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June 11, 1980
IPN-80-57

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Operating Reactors

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Confirmatory Order (Interim Actions)
120 Day Responses

Dear Sir:

Attachment 1 to this letter provides the Authority's responses to the 120 day action items of the NRC February 11, 1980 Confirmatory Order.

Very truly yours,

Paul J. Early
Vice President and
Assistant Chief Engineer-Projects

cc: Mr. T. Rebelowski
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ATTACHMENT 1

RESPONSE TO CONFIRMATORY ORDER

120 DAY ITEMS

POWER AUTHORITY OF THE STATE OF NEW YORK
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
JUNE 11, 1980

E.1 The licensee shall examine key plant system vulnerability areas and possible operator dependent areas with the intent of maximizing the reliability in the subject areas. Specifically, the licensee shall:

a. Verify that the sump for ESF recirculation is free of debris and determine if flow test verification was initially performed. If not performed, explore means to verify. Review existing procedures and training on recirculation alignment and RWST refill.

RESPONSE:

After the last refueling operation, the floor and gratings over the trenches and sumps in the containment were cleaned and inspected and were verified to be free of debris on January 31, 1980. On February 9, 1980, the containment was locked closed for power operations and has since remained locked closed except for periodic routine inspections following plant trips, which did not effect the cleanliness of the sump. The only kind of debris that could occur during operation would be in the immediate vicinity of a postulated high energy pipe break.

There are two sumps inside the containment, the recirculation sump and the back-up containment sump. The recirculation sump is located on the west side of the reactor while the containment sump is located on the south side some 90^{o} away from the recirculation sump. The recirculation sump is located in a missile shielding barrier inside the crane wall, and is well protected against flying debris. Most of the grating area that feeds the sump is inside the missile barrier. This arrangement reduces the chances of debris, if any occurs, from clogging the gratings. The grating over the trenches outside the missile barrier alone provides sufficient area for water flow. The recirculation sump construction also incorporates baffles and a screen to further exclude any particles greater than ¼ inch in diameter from getting into the recirculation pump suction. The other sump is the containment sump which is located inside the crane wall. This sump serves as a back up for the recirculation system by utilizing the Residual Heat Removal (RHR) pumps. The containment sump has a grating area that will produce a water flow velocity of less than 1 ft./second when both RHR pumps are operating. In addition, the trenches outside the crane wall will collect water and feed into the sump via a six inch pipe.

Based on the above analysis, the two sumps as designed and constructed should remain essentially free of debris.

Verification of the ESF recirculation sumps flow by testing has not been done for Indian Point Unit 3. Consequently, an analysis has been performed to verify adequate flow to the ESF recirculation pumps during all modes of post DBA operation. The analysis is based on conservative assumptions of saturated liquid in the sump and atmospheric pressure in the reactor vessel. It is based on certified pump performance curves and as-built system piping configurations.

The analysis demonstrates that for one or two pump operation for either of the two ESF sumps, there will be adequate NPSH for the pumps to supply at least the minimum required cold leg injection flow and containment spray header flow.

Although it is highly unlikely that a significant amount of debris will collect on the sump gratings as discussed above, the analysis verifies that with up to 50% blockage of the sump gratings, the recirculation system will provide the required flow.

Procedures, including the recirculation alignment, were revised as a result of the T.M.I. Owners Group recommendations. These revisions were completed prior to the unit return to service following its last refueling outage. At that time, all licensed operators were trained in their use through both classroom and simulator instruction in accordance with Section A.7.d of this Confirmatory Order.

With respect to RWST refill, the operating procedure for filling the RWST, SOP-SI-2, allows normal make-up to the tank via a tie connection to the Chemical and Volume Control System downstream of the boric acid blender. During LOCA conditions, the amount of water discharged to the containment building via the containment spray and/or safety injection systems is sufficient to insure initial adequate core cooling. After the initial injection phase, internal recirculation may be accomplished utilizing the recirculation sump and two recirculation pumps. If needed external recirculation could be accomplished using the containment sump and the two RHR pumps. The level of borated water in the containment building under these conditions will be below the point where potential problems could occur with certain vital electrical equipment. Therefore, our procedures do not contain provisions for refilling the RWST during the LOCA condition, although procedures exist and hardware is installed to perform this function if required.

E.1.b. Review administrative check and verification procedures for assuring that the two single failure points (manual) valves in AFWS supply line are in the correct position.

