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SUBJECT: Discusses corrective actions per NUREG-0737 Item 1.D.1, "Control Room Design Review," to identify significant human factors & instrumentation problems. Seventeen corrective actions identified in License Condition 19F completed.

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K. P. BASKIN
MANAGER OF NUCLEAR ENGINEERING,
SAFETY, AND LICENSING

August 19, 1982

TELEPHONE
(213) 572-1401

Director, Office of Nuclear Reactor Regulation
Attention: Mr. Frank Miraglia, Branch Chief
Licensing Branch No. 3
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

Item I.D.1, Control Room Design Review, of NUREG-0737 required SCE to conduct a detailed control room design review to identify significant human factors and instrumentation problems and to establish a schedule approved by the NRC for correcting deficiencies. Corrective actions which were identified and agreed to by both the NRC staff and SCE during the course of the control room design review/audit, along with a schedule for implementation of corrective actions were identified in Supplement No. 1 of the Safety Evaluation Report (SER) for San Onofre Units 2 and 3. Seventeen (17) corrective actions which were scheduled for completion prior to the operation of San Onofre Unit 2 above 5% power were incorporated as part of License Condition (19)f of Operating License No. NPF-10 for San Onofre Unit 2.

SCE has completed the activity associated with the seventeen corrective actions identified in License Condition (19)f. Relative to corrective Action No. 4 which required SCE to "Identify changes to correct control room lighting for optimum operator performance," SCE recently reevaluated control room lighting, subsequent to the following improvements which were implemented as part of the overall control room modification program and which enhanced illumination for optimum operator performance:

1. Repainting of control room walls/panels with colors that reduced glare/reflectance and enhanced optimum operator performance and comfort.
2. Utilization of anti-glare materials and processes to reduce the glare contribution from annunciators and back lighted switches.
3. Replacement of instrument lenses with anti-glare lenses as required.
4. Relocation and relettering of labels for consistency, elimination of shadows and improved legibility.

Boo1

Control Room lighting was reevaluated with consideration to the guidelines for normal and emergency lighting discussed in Section 6.1.5.3, "Illumination" of NUREG-0700, "Guidelines for Control Room Design Reviews" which recommend the following illumination levels:

1. <u>Normal Lighting</u>	Task Illuminance, Footcandles		
	<u>Min.</u>	<u>Recommended</u>	<u>Max.</u>
Panel Area	20	30	50
Seated Operator Stations	50	75	100
Reading and Writing Areas	50	75	100

2. Emergency Lighting Minimum illumination level of 10 footcandles at all work stations in the primary operating area.

The results of the San Onofre Units 2 and 3 Control Room lighting survey for the normal lighting levels are summarized in Enclosure I. The results of the lighting survey for vertical section (A) of both the main control panel and mimic panel showed an average lighting level of 42.9 footcandles consistent with the guidelines of NUREG-0700 for panel areas. The results of the lighting survey for inclined sections (B) and (C) of the main control panel and inclined section (D) of the mimic panel showed average lighting levels of 57.4, 69.5 and 77.5 footcandles respectively. These higher lighting levels are a direct result of the increase in incident light on the panels due to the orientation of the inclined panels. The results for these inclined areas are also considered to be consistent with the guidelines of NUREG-0700 since the illumination levels fall between the recommended guidelines for vertical sections (panel area) and sit-stand sections (seated operator stations). The results for reading and writing areas (Z) showed an average lighting level of 96.9 footcandles consistent with the guidelines of NUREG-0700.

The results of the San Onofre Units 2 and 3 Control Room lighting survey for the emergency lighting level are summarized in Enclosure II. The results of the lighting survey for reading and writing areas (Z) (work stations in the primary working area) showed an average lighting level of 13.8 footcandles consistent with the guidelines of NUREG-0700 for emergency lighting. The average lighting levels for the panel areas are also identified in Enclosure II. The emergency lighting levels in the panel areas did not impair the capability of the operators to obtain clear and discernable readings.

Based on the results of the lighting survey, SCE concludes that the normal and emergency lighting levels in the control room are consistent with the guidelines of NUREG-0700 and that no further lighting modifications are necessary. SCE also considers that the related issues of glare and shadows discussed in Supplement No. 1 of the SER have been resolved as a result of the improvements discussed above which were implemented as part of the overall control room modification program.

