Entergy

Entergy Nuclear Northeast
Entergy Nuclear Operations, Inc.
Indian Point 3 NPP
P.O. Box 308
Buchanan, NY 10511
Tel 914 736 8001 Fax 736 8012

Robert J. Barrett
Vice President, Operations-IP3

December 29, 2000
IPN-00-093

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, D.C. 20555-0001

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Proposed On-Line Battery Replacement Allowed Outage Time Technical Specifications Amendment
Reply to NRC Request for Additional Information

REFERENCES:

1. NRC letter, "Indian Point Nuclear Generating Unit No. 3 – Request for Additional Information Regarding Proposed On-Line Battery Replacement (TAC No. MB0180)", G. Wunder to J. Knubel dated November 28, 2000.

2. NYPA letter, "Proposed One-Time Change to Technical Specifications Regarding the Replacement of Station 125VDC Batteries 31 and 32," J. Knubel to U.S. NRC Document Control Desk dated September 7, 2000.

Dear Sir:

This letter is to transmit Entergy's responses to the NRC Request for Additional Information (Reference 1) related to analyses associated with temporary conditions that will support the on-line Station Battery replacement. The initial request for this on-line replacement was discussed in a Proposed Battery Allowed Outage Time Technical Specification Amendment (Reference 2). These responses follow up the telephone conference discussion of November 1, 2000.
The Attachment and associated enclosures contain the responses to these questions regarding the vulnerability of the replacement of station batteries 31 and 32 to fire and seismic events.
Entergy is making no new commitments in this letter. If you have any questions, please contact Mr. Ken Peters at 914-736-8029.

Very truly yours,

JPR for R. Barrett

Robert J. Barrett
Vice President, Operations
Indian Point 3 Nuclear Power Plant

cc: next page

STATE OF NEW YORK
COUNTY OF WESTCHESTER
Subscribed and sworn to before me
this 29 day of DECEMBER 2000.
– JOSEPH P. DERBY –

A001

Christina Leitmann
Notary Public, State of New York
Registration #01LE5070946
Qualified In Putnam County
My Commission Expires Jan. 6, 2001

Attachment: Reply to NRC RAIs Regarding Proposed On-Line Battery Replacement Technical Specification Amendment
Enclosures: 1, 2A and 2B

cc: Regional Administrator
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, Pa. 19406

Resident Inspector Office
Indian Point Unit 3
U.S. Nuclear Regulatory Commission
P.O. Box 337
Buchanan, NY 10511

Mr. F. William Valentino, President
New York State Energy, Research
and Development Authority
Corporate Plaza West
286 Washington Avenue Extension
Albany, NY 12203-6399

Mr. George Wunder, Project Manager
Project Directorate I
Division of Reactor Projects I/II
U.S. Nuclear Regulatory Commission
Mail Stop 8 C4
Washington, DC 20555

REPLY TO NRC RAIs REGARDING PROPOSED ON-LINE BATTERY REPLACEMENT TECHNICAL SPECIFICATION AMENDMENT

Q1. Are there any potential fire-accident scenarios that could have a significant impact on the risk associated with the proposed change? For example, a fire in the Turbine Building may damage the temporary battery and cause a loss of offsite power. For another example, an area in which the temporary cables run may contain cables for offsite power sources; therefore, a fire in the area may cause a loss of offsite power and loss of temporary batteries at the same time. For potentially significant fire scenarios, the staff expects that the licensee commit to appropriate compensatory measures to reduce the risk.

Answer: The proposed arrangement for the temporary battery, which will be physically located on 53-foot elevation Turbine Building (TB), is for its connection to Control Building (CB) DC power panel 31 or 32 utilizing circuit #19, which is normally the power panel tie breaker. Two 500 MCM conductors per phase, about 175 feet in length, will be utilized to make the connection between power panel 31 or 32 and a local disconnect switch located at the temporary battery on the 53-foot elevation of the Turbine Building (TB). The two 500 MCM cables will be sized such that the temporary battery provides adequate voltage at the load terminals for the necessary 125 VDC components to meet the two-hour design basis duty cycle; these cables will also be adequately protected for potential short circuit or overload conditions. The temporary cabling from this temporary battery is to be routed from the 53-foot elevation TB down to the south loading well, then to the 36-foot 9-inch CB elevation. This cabling will be strung below the ceiling, under the 53-foot elevation floor beams, and will be supported using unistrut hangers. The cables will enter the CB utilizing existing Fire Barrier Penetration "0613 (0624)." The cables will be routed such that appropriate cable separation is maintained. (Note that specific details of the temporary battery arrangement could change as allowed under the IP3 temporary modification process.)

A review of this proposed temporary rack and cable routing scheme was performed with respect to the Individual Plant Examination of External Events (IPEEE) – Fire PRA, IP3-RPT-UNSPEC-02182 (September 1997). This review found that the only increased vulnerability to fire would come from the temporary battery rack and that portion of the cabling from the battery rack to the entrance of the CB.