RESPONSE:

The two condensate valves in the AFWS supply line are included in Indian Point Unit 3 plant procedures COL-LV-1, Locked Valve Check-off List and COL-FW-2, Auxiliary Feedwater Check-off List which are performed on a monthly basis to verify these valve positions. In addition, the surveillance test 3PT-M20 for testing the Auxiliary Feedwater pumps verifies these valve positions on a monthly basis. Also, the surveillance test, 3PT-W5, for checking manual valves on safety related equipment verifies these valves are open on a weekly basis. These checks are performed whenever the reactor is above the cold shutdown condition.

E.1.c. Impose an administrative order requiring expeditious shutdown whenever an independent train of the auxiliary feedwater system and any one of the following are inoperable: All backup sources of offsite power, the diesel generator supplying power to the independent train or either of the other trains of the auxiliary feedwater system.

RESPONSE:

The Indian Point Unit 3 operating procedure SOP-RPC-8, has been revised to require that the unit be placed in the hot shutdown condition within 12 hours using normal operating procedures whenever the following conditions exist:

An independent train of auxiliary feedwater is inoperable, and:

1. All back-up sources of offsite power are unavailable, or

2. Diesel generators required for the operation of the remaining trains of auxiliary feedwater are inoperable, or

3. Any of the remaining trains of auxiliary feedwater is inoperable.

E.1.d. Develop station blackout procedures addressing:

i. grid dispatcher actions
ii. reactor operator actions
iii. diesel generator repairs

RESPONSE:

Indian Point Unit 3 station blackout emergency procedure (PEP-EL-1) essentially will direct the operator to maintain the reactor in a safe condition. Continuous contact between the control room and both the district operator and the system operator is available, so that all involved personnel are fully informed of actions taken during a system blackout. Diesel generator repairs are determined by Technical Specification requirements under all possible conditions and are performed in accordance with maintenance PM procedures. Actions required by the grid dispatcher are covered by Con Edison Engineering Order as follows:

E.O. 4400 - System Restoration Plan
E.O. 4461 - Buchanan Startup
E.O. 4479 - Operating Connections for Buchanan

These orders have been in effect prior to the issuance of the February 11, 1980 Confirmatory Order, and are being supplemented by a procedure which will allow gas turbines to be used as alternate power supplies to the stations.

E.1.e Assure that DC-powered lighting is available at the steam-turbine driven auxiliary feedwater pump.

RESPONSE:

The Authority has installed DC-powered lighting at the steam-turbine driven auxiliary feedwater pump.

E.1.f. Verify that the gas turbine station has black-start capability.

RESPONSE:

Indian Point Unit 3 is not equipped with gas turbines. The response to this item will be provided by Consolidated Edison (Unit 2).

E.1.g. Review causes for, and procedures and operator training required to diminish, the overall number of reactor and main feedwater trips.

RESPONSE:

The Authority in conjunction with Westinghouse Electric Corporation has reviewed the trips that have occurred at Indian Point 3 from March 1976 through December of 1979. Utilizing the information provided by our review of Significant Occurrence Reports and Licensee Event Reports, the following list was developed:

Year	Total Plant Trips	Feedwater Problem Induced	Potential Operator Induced
1976	34	15	7
1977	8	3	1
1978	7	4	1
1979	8	2	0

The significant number of trips which occurred in 1976 can be attributable to low power testing of the Indian Point 3 Plant and the initial start up period. Prolonged operation at very low power levels required feedwater control to be in the manual mode on a continuous basis. Even with astute operator action, trips occurred which were a result of testing balance-of-plant components. An example of such a test was a 50% load reduction which required that no operator action be taken to preclude steam generator low level trips as part of the test acceptance criteria. The total number of trips reflects power trips which were conducted per the start up testing program.

Upon completion of the testing period, it is evident from the table presented above that plant trips decreased significantly in 1977, 1978 and 1979.

As indicated on the plant trip table, the feedwater induced trips contributed less than 50% of all trips. Investigation of these trips indicated problems associated with operation of the main feedwater pumps control oil system were the main cause of feedwater problems. Mechanical modifications to the control oil systems have been undertaken to remedy this condition. Trips other than those categorized as potential operator induced include various mechanical valve and pump failures while operating at high power levels.

