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PY-CEI/NRR-1329 L

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket No. 50-440
Supplemental Response on
Station Blackout

Gentlemen:

By letter PY-CEI/NRR-0995 L, dated 4/17/89 we provided a 4 hour blackout coping evaluation and proposed plant/procedure modifications for NRC review. This evaluation was based on NUMARC 87-00 and Regulatory Guide 1.155, with implementation of proposed changes to be 1 year following NRC notification that our evaluation was adequate. We subsequently reconfirmed that our evaluation was performed in accordance with NUMARC 87-00, and that diesel generator target reliability of 0.95 would be maintained, in letter PY-CEI/NRR-1159L, dated 3/30/90.

In a telephone conference on 2/8/91, several additional NRC questions concerning our blackout evaluation were addressed. These questions and the responses are included in the attachment to this letter. These answers should provide the necessary information to allow NRC resolution of this issue for the Perry Nuclear Power Plant.

If you have any questions, please feel free to call.

Sincerely,

M. D. Lyster

Michael D. Lyster

MDL:WJE:njc

Attachment

cc: NRC Project Manager
NRC Resident Inspector Office
NRC Region III

Operating Companies
Cleveland Electric Illuminating
Toledo Edison

1) Explain the classification of PNPP as severe weather (SW) group 2 versus SW group 3 since, according to the PNPP USAR, there is only one right-of-way for the first 1.1 miles from the plant.

Severe Weather Group was calculated per Table 6 of Regulatory Guide 1.155, using the multiplier on annual tornado expectation (b) = 12.5. This (b) factor is justified by the answer to question number 22 in "Responses to Questions Raised at the Station Blackout Seminars," which was approved as Enclosure 2f in NRC letter dated 10/7/88, "Approval of NUMARC Documents on Station Blackout," A.C. Thadani to W.H. Rasin (NUMARC). As stated there, a plant is justified using a (b) factor of 12.5 if transmission lines are separated at least 1/4 mile at a point less than 1 mile from the plant. Referring to Perry USAR Figure 8.2-1, line S-29-AT-ERW is in the common corridor for a radial distance of 4600 ft. from the switchyard (distance verified by survey on 2/15/91), before doubling back in the direction of the plant and heading east to obtain the required separation within 1 mile of the switchyard. USAR text (p. 8.2-7) will be revised accordingly.

2a) Does the condensate storage tank technical specification level of 150,000 gallons apply under normal operating conditions?

The condensate storage tank (CST) is a 500,000 gallon tank vented to atmosphere. Normal level of the condensate storage tank is automatically maintained between 250,000 and 300,000 gallons. Redundant level alarms warn the operator if CST level drops below 155,000 gallons available to a common suction for High Pressure Core Spray (HPCS) and Reactor Core Isolation Cooling (RCIC). The HPCS/RCIC common suction line taps into the tank approximately one foot (~ 15,000 gallons) from bottom. Other supply lines that penetrate the CST and drop below the 11 foot level have siphon breaker holes to prevent siphoning the HPCS/RCIC reserve volume. CST low level switches that automatically transfer HPCS/RCIC suction from the CST to Suppression Pool are covered by Technical Specification 3.3.3-1, ECCS Actuation Instrumentation. At least 150,000 gallons therefore remain available for HPCS supply.

2b) Please provide information on several key points of the sequence of events during SBO, including the conditions of the reactor coolant system (RCS) at the end of the SBO event.

Initial conditions for the 4 hour coping analysis, and important points of the sequence of events are listed below, including RCS conditions at the end of the SBO event:

Time	Plant Conditions
0 - sec	Initial Conditions: USAR Table 15.0-1 Loss of all AC transmission lines, plant undervoltage relays initiate diesel starts for Div. 1, 2, 3
0 + sec	USAR 15.2.6.2.2; HPCS diesel start
10 sec	Div. 1 and 2 diesels fail to reach design conditions
13 sec	HPCS diesel at design conditions; HPCS AC power available

Time	Plant Conditions
36 sec	HPCS initiates on Level 2
90 min	Manual depressurization initiated per EPG guidance; suppression pool at 143°F.
140 min	CST volume depleted; transfer (automatic or manual) HPCS pump suction to suppression pool
173 min	Suppression pool 180°F; manually initiate upper pool dump by opening suppression pool make-up system valves
182 min	Upper pool dump complete; suppression pool 163°F
240 min	Suppression pool 180°F; reactor outlet 160 psia saturated steam
240 + min	Division 1 or 2 AC power restored; manually establish normal decay heat removal and commence suppression pool cooldown

2c) What are the plant modifications necessary to make the Suppression Pool Make-up System (SPMS) available?