Fire Zone 49A (TB 53'-foot elevation, south end) includes negligible amounts of combustibles. Protection in this zone is provided by a fire hose station and portable fire extinguishers used during manual fire suppression activities. Fire Zone 43A, applicable where the cabling enters the CB (TB 36-foot 9-inch elevation, south end), is provided with a wet pipe sprinkler system in addition to manual fire suppression capability.

A conservative analysis was performed assuming a fire in zones 43A and 49A that results in a subsequent loss of 125 VDC power panel 31 or 32, in addition to the loss of the temporary battery rack. This assumption accounts for any scenario-specific and fuse/circuit breaker coordination concerns. For a fire in zone 49A, the plant response would be a turbine trip; for a fire in zone 43A, the potential exists for a resulting loss of offsite power (LOOP). In lieu of a more detailed analysis, it was further conservatively assumed that a failure of manual suppression is 0.1. A severity factor of 0.1 was applied, which is consistent with the methodology used in the Fire-PRA. Enclosure 1 indicates the conditional core damage probability (CCDP), which is the vulnerability to core damage for the respective 10-day station battery replacement allowed outage time (AOT) period for each battery. For this evaluation it was assumed that no maintenance is performed on other 125VDC components other than the battery replacement during each 10-day AOT period. For replacement of station battery 32, common-cause failure of motor driven auxiliary feedwater (AFW) pumps was eliminated since AFW pump 33 would not be available given the predicated fire damage. A review of the produced cutsets show that for a fire in zone 43A, the vulnerabilities are similar to that of the seismic case evaluated and indicated within the results of the Reference 2 Safety Evaluation. For a fire in zone 49A, the vulnerability is to a loss of AFW which could result in core damage due to the inability to open both pressurizer Pilot Operated Relief Valves (PORVs) for bleed-and-feed. In both cases the additional CCDP falls well below the 1 E-6 risk significance threshold of the EPRI "PSA Applications Guide," EPRI-TR-105396, August 1995.

Thus, there are no scenarios with a significant impact on the risk associated with this Technical Specification one-time change. No additional compensatory measures are needed. Existing or revised plant procedures will restrict combustibles in these Fire Zone areas during the battery replacement allowed outage time period.

Q2: Explain how the Appendix "R" Diesel Generator could be credited for the scenarios developed. Would the proposed work compromise the Appendix "R" safe shutdown capability without any compensatory measures?

Answer: Use of the Appendix "R" Diesel Generator (DG) was not credited for these scenarios identified. For some scenarios, assuming feeder circuits to the 6.9KV switchgear survive the fire, the Appendix "R" DG could be aligned to provide power to the appropriate 480VAC switchgear, via the station service transformers, by use of existing emergency and system operating procedures. The greatest benefit of Appendix "R" DG in this scenario would be as a result of a fire in Fire Zone 43A, which has the potential to create a station blackout upon a random failure of an Emergency Diesel Generator (EDG) and failure of one remaining essential service water pump to provide cooling to a remaining EDG. However, given the low CCDPs of this scenario (5.92 E-8 for station battery 31 and 6.04 E-8 for station battery 32) as well as the timing involved, the Appendix "R" DG was not credited in our risk analysis. The Appendix "R" DG (as indicated in Reference 2 safety evaluation) will be required, however, as a conservative measure to be available prior to entry of the allowed outage time period for this battery replacement maintenance.

A deterministic review of the IP3 Appendix "R" Safe Shutdown Compliance Strategy, during both 31 and 32 station battery replacement AOT periods, was also performed. In this review the temporary battery on 53-foot elevation TB was considered as failed based upon a fire in Area TBL-5 of the strategy. In both cases, the ability to achieve and maintain safe shutdown in the event of a fire is maintained. Some additional operator actions are required to compensate for the loss of the temporary battery. These changes will be implemented through revisions to existing IP3 Fire Protection Off-Normal Operating Procedures (FP-ONOPs) as required.

Q3: The submittal stated that Attachment 1 of IP3 EOP ECA 0.0. "Loss of All AC Power," Revision 13, addresses the single essential service water pump operation. Explain the exact entry condition and the applicable plant configuration at the time of the entry. The credit given to the utilization of the procedure, 0.1, needs to be better justified by explaining the applicability of the procedure to the dominant sequences associated with the proposed change. Provide a list of the top five dominant cutsets given a seismic initiating event during the proposed extended allowed outage time.

Answer: The Safety Evaluation of Reference 2 recommended the training of operating crews be verified for Emergency Operating Procedure ECA-0.0, "Loss of All AC Power," and associated procedures involving operation of a single EDG on a single service water pump. For purposes of the PRA analyses utilized, entry into ECA-0.0 is deemed to occur upon a loss of AC power from at least two of the EDGs after a loss of offsite power. The Reference 2 Safety Evaluation further indicated that operator actions would be performed while in single essential service water pump operation to ensure the required EDG jacket water cooling functions are maintained, as per ECA-0.0, Attachment 1. The EDG jacket water cooling system serves to remove unused heat of combustion imparted to the diesel cylinder walls, thus keeping the diesel engine metal within design temperature limits. A conservative screening factor of 0.1 was then applied to account for a failure of the operators to carry out the necessary service water valve alignments required. In reality, however, operations personnel are typically dispatched to monitor EDGs locally upon start. Attachment 1 of ECA-0.0, addressing "Essential Service Water Alignment," is entered promptly upon operators determining that there are not at least two essential service water or backup service water pumps running.