Mr. Frank Miraglia

August 19, 1982

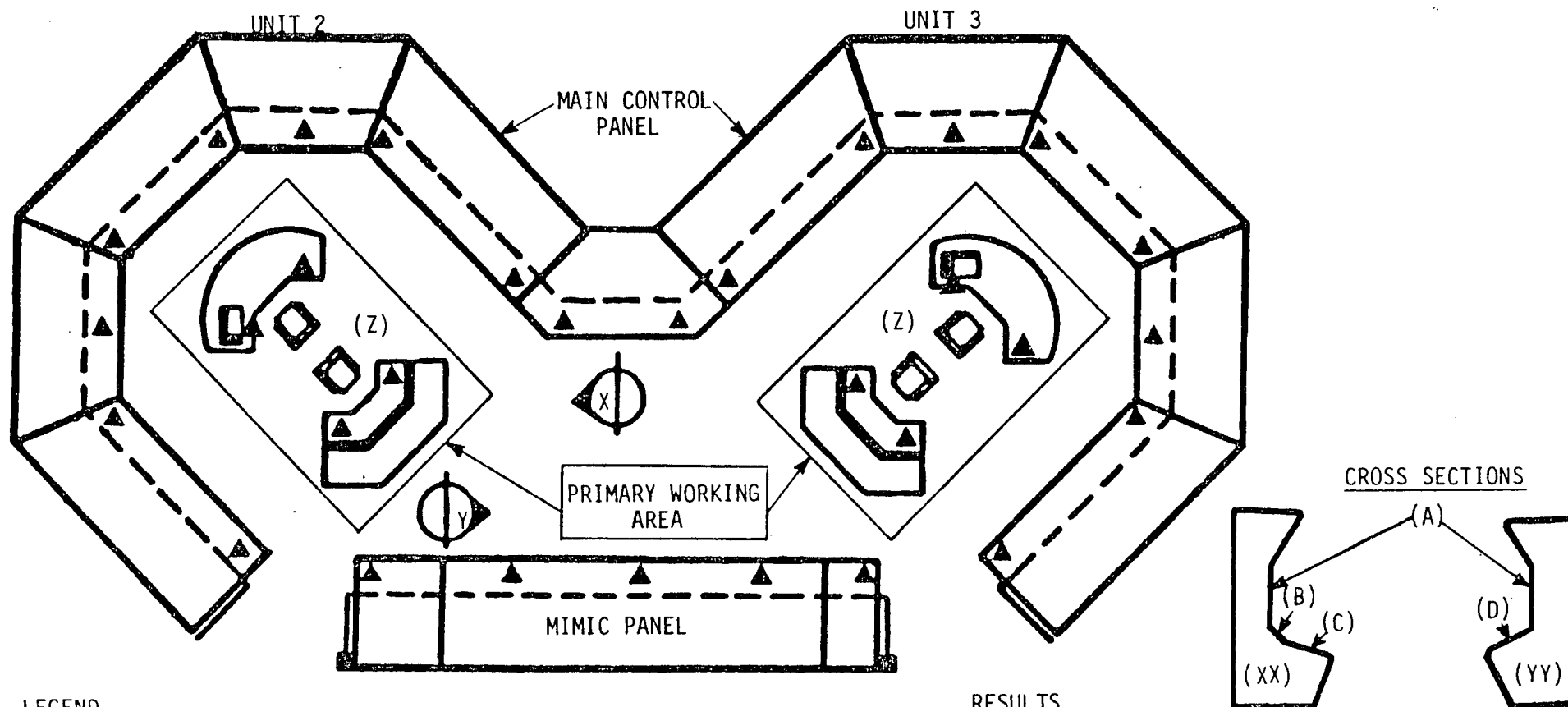
SCE considers that the information provided by this letter satisfies the requirements of license condition (19)f and that additional lighting modifications are no longer considered necessary for the first refueling outage.

If you have any questions or comments, please let me know.

Very truly yours,

W.P. Baskin

SAN ONOFRE UNITS 2 AND 3 CONTROL ROOM
SURVEY OF NORMAL LIGHTING LEVELS

LEGEND

- (Z) Primary Working Area
- (XX) Cross Section of Mimic Panel
- (YY) Cross Section of Mimic Panel
- (A) Vertical Portion of Main Control and Mimic Panel
- (B) Inclined Portion of Main Control Panel
- (C) Inclined Portion of Main Control Panel
- (D) Inclined Portion of Mimic Panel
- (▲) Locations at which lighting measurements were taken

