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March 22, 1983

L. V. MAURIN
Vice President Nuclear Operations

W3B83-0002

Director of Nuclear Reactor Regulation
Attention: Mr. G. Knighton, Chief
Licensing Branch No. 3
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: Waterford SES Unit 3
Docket No. 50-382
Addendum to LP&L Report; Response to Human
Factors Engineering Control Room Design
Review/Audit, December 1982, Rev. 1

Dear Sir:

Attached is the information requested by your Ms. A. Ramey Smith during a conversation with our Dr. Sabri.

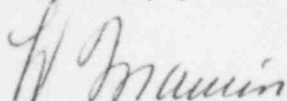
Attachment 1 details those findings and responses for which further clarification or update was requested.

Attachment 2 is a simple listing of those HED's both completed and checked by the NRC on-site inspector.

Attachment 3 is a listing of those HED's that are complete and awaiting check by the inspector.

We hope this will give you everything you require to complete the SER on the Control Room Design Review.

Very truly yours,


L. V. Maurin

LVM/DHL/sm

Attachments

cc: W. M. Stevenson, E. L. Blake, J. Wilson, A. Ramey Smith

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REVISED HEDs

ATTACHMENT 1

B-5, Finding 1, Priority 1

"Motor amperage is not displayed and is considered necessary by operators. NUREG-0700, para 6.5.1.1b requires that necessary information be presented."

Response

Motor amperage is generally displayed via the plant monitoring computer. However, at the operators request, ammeters for the four reactor coolant pump motors are being provided on the middle right vertical section of CP-2(DCN-IC-837). LP&L has evaluated ammeters for safety-related pumps and ammeters for LPSI pumps will be provided prior to Licensing.

B-5, Finding 25, Priority 3:

1. "These critical meters use multipliers (reading X100) in lieu of showing entire actual value on the scale. Other pressure meters show actual values, (e.g., 0-30 psia for Containment). (Other meters in control room show value X10.)"
2. "Wide range and setpoint meters display in 40 psia graduations. Adjacent narrow range meter displays 20 psia graduations. (Re: NUREG 0700, 6.5.1.5d). Cross-reference can be confusing. Normal operating pressure of 2250 psia is at same vertical point on the scales, aiding normal operating; but increases potential for confusion/error, reading other values."

Response

The use of multipliers on meter scales is a standard practice that generally represents only a minor nuisance to the operators. If taken alone these might not be a significant discrepancy. However, the use of various multipliers when space would permit actual values is one of several factors which can combine with others to result in poor meter scale displays. While these meters on CP-7 are felt to be acceptable, all meters are presently being reviewed, part of this review will include the consistency with procedures, and any unduly confusing scales will be changed prior to Licensing. (Refer to Section 2.15, Generic Panel findings.)

Regarding the different scale graduations between wide and narrow range pressurizer pressure, the consequences of misreading values are considered to be very slight since the PPS is fully automatic and the operator would normally control pressurizer pressure from CP-2. The dual scales provide some benefit as a way of checking the channel reading.

B-5, Finding 26, Priority 1:

"Containment wide range pressure measures from 0-40 psi. Narrow range measures from 0-30 psi. Mixed scales on same meter make easy interpolation/reading difficult".

Response

The subject containment pressure indicators are not for the monitoring of narrow and wide ranges. They are part of two independent loops; one for containment isolation (CIAS); and the other for containment spray (CSAS). As shown on the enhancement drawing (Figure 2.2-1), labels to clarify this point will be provided by Hot Functional Testing. No comparison of the subject scales will be required.

B-8, Finding 34, Priority 1:

"On CP-7 Containment Pressure meters, wide range meter is on right; on Pressurizer Pressure meters, wide range is on left."

Response

Refer to B-5, Finding 26. The meters for containment pressure had been mislabeled. The scales are separately provided for monitoring of the containment isolation actuation signal and the containment spray actuation signal. The labeling will be corrected by Hot Functional Testing.

