." They believe this lower bound is "the most representative of the CR-3 transient" and that upper bound is "exceedingly conservative" and "has little relevance." The point estimate in the draft report "is only slightly conservative as the 'B' diesel generator was operating in a somewhat degraded condition with problems in the jacket water cooling system." Finally, the licensee states that subsequent to this event, an additional transformer was installed. If it had been installed at the time of this event, it would "reduce the conditional core damage probabilities in the table (below) even more."

| Conditional Core Damage Probability | | | Description/ Assumptions |
|---|---|---|---|
| ASP Value | | Licensee Value | |
| Draft | Final | | |
| $1.2 \times 10^{-4}$ | $1.7 \times 10^{-5}$ | $4.6 \times 10^{-5}$ | ASP Point Estimate. |
| $1.3 \times 10^{-5}$ | $1.3 \times 10^{-5}$ | $1.8 \times 10^{-6}$ | ASP Lower bound. Assumes EDG 3B and B train equipment operable throughout the LOOP event. |
| $2.6 \times 10^{-4}$ | $2.6 \times 10^{-4}$ | $2.2 \times 10^{-4}$ | ASP Upper bound. Assumes EDG 3B and B train equipment out of service for entire LOOP recovery. |

*Response 3:* The upper bound is conservative since the 3B EDG did run for the first 2.5 h of the event, although it was degraded. The lower bound is nonconservative, as identified by the licensee, since the EDG was degraded. The licensee states that the event is most appropriately modeled with the "B" EDG operable, "B" train equipment operable, and the "C" inverter operable. However, due to the degraded condition of the "B" EDG this is not the most appropriate modeling.

As recognized by the licensee, the 3B EDG was operating in a degraded condition during the period that offsite power was lost to its associated bus. LER 302/92-002 states the following:

> "Prior to the reactor trip, EDG 3B had a one gph leak from the jacket coolant pump (DJP-2). The leakage was being made up regularly."

Following the LOOP and the starting of EDG 3B, "...leakage from the seal of DJP-2 had increased to approximately 2-3 gpm with the diesel running and make up to account for the increased leakage was difficult. At this point the operability of EDG 3B was questioned." This occurred during the time when offsite power to the associated bus was unavailable.

> "After the diesel was shutdown, ...the leakage had decreased although the volume of the leak was higher than before the trip."

> "...following the automatic start of EDG 3B on loss of the OPT, the leakage had increased to the point where makeup for the leak was no longer practical and the Nuclear Shift Supervisor determined the EDG was not operable."

Seven h and 52 minutes after the EDG was shutdown, it was declared inoperable after discussions between the engineer responsible for the EDG system, the On-Duty STA, and management personnel.

A point estimate calculation should incorporate the degraded condition of the 3B EDG. The point estimate in the DRAFT report was overly conservative in that it assumed that the "B" EDG was inoperable. The point estimate in the final report was developed assuming that the "B" EDG would operate for the first 2.5 hour of the event and then subsequently fail. This decreased the point estimate for the event to a value close to the original lower bound.

**ASP Analysis of LER 327/92-027**

Reference 1: Letter from Robert A. Fenech of the Tennessee Valley Authority to the U.S. Nuclear Regulatory Commission, dated June 25, 1993.

*Comment 1:* The comment indicates there is a discrepancy between the summary description for the precursor and the LER.

*Response 1:* The Summary description has been reworded to clarify the sequence of events.