As noted in our original response, a temporary power supply to the SPMS valves from the Division 3 AC source will be utilized. This consists of a temporary cable used to interconnect spare buckets between HPCS motor control center EF1E-1 and motor control center EF1C07, which will allow the necessary valve manipulations to be made from the control room. Battery-powered lighting will also be provided. The use of the temporary cable will be proceduralized and the cable will be stored in a designated location.

3) Battery calculations: What actions will be taken to ensure that the Division 1 or 2 batteries (guidance requires that at least one division of instrumentation and control be available) will last for four hours, since the UFSAR states that the batteries are designed for two hours?

As described and found acceptable in SER (NUREG-0887) Section 8.3.2.1 and in SSER 10 Section 16.2.15, maintenance tie busses connect the same Divisions of Unit 1 and 2, e.g., Unit 1, Division 1 to Unit 2, Division 1. This cross-tie effectively doubles the capacity of our DC system, providing the 4 hour capability described. These cross-ties are routinely used in normal plant operations for maintenance. As noted in the SER, battery capacity includes a design margin of 1.15 and an aging factor of 1.25. No Unit 1 load shedding was assumed in determining the capability to supply DC power to associated safe shutdown loads for 4 hours.

Our station blackout (SBO) procedures will specify that plant DC loads will remain on the Division/Unit batteries in use at the time of SBO initiation. Unit 2 batteries will be tied to their corresponding Unit 1 Division by SBO procedure early in the event, before loss of capability to supply necessary loads.

4) Loss of HVAC. Explain

a) the way in which areas of concern were chosen.
b) the initial temperature assumptions and final temperatures reached.

Areas of concern were chosen using NUMARC 87-00 for guidance, with areas necessary to support HPCS operation, and to provide control room indication/control functions, receiving primary attention. As noted in NUMARC 87-00, large dry containments are well bounded by LOCA (SAR Chapter 15) temperatures used to determine equipment qualification envelopes. The Perry Mark III containment, although not as large as comparably sized PWR's, has over one million cubic feet of free volume and significant temperature increases are not expected during an SBO. We have also reviewed drywell temperature response, with 66 gpm leakage assumed due to both recirculation pump seals and Tech Spec maximum leakage, which confirmed that other USAR analyzed accidents conservatively bound the SBO drywell conditions.

The steam tunnel does not contain equipment required for 4 hour coping.

Ventilation for HPCS-associated equipment is provided by a system powered from the HPCS diesel, with the exception of some containment instrumentation (addressed above) and the switchgear/battery room. This room temperature is routinely checked on plant rounds, and remains at or below 75°F. Heatup under SBO conditions would be less than 13°F. which is of no equipment qualification (EQ) concern, since the lowest temperature effect on equipment in this room is MCC thermal overload switch potential actuation at 104°F. In addition, this room would be opened for the MCC interconnection described under #2c, coincidentally providing further cooling from a much larger switchgear room with no SBO heat load (excepting MOV isolation if needed, one valve at a time).

The Control Room, also with daily temperature records indicating initial temperature below 75°F, was calculated using NUMARC 87-00 methodology to increase 23°F under SBO conditions to 98°F. Starting at the Tech Spec 4.7.2 limit of 90°F results in a final temperature of 113°F. Instrument cabinets (each of which contains associated DC inverters) will be opened under procedural control if temperatures exceed 104°F to provide assurance that no EQ concern exists.

The redundant reactivity control system inverters located in the cable spreading room will be turned off per SBO procedures in order to essentially eliminate heat loads in this area.

6) What are the plant modifications necessary to provide containment isolation capability during an SBO?

The plant modification described in #2c will allow closure of required inboard isolation MOV's from the control room with position indication. Procedures will list the isolation valves to be closed, one at a time to avoid overloading the temporary cable or the AC power source. This procedure will address normally closed MOV's to ensure that they are closed. Credit will be taken for normal function of inboard isolation check valves.