B-1, Finding 16, Priority 2:

1. "The panel meters that are located on the upper portion of the panel are placed too high. They are located beyond the optimum visual distance for good human engineering practices."
2. "Parallax in discrimination of the major/minor scales of the meter may result from the present location of many of the meters. Lighting reflections may increase the reading problem, especially for shorter operators."

Response

1. The control boards do not accommodate the 5th percentile female. However, the control boards are designed so that all the major controls and indicators are generally accessible and readable.
2. If during startup testing and procedure validation a readability problem is discovered, then the individual component will be evaluated and modified if necessary prior to Licensing. Lighting changes will reduce reflective glare and ameliorate reading difficulties for the shorter operators. Also refer to Section 2.15.5, Findings 14 and 15.

B-5, Finding 28, Priority 1:

"The two recorders adjacent to D-5 recorder waste flow in blue ink as per its window labels. D-5 recorder charts waste flow in red ink which is not consistent with the other."

Response

The ink color markers will be corrected to red for waste and green for radiation by Hot Functional Testing.

B-6, Finding 35, Priority 1:

"This vertical meter is mislabeled. It is now labeled (Hold Up Tank D). It should be labeled (Hold Up Tanks Vent Header Pressure)."

Response

As shown on Figure 2.3-1 (upper right corner) this meter will be labeled, "Hold Up Tanks, Vent Header Pressure" by Hot Functional Testing.

B-8, Finding 7, Priority 1

"On CP-1, steam generator pressure is shown only as combined value on indicator SBCS master controller. Individual Steam Generator pressures are shown only on CP-8. Operator desires individual Steam Generator pressures on CP-1, at least to help localize a tube rupture. Isolation valve controls are on CP-1."

NRC Review Team Comment: Isolation valve controls are on CP-8.

Response

Individual steam generator pressure indicators are being added to CP-1 (DCN-IC-1014) and will be completed by Hot Functional Testing.

B-9, Finding 11, Priority 1

"Operators report the Turbine Generator Temperature Control Valves will be difficult to operate with desired or necessary precision. Possible violation of NUREG-0700, Para. 6.9.3.2.a."

NRC Review Team Comment: Operators agree that the indication on valve position is adequate (0-100%), but there may be a question concerning valve travel rate (% sec).

Response

No difficulty is anticipated with the modulating control valves. Valve position indication is provided over the full range and the temperature is also indicated. No problem with the valve travel rate is anticipated based on experience at other operating plants. The adequacy of the valve travel rate will be confirmed and documented during startup testing and corrected if needed prior to startup following the first refueling.

B-8, Finding 10, Priority 1

Dry Cooling Tower Fans - Labels

The dry cooling tower fan number sequence on CP-33 in the Control Room does not correspond with that on the CWD's. This discrepancy was reported by operators and was verified by looking at the cable wiring schemes.

Response

DCN-IC-885 has been issued to correct this problem (Refer to Figure 2.8-1), and will be completed by Hot Functional Testing.

B-3, Finding 7, Priority 1

"The SI tank (meter) displays on the left side of CP-8 (under annunciator panel M) have their corresponding annunciator on panel N - located on the right side of the panel. The SI meters on the right have their annunciator on the left."

Response

The subject alarms and associated indicators on CP-8 is being rearranged (DCN-IC-954), and will be completed by Hot Functional Testing.

B-3, Finding 9, Priority 3

"The annunciators for Reactor Cooling Pump Seal Water and Component Cooling Water appear to be inappropriately located on the CP-18 HVAC and Containment Isolation Panel."

Response

The annunciator panels on CP-18 are Class IE. Loss of Reactor Coolant Pump Seal Water and Component Cooling Water surge tank level should be responded to promptly. Therefore it is required to locate these alarms on CP-18 annunciator panels. The Reactor Coolant Pump Seal Water and Component Cooling Water surge tank level are also annunciator on CP-2 and CP-8 respectively, which are the same control panels where the control switches and indicators for Reactor Coolant Pumps and Component Cooling Water are located.

