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NewYorkPower Authority

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IPN-86-62

John C. Brons
Senior Vice President
Nuclear Generation

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

Attention: Mr. Steven A. Varga, Director
PWR Project Directorate No. 3
Division of PWR Licensing-A

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Detailed Control Room Design Review (DCRDR)

References: 1) Letter from J. D. Neighbors to J. C. Brons dated October 9, 1986, regarding NRC audit of Indian Point 3 DCRDR.

2) Letter from J. C. Brons to S. A. Varga dated September 30, 1986 (IPN-86-48), entitled: "Detailed Control Room Design Review."

Dear Sir:

Reference 1 details the results of the NRC audit of the Indian Point 3 DCRDR and requests the submittal of additional information. Attachment 1 to this letter provides a portion of the information requested in Reference 1. The remainder of the requested information has been previously submitted by Reference 2.

Attachment 2 to this letter documents the telephone conversations between Authority personnel and Messrs. J. Neighbors and J. Kramer of the NRC Staff regarding Reference 2.

Should you or your staff have any questions regarding this matter, please contact Mr. P. Kokolakis of my staff.

Very truly yours,

John C. Brons
Senior Vice President
Nuclear Generation

cc: See next page

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cc: Resident Inspector's Office
Indian Point Unit 3
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Mr. J. D. Neighbors, Sr. Proj. Mgr.
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Attachment 1 to IPN-86 -62
DCRDR Additional Information

New York Power Authority
Indian Point 3 Nuclear Power Plant
Docket No. 50-286

The information presented in this attachment has been arranged to correspond to the sequence in which the information was requested in Reference 1. The description of the HEDs presented in this attachment were previously provided in the DCRDR Summary Report.

A. Control Room Survey

Emergency Lighting System Survey

An emergency lighting system survey will be performed, in accordance with the guidance of NUREG-0700, during the Cycle 5/6 outage. The Authority's resolution of the survey results will be submitted within 60 days of the completion of the survey.

B. Selection of Design Improvements

Results/Dispositions of Lighting Study

Requested information has been previously submitted by Reference 2. Additional information is provided by Attachment 2 to this letter.

Results/Dispositions of Communications Study

Requested information has been previously submitted by Reference 2. Additional information is provided by Attachment 2 to this letter.

Results/Dispositions of Annunciators Study

Requested information has been previously submitted by Reference 2. Additional information is provided by Attachment 2 to this letter.

Results/Dispositions of Correlation of Control Switches with Reset Pushbuttons Study

Requested information has been previously submitted by Reference 2.

Methodology for Labels, Color Coding, Demarcation of Panels

The resolution of HED 20 involves a surface enhancement program to resolve labeling deficiencies associated with safety related controls and displays. The necessary modifications will be completed by the end of the Cycle 5/6 refueling outage. For these modifications, an effort was undertaken to develop a standardized scheme for labels, color coding and demarcation of panels. This scheme has not been completed as yet.

The effort to develop a standardized scheme is part of the engineering process to implement a modification. The Authority believes that the submittal of this type of information is not necessary. The level of detail of the information previously submitted for this HED is consistent with that information submitted regarding the above studies.

C. Implementation Schedule for Design Improvements Associated with the Studies

Requested information has been previously submitted by Reference 2.

D. Re-evaluation of HEDs 379, 428, 497, 433 & 487

These HEDs have been re-evaluated by the DCRDR Task Force. The disposition of these HEDs follow:

- HED 379 - Low head recirculation flow meters use a log scale of 0 to 1000 gpm when not necessary.

  Resolution - No further action is planned. This HED is based on NUREG - 0700 checklist No. 6.5.2.5.E, which states logarithmic scales should be avoided unless needed to display a large range of values. The EOP for transfer to cold leg recirculation requires the assurance of adequate low head recirculation flow by verifying a flow of at least 600 gpm in at least two of the four loops. This EOP also requires the total recirculation flow to be less than 3000 gpm. As there are two recirculation pumps each with a 3000 gpm design discharge flow rate, there is a large range of possible flow rate values indicated on these meters. Furthermore, the value of concern 600 gpm is readable on the existing logarithmic scale.

- HED 428 - LCV-1128 and -1129 manual control are opposite each other. LCV-1128, hotwell make-up, is clockwise to close and LCV-1129, hotwell return to condensate storage tank, is clockwise to open.

  Resolution - No further action is planned. This HED is a Category 4 HED. Hotwell make-up and return are not safety-related. The controls are clearly marked. Furthermore, as noted in the DCRDR Summary Report, no action is planned for the Category 4 HEDs.