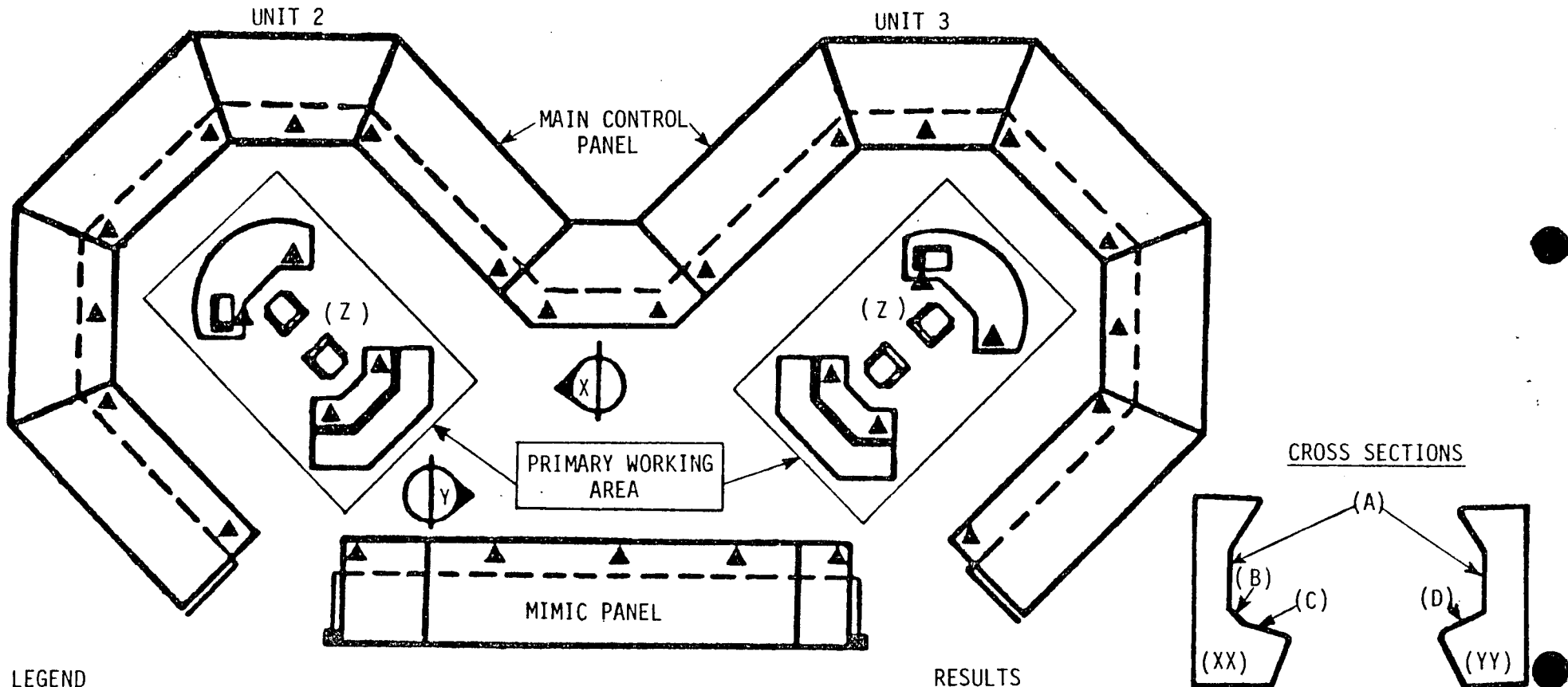
Note

For the main control panel, measurements were taken at levels (A), (B) and (C) as shown on section (XX).
For the mimic panel, measurements were taken at levels (A) and (D) as shown on section (YY).

RESULTS

Average Lighting Levels in Foot Candles	
For Location (A)	42.9
For Location (B)	57.4
For Location (C)	69.5
For Location (D)	77.5
For Location (Z)	96.9

SAN ONOFRE UNITS 2 AND 3 CONTROL ROOM
SURVEY OF EMERGENCY LIGHTING LEVELS



LEGEND

- (Z) Primary Working Area
- (XX) Cross Section of Mimic Panel
- (YY) Cross Section of Mimic Panel
- (A) Vertical Portion of Main Control and Mimic Panel
- (B) Inclined Portion of Main Control Panel
- (C) Inclined Portion of Main Control Panel
- (D) Inclined Portion of Mimic Panel
- (▲) Locations at which lighting measurements were taken

RESULTS

Average Lighting Levels in Foot Candles	
For Location (A)	6.9
For Location (B)	8.6
For Location (C)	10.3
For Location (D)	11.9
For Location (Z)	13.8

Note

For the main control panel, measurements were taken at levels (A), (B) and (C) as shown on section (XX).
For the mimic panel, measurements were taken at levels (A) and (D) as shown on section (YY).