B-3, Finding 11, Priority 1

"Alarm windows are snap-on onto the frames. These slip out easily and more than one may come out inadvertently when removing one, or when door is handled to replace lamps. Error may occur when replacing windows-in wrong position."

Response

The annunciator panels are being reviewed for loose tiles. Loose tiles will be secured, and the annunciator administrative procedure will call for a review and correction of loose tiles by Hot Functional Testing.

B-3, Finding 15, Priority 3

"Cues for prompt recognition of annunciators that are out-of-service are not presently available."

Response

LP&L will handle this by periodic testing and administrative procedures.

Self-sticking "markers" can be used on the corresponding windows. This practice will be tried out and implemented during Hot Functional Testing.

B-6, Finding 36, Priority 3

"The word TURBO is used in labeling. Turbo is a prefix and should not be used as a substitute word for turbine."

Response

Per the Control Room glossary, turbine will be abbreviated TURB during the enhancement of the fire panels and control room panels prior to Licensing.

B-7, Finding 4, Priority 1

"The control room printer which will be used to print alarms, critical status information, and trend data does not have a high-speed print capability of at least 300 lines a minute."

Response

This will be evaluated during testing of the computer. If faster printer is required it will be installed by Licensing. Presently a 600 line per minute printer is provided in the Computer Room which is adjacent to the Control Room, can be manually switched to print alarms, critical status information and trend data.

B-6, Finding 14, Priority 1

"In the Remote Shutdown panel room there is an unlabeled blue pushbutton on the communication panel."

Response

Blue pushbutton will be removed (DCN-E-933) by Hot Functional Testing.

B-8, Finding 6, Priority 1

"No indication is provided in the Emergency Control Room that all transfer switches have been thrown. In the latter case, there is no indication of which switches have not been thrown (there are approx, 62 switches)."

Response

No special light is required to indicate that all transfer switches have been operated for the following reasons.

- 1) Unless the transfer switch is operated, there will be no lights on the associated controls that are serviced by that particular transfer switch. The missing lights on the panel will be an indication to the operator that the control circuit related to those lights has not been transferred. A drawing marked to show the transfer switch associated with LCP 43 indications and controls will be provided in the Remote Shutdown Room prior to Licensing.
- 2) The fact that not all transfer switches were operated is not an indication that the safe shutdown of the unit is impaired. The transfer of one safety channel SA or SB in addition to four protective channels is sufficient to effectuate the safe shutdown of the plant. This would require operation of approximately half the number of existing transfer switches. (See also response to B-6, Finding 30).

B-8, Finding 21, Priority 3

"Panel layout employs "mirror imaging" of groups of panel elements. Layout within each group is generally the same on "A Train" or "B Train" sides; exceptions within groups are elements that are redundant from A to B (example: Boric acid pumps A and B - SA Power, and boric acid tanks A and B gravity feed valves. Groups such as CVCS (B side), emergency feedwater (A & B sides) shutdown cooling (side BO, RCS/Pressurizer). Entire upper portion of panel have layouts that do not reflect functional grouping, operator use, anthropometrics, or reasonable control display relationships.

NRC Review Team Comment: On LCP-43 functional group blocks are mirror imaged, while component (control and indicator) locations within each group have a consistent left to right and top bottom relationship."

Response

The layout of components on panel LCP-43 was rearranged so as to maintain left to right and top to bottom relationship of components within each group. LCP-43 demarkation will be completed prior to Licensing.

B-6, Finding 25, Priority 1

"Meter labels (Wide/Narrow Range Meters) do not include the designators, "wide range" or "narrow range" as appropriate. Labels should be accurate."

Response

Labeling will be enhanced by Hot Functional Testing to include "wide range" and/or "narrow range" as appropriate.