- HED 497 - Steam generator atmospherics [dump valves] should have an open/close indication since the controller is a demand type and there is no direct indication as to their status.

  Resolution - Limit switches will be installed on the steam generator atmospheric dump valves. This modification will be completed by the completion of the Cycle 6/7 refueling outage.

- HED 433 - Instrument bus voltage and DC bus voltage indicators should be located on the front panels.

Resolution - No further action is planned. These indicators are located on the back panels. This HED resulted from the operating personnel interview. The validation and verification process did not identify the location of indicators as a concern.

- HED 487 - Need more graduations on Figure ECA 11-1.

  Resolution - This figure will be revised to provide more graduations. This revision will be completed by the completion of the cycle 5/6 refueling outage.

E. IE Information Notice 86-64

Two of the concerns identified in IE Information Notice No. 86-64, "Deficiencies in Upgrade Programs for Plant Emergency Operating Procedures," are applicable to Indian Point 3. The Authority is taking measures to resolve these concerns.

Attachment 2 to IPN-86-62
Documentation of Telephone Conversations

New York Power Authority
Indian Point 3 Nuclear Power Plant
Docket No. 50-286

During telephone conversations with the staff, the Authority elaborated on a number of the HED resolutions provided in Reference 2. As requested by the staff, the following documents these telephone conversations.

Communications Study

Resolution of HED 68 - In addition to adding the speakers/handsets to the ongoing maintenance program, the identified inoperable speakers/handsets will be repaired or replaced by October 1, 1987.

Resolution of HED 70 - It was stated in Reference 2 that the control room operators would not lower the paging system volume below audible levels. As the volume controls are located on the individual speakers which are located approximately 12 feet above the floor, it would take a pre-determined effort on the part of the operator to reduce the speaker volume.

Control Room Lighting Study

Resolution of HED 90 - As noted in Reference 2, the Authority had a consultant conduct a second illumination study in the control room. Based on the findings of the second study, it was stated that the measurements from the first study, upon which HED 90 was based, were taken with the light sensitive cell in the horizontal position which is an incorrect position. It was also stated that the actual illumination levels based on the second study are in fact acceptable. The Staff was concerned with this apparent discrepancy. The discrepancy in reported illumination is not attributable to the manner in which the surveys were conducted but rather it is attributable to the application of the obtained data.

As part of the illumination studies, both consultants took measurements with the light sensitive cell in the vertical and horizontal positions. The difference in the obtained results are negligible. As such, there is not a concern regarding the manner in which the consultants performed the illumination study. HED 90 is based on illumination measurements taken with the light sensitive cell in the horizontal position, perpendicular to the control panel. This angle of incident light corresponds to tasks such as data logging and reading procedures. NUREG - 0700 recommends an illumination level of 50-100 footcandles (FC) for writing and data recording and an illumination level of 20-50 FC for reading printed material. As the horizontal illumination levels range from 52 to 90 FC, the existing illumination level is excessive only for reading printed material. However, if a situation arises necessitating entrance into the EOPs, the SRO will normally read the EOPs at his desk, not in front of the panel, and will direct the ROs as appropriate from his desk.

Furthermore, in the control panel area, the aforementioned tasks are secondary to the principal task of reading panel indications. The Illumination Engineering Society Lighting Handbook, 1981 Reference Volume, states that the measuring instrument should be located so that when readings are taken, the surface of the light sensitive cell is in the plane of the work on which the critical visual task is performed. NUREG-0700 recommends an illumination level of 20-50 FC for panels, primary operating areas and scale indicator reading. As stated in Reference 2, the vertical illumination measurements range from 16 to 50 FC, with the majority of measurements at the lower end of the acceptable range. The illumination levels are acceptable for the primary task of reading panel indications.

NUREG - 700 qualifies the strict application of the recommended illumination levels by the statement that specific task situations may dictate other illumination levels. This statement taken together with the mutually exclusive nature of some of the recommended ranges, indicate that a task heirarchy be established for determining acceptable illumination levels. In the control panel area, the Authority considers the primary task to be reading panel indications and the secondary task to be data logging and reading written materials. By lowering the illumination levels to comply with the acceptable range for reading written materials, the illumination levels for reading panel indications may no longer satisfy the acceptable range. Therefore, the Authority will not adjust the illumination levels for a secondary task to the potential detriment of the primary task.