The predominant PRA seismic cutsets are presented in Enclosures 2A and 2B for each battery replacement, 31 and 32, respectively. These top-five dominant cutsets involve EDG hardware failures that result in failure of a second of the three essential service water pumps. These failures along with EDG jacket water overheating would be expected to be readily detected. Considering these symptoms along with the indicated heightened awareness of operations personnel, the probability of non-recovery of the 0.1 factor used is considered conservative.

Case	Zone	Plant Response	Ignition Frequency per year	Core Damage Probability	Manual Suppression Failure Probability	Severity Factor	Conditional Core Damage Frequency per year	Duration in Days	Conditional Core Damage Probability
	43A	Loss of Offsite Power	2.05E-03	1.03E-01	1.00E-01	1.00E-01	2.11E-06	10	5.78E-08
Battery 31	49A	Turbine Trip	1.02E-02	4.73E-04	1.00E-01	1.00E-01	4.82E-08	10	1.32E-09
Total Fire Core Damage Vulnerability for Battery 31									**5.92E-08**
	43A	Loss of Offsite Power	2.05E-03	9.26E-02	1.00E-01	1.00E-01	1.90E-06	10	5.20E-08
Battery 32	49A	Turbine Trip	1.02E-02	3.00E-03	1.00E-01	1.00E-01	3.06E-07	10	8.38E-09
Total Fire Core Damage Vulnerability for Battery 32									**6.04E-08**

Cutset Number	Events	Description	Probability/ Frequency	Cutset Frequency
1	NR-ESW	FAIL TO ALIGN FOR SINGLE ESSENTIAL SW PUMP OPERATION	1.00E-01	3.60E-06
	EDG-GEN-HW-EDG31	DG31 GENERATOR FAILURE	2.57E-02	
	ODEP-TB-SUCC	SUCCESSFUL DEPRESSURIZATION DURING SBO	1.00E+00	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
2	NR-ESW	FAIL TO ALIGN FOR SINGLE ESSENTIAL SW PUMP OPERATION	1.00E-01	3.60E-06
	EDG-GEN-HW-EDG32	DG32 GENERATOR FAILURE	2.57E-02	
	ODEP-TB-SUCC	SUCCESSFUL DEPRESSURIZATION DURING SBO	1.00E+00	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
3	NR-ESW	FAIL TO ALIGN FOR SINGLE ESSENTIAL SW PUMP OPERATION	1.00E-01	6.52E-07
	EDG-ENG-FR-DG31R	DG31 FAILS TO RUN	4.66E-03	
	ODEP-TB-SUCC	SUCCESSFUL DEPRESSURIZATION DURING SBO	1.00E+00	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
4	NR-ESW	FAIL TO ALIGN FOR SINGLE ESSENTIAL SW PUMP OPERATION	1.00E-01	6.52E-07
	EDG-ENG-FR-DG32R	DG32 FAILS TO RUN	4.66E-03	
	ODEP-TB-SUCC	SUCCESSFUL DEPRESSURIZATION DURING SBO	1.00E+00	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
5	AC4-RCI-FE-U1-3A	UV REL 27-1/3A DOES NOT ENERGIZE	3.12E-03	4.37E-07
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
	NR-ESW	FAIL TO ALIGN FOR SINGLE ESSENTIAL SW PUMP OPERATION	1.00E-01	

Cutset Number	Events	Description	Probability/ Frequency	Cutset Frequency
1	EDG-GEN-HW-EDG31	DG31 GENERATOR FAILURE	2.57E-02	3.60E-05
	ODEP-TB-SUCC	SUCCESSFUL DEPRESSURIZATION DURING SBO	1.00E+00	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
2	EDG-GEN-HW-EDG33	DG33 GENERATOR FAILURE	2.57E-02	3.60E-05
	ODEP-TB-SUCC	SUCCESSFUL DEPRESSURIZATION DURING SBO	1.00E+00	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
3	AC4-RCK-NO-BCH39	FAULTS AT MCC39 TO BATT CHGR 31	2.50E-03	3.50E-07
	NR-CHGR35	FAILURE TO PROPERLY ALIGN BACKUP CHARGER	1.00E-01	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
4	AFW-TDP-FR-TDP32	AFW TDP 32 FAILS TO CONTINUE TO RUN	9.43E-03	3.39E-07
	EDG-GEN-HW-EDG31	DG31 GENERATOR FAILURE	2.57E-02	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	
5	AFW-XHE-RE-AFW32	FAIL TO RESTORE PM 32 PATH COMPS AFT MAI	5.02E-03	1.80E-07
	EDG-GEN-HW-EDG31	DG31 GENERATOR FAILURE	2.57E-02	
	IE-SEISMIC-05	SEISMIC EVENT 0.05g FOR EVALUATION	1.40E-03	