B-5, Finding 22, Priority 1

"Discriminability of minor and intermediate scale markings is poor. Their dimensions violate the guidelines of NUREG-0700, Para. 6.5.1.5."

Response

LP&L has evaluated the meter scales and those that are a problem will be corrected prior to Licensing.

B-5, Finding 41, Priority 3

"Strip Chart Records

Recorders fail to comply with several points of NUREG-0700, para. 6.5.4.1.

1. No provision for tearing off record strip.
2. No provision in design or location to facilitate annotation of records.
3. No easy selection of paper speeds or fast runout speed are provided."

Response

1. There is no tear-off attachment to the recorder. However, the record strip can be cut off with the remainder of the roll remaining in the recorder.
2. The recorder chart platen is designed for easy marking of charts, and prevents distortion of the paper by its design.
3. 3/4 inch per hour is the only speed provided for plant historical data. Fast runout is not provided since 2 hours is all that is generally needed. The plant computer has software for pre-selected events that provides 2 hours of pre-event historical data and 4 hours of on-line storage post event. Operator can do real time trending by using CRT as output device.

B-2, Finding 10, Priority 1

"There are no sound powered headsets or storage provisions area for them in the Transfer Switch room or in the Remote Shutdown Panel area."

Response

Sound powered headsets and storage provisions for such will be provided in the relay room and the remote shutdown panel room prior to Licensing.

B-1 Finding 23, Priority 1

"The Transfer Switch Room battery operated DC emergency lights appear to be inadequate for an operator to perform emergency functions during the 15 second delay period required for AC emergency lighting to come on."

Response

Six additional DC emergency lights will be installed in the relay room to provide sufficient lighting for emergency operation during the 15 second delay period required for AC emergency lighting to come on in the unlikely event that there is a loss of offsite power during a transfer to LCP-43 (DCN-E-920) prior to Licensing.

B-1, Finding 24, Priority 1

"To provide emergency AC lights in the Remote Shutdown Panel room, there is a period of approximately 15 seconds between the time an offsite power loss occurs and the time diesel generator loading begins. DC battery lighting is not provided during this 15 second periods."

Response

DC emergency lights will be installed to provide sufficient lighting for emergency operation at LCP-43 during a 15 second blackout (DCN-E-920) prior to Licensing.

COMPLETED HEDs - CHECKED BY NRC ON-SITE INSPECTOR

ATTACHMENT 2

B-1- 4	B-3-23	B-5-28	B-6- 5	B-8-17	B-8-33
B-1-13	B-4- 1	B-5-32	B-6-14	B-8-22	B-9- 2
B-1-22	B-4- 2	B-5-38	B-6-18	B-8-23	E-9- 4
B-1-25	B-4-11	B-5-40	B-6-39	E-8-24	B-9- 5
B-3- 5	B-4-17	B-5-41	B-8- 1	B-8-25	B-9- 8
B-3-11	B-5- 2	B-5-45	B-8- 3	B-8-26	B-9- 9
B-3-18	B-5-20	B-6- 2	B-8- 8	B-3-28	
B-3-21	B-5-24	B-6- 3	B-8-10	B-8-30	

COMPLETED HEDs

ATTACHMENT 3

B-3- 7	B-6-25
B-3-10	B-6-26
B-3-12	B-6-32
B-3-13	B-6-33
B-3-14	B-6-35
B-3-15	B-6-41
B-3-17	B-6-44
B-4-15	B-6-45
B-4-16	B-6-46
B-5- 9	B-6-48
B-5-11	B-8- 2
B-5-13	B-8- 4
B-5-26	B-8- 7
B-6- 8	B-8-13
B-6- 9	B-8-16
B-6-12	B-8-19
B-6-17	B-8-20
B-6-19	B-8-34
B-6-20	B-8-35
B-6-23	B-9- 1
B-6-24	