Resolution of HED 95 - Reference 2 stated that while most of the measure reflectances were below the recommended range of 80-100%, this does not appear to be a real problem from a visual standpoint. This subjective conclusion was independently arrived at by both consultants and the Authority's DCRDR Task Force.

Resolution of HED 96 & 413 - No action is planned on a majority of the meter faces due to the unacceptability of the non-glare type meter faces. However, the glare on a number of meter faces will be reduced by tilting the meters. The resolution to HED 318, which is included in the DCRDR Summary Report, lists those meters that will be tilted.

Resolution to HED 127 - The conclusion that the operator has no problem distinguishing which indicator lights have been illuminated was based on a review performed by the DCRDR Task Force which includes 3 members with an operator license.

Alarms in the Control Room

Resolution to HED 386, 405 & 442 - In Reference 2 it was stated that a number of critical annunciators will be relocated. This commitment was based on an Alarm Study finding that a large number of the supervisory panel annunciator window messages pertain more to the flight panels than to the supervisory panels. This finding was based on the desire to have the annunicators located above the corresponding controls. However, this finding did not take the existing functional grouping of the annunciator into account.

The annunciators corresponding to reactor protection system actuation inputs are functionally grouped on supervisory panels SBF-1 and SBF-2. The controls for the parameters associated with these inputs are located on the flight panels. For example, the annunciators for steam/feedwater flow mismatch are located on supervisory panel SBF-2. The feedwater regulators are located on flight panel FBF. Steam flow and feedwater flow are also indicated on flight panel FBF. The study recommended relocating these annuciators from the supervisory panel to the flight panel. However, this recommendation failed to take into account the importance of functional grouping of annunciators. When the relocation of an annunciator to the immediate vicinity of the corresponding controls is deemed critical to the performance of the task, the annunciator will be so relocated.

Miscellaneous Studies

Resolution of HED 213 - The HED lists 12 indicators for which a bulb failure would not be apparent to the operator. Nine of the indicators (equipment hatch pressure, personnel lock pressure, fuel transfer tube, piping penetrations, electrical penetrations, supply pressure, exhaust pressure, pressure 1st - 2nd, and pressure 2nd - 3rd) will normally illuminate to alert the operator to a concern in a specific portion of the weld channel and penetration pressurization system (WCPPS). The WCPPS is an non-safety related system and no credit is taken for it in the FSAR transient analyses.

There is a common alarm corresponding to the equipment hatch pressure, personnel lock pressure and fuel transfer tube indicator lights. There also is a common alarm coresponding to supply pressure, exhaust pressure, pressure 1st - 2nd, and pressure 2nd - 3rd indicator lights. If one of the common alarms annunciate, the operator would have to examine the corresponding indicator lights to ascertain the specific concern. If none of the indicator lights illuminate, the operator knows that at least one of, at most, four bulbs have burned out. The operator then removes a suspect bulb and replaces it with a new bulb in order to ascertain the burned out bulb.

There are individual annunicators corresponding to both the piping penetrations and electrical penetrations indicator lights. If the alarm annunicates and the corresponding indicator light does not illuminate, the operator is alerted to that indicator light being burned out.

The remaining three indicator lights correspond to the fuel storage building exhaust and the primary building (PAB) exhaust. The indicator light for fuel storage building exhaust duct flow is normally illuminated. As such, bulb failure would be apparent to the operator. The PAB exhaust charcoal dampers (face) and PAB exhaust charcoal dampers (bypass) indicator lights would be checked by the operators upon receipt of a high radiation alarm from radiation monitors R-30 or R-31 (PAB Iodine monitors). During this situation the indicator lights should be illuminated. The failure of the PAB charcoal exhaust dampers (face and bypass) indicator lights to illuminate would alert the operator to change the suspect bulb.

Resolution of HED 423 & 424 - While valve accessability may involve a human factors concern, it does not pose a human factors concern within the scope of the DCRDR.

Resolution of HED 422 - A study of the total feedwater system is being performed. Included within the scope of this study is the feedwater pump turbine control oil and speed control systems. It is anticipated that the recommendations generated by this study will be dispositioned by early 1987 and any resulting modifications to the feedwater pump turbine control oil and speed control system relating to these HEDs will be completed by the end of the Cycle 6/7 refueling outage.

Resolution of HED 72 - Subsequent to the identification of this HED, the computer printer was replaced with a quieter printer. As such it was concluded by the DCRDR Task Force that no further action is necessary due to the small size of our control room, different locations of signals and the different types of signals i.e. bells, horns, siren, etc. which enable the operators to hear and distinguish the various signals over the ambient noise.