Operator training has included training on the Indian Point simulator to simulate various feedwater problems experienced on the actual plant to allow operators sufficient opportunity to assess plant conditions and take necessary action to preclude trips for various failure modes. The Authority feels that use of the simulator as a training aid has had a positive effect on decreasing the number of feedwater induced trips caused by the operator. The operating procedures relative to the feedwater sytem at Indian Point 3 have been written to bound plant transients which have been experienced and reflect proper operator actions when feedwater problems occur.

The balance of the plant trips which have occurred are due to mechanical and electrical failures of various plant components.

A comparative analysis of the number of plant trips experienced at Indian Point 3 to other Westinghouse operating plants, indicates that this facility has had fewer than the average number. This was

verified by an independent study of Westinghouse plants.

The Authority is continuing to stress simulator training and review potential plant modifications to reduce the number of trips experienced at the Indian Point 3 Plant Facility.

E.1.h. Develop or review procedures to restore main feedwater promptly after a trip and to mitigate the consequences of an ATWS event (e.g. emergency boration and CVCS control).

RESPONSE:

Indian Point Unit 3 emergency procedure for loss of feedwater (PEF-FW-1) has been revised to improve the procedure for using the condensate pumps to supply feedwater through the inoperable main feedwater pumps.

The emergency procedure for emergency boration (PEP-CVCS-3) has been revised to address the ATWS concerns using boration to mitigate the event. The emergency procedure for reactor trip, PEP-RPC-1, has been reviewed for the ATWS concerns which have been previously included.

E.1.i. Review administrative controls on the manual valve(s) whose misalignment could fail all ECCS.

RESPONSE:

The Authority has determined that there is only one manual valve at the Refueling Water Storage Tank whose misalignment could cause a partial failure of the ECCS during a safeguards actuation. This valve is checked on a weekly basis using surveillance test 3PT-W5 and checked on a monthly basis using check-off list COL-LV-1 when the reactor is above the cold shutdown condition.

E.2 A review of control room emergency procedures shall be conducted for the purpose of improving these procedures from a human factors engineering standpoint. Improvements which can be attained by modifying procedures shall be implemented within the 120 days. Control room displays shall also be reviewed for the purpose of identifying improvements which will increase the operators' ability to assess plant conditions. A report will be submitted to describe the improvements recommended and the schedule for their implementation.

RESPONSE:

Consolidated Edison and the Authority jointly contracted the Essex Corporation to make a study of the plant emergency procedures from a human factors engineering standpoint. The results of this review indicated that the existing emergency procedures, which were orginally written and upgraded in conformance with ANSI Standard 18.7 and Regulatory Guide 1.33, were technically correct and adequate for present use. However, Essex undertook the task to rewrite these procedures utilizing a different format.

This new format is being studied to determine its applicability and possible implementation at the completion of the next refueling outage. In addition Essex Corporation recommended a filing system change for storage and use of the emergency procedures in the Control Room. The use of an open file, conspicuously labelled, has been established and will provide the operator with the capability to refer quickly to the desired emergency procedure.

Concurrent with the procedures review, Essex Corporation was jointly contracted to review the control room displays for the purpose of identifying improvements which will enhance the operator's ability to assess plant conditions. The control room displays were reviewed and eight items were identified as having need for improvement. The resolution of these eight items is as follows:

1) Lack of accessibility of procedures - as discussed above, a solution has already been implemented.

2) Lack of demarcation of functionally related components - sections of the control panels will be painted various colors; controls, indicators and instruments will be released; and panels will be highlighted with demarcation lines. This demarcation effort is scheduled to be complete by January 1, 1981.

3) Control use convention inconsistencies - demarcation, conspicuous labelling and installation of a different type handle on those controllers and switches which are inconsistent with standard convention will be provided. These modifications are scheduled to be complete by January 1, 1981.

4) Lack of control feedback - review of these cases reveals that existing instrumentation is sufficient to provide the operator with the necessary indications for determining control response. Therefore, no further action is required.

5) Control display association obscurities - clarification will be provided by the demarcation effort, described above, scheduled to be complete by January 1, 1981.

6) Lack of lamp test capability - currently, all annunciation alarms have lamp test capability. The Authority will initiate an engineering feasibility study to determine which indications require lamp test capability. This study is scheduled to be complete by December 1981 and, at that time, we can further schedule our efforts toward providing the recommended capability.

7&8) Lack of annunciator (audible) defeats and poor annunciator location - a study is underway to determine the feasibility of relocating annunciators to locations more consistent with associated control functions and providing a new system of audible defeat capability. The feasibility study and a schedule for installation is scheduled to be complete by January 1, 1981.