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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JUN 2 1981

Docket No.: 50-341

Mr. Harry Tauber
Vice President
Engineering & Construction
Detroit Edison Company
2000 Second Avenue
Detroit, Michigan 48226

Dear Mr. Tauber:

Subject: Requests for Additional Information in Fermi 2 Operating License Application

As a result of our continuing review of the operating license application for the Enrico Fermi Atomic Power Plant Unit 2, we have developed the enclosed positions and requests for additional information.

Enclosure 1 gives the results of our preliminary control room design review. As discussed by phone previously, we will meet in Bethesda on June 3, 1981 to hear your plans for correcting deficiencies. Please provide your commitment for correcting these deficiencies by June 5, 1981.

Please amend your application to comply with the requirements listed in Enclosure 2. Our review schedule is based on the assumption that the additional information will be available for our review by June 8, 1981. If you wish clarification of the requests or if you cannot meet these dates, please telephone the Licensing Project Manager, L. Kintner, within 7 days after receipt of this letter.

Sincerely,

R Tedesco

Robert L. Tedesco, Assistant Director
for Licensing
Division of Licensing

Enclosures:
Requests for Additional
Information

cc w/enclosures:
See next page

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ENCLOSURE 1

HUMAN FACTORS ENGINEERING
CONTROL ROOM DESIGN REVIEW/AUDIT REPORT
OF
ENRICO FERMI 2
DETROIT EDISON COMPANY

A human factors engineering preliminary design review of the Fermi 2 control room was performed at the site on April 27 through May 1, 1981. This design review was carried out by a team from the Human Factors Engineering Branch, Division of Human Factors Safety. This report was prepared on the basis of the HFEB's review of the applicant's Preliminary Design Assessment and the human factors engineering design review/audit performed at the site. The review team was assisted by human factors consultants from BioTechnology, Inc. (Falls Church, Virginia) and from Lawrence Livermore National Laboratory (University of California), Livermore, California.

Observed human factor design discrepancies were given a priority rating on one to three, (high, moderate, low), based on the increased potential for operator error and the possible consequences of that error. Priority rating 1 and 2 discrepancies should be corrected prior to loading fuel and prior to achieving sensible heat, respectively. Priority rating 3 discrepancies should be evaluated and proposed actions reports as part of the long term design review (due one year from the issue date of NUREG-0700. Note that some priority ratings include a superscript one (e.g., 2^1). Since the resolutions of these discrepancies involve relatively easy corrective actions, these discrepancies should be corrected prior to loading fuel).

The following sections are numbered to conform to the guidelines of the January 1981, draft version of NUREG-0700 and summarize the team's observations of the control room design and layout of the control room operator interfaces with that environment.

HUMAN FACTORS ENGINEERING

CONTROL ROOM DESIGN REVIEW

AUDIT REPORT

ENRICO FERMI - 2 NUCLEAR POWER STATION

1. CONTROL ROOM WORKSPACE

PRIORITY RATING	FINDING	FINDING
2	1*	When seated at the desk, the operator's view of parts of Panels 602, 603, and 604 is obstructed by the CRT and trend recorder.
2	2	The placement of controls on some panels is outside acceptable anthropometric limits.
3	3	The placement of indications on some panels is outside acceptable anthropometric limits.
3	4	The recorders on Panels 808, 810, and 813 are too high and too far back for easy reading by 5th percentile persons.
1	5*	A full set of procedures is not available in the control room for operator reference.
3	6*	All of the chairs in the control room do not have an adjustable seat height.
1	7*	The control room communication system equipment that is presently available is not physically adjustable for individual users.
1	8*	The control room procedure binders do not have an index in front of each volume or index-tab separators for individual procedures.
1	9*	Control room procedures for both manual and automatic controllers are not included in the procedure binders.
1	10	There are no written procedures stored at the remote shut-down panel.

* Discrepancy also noted in Detroit Edison Human Factors Design Review of Enrico Fermi 2 Control Room

2. WORKPLACE ENVIRONMENT

PRIORITY RATING	FINDING	
1	1	The HVAC could not be evaluated because it was not completely installed.
3	2*	On Panel-805 the lighting on the "c" surfaces was lower than recommended levels whereas "a" and "b" surfaces were within an acceptable range. (See Fig. 1)
3	3	Under some lighting conditions the contrast between indicator lights and background is low on Panel-805. (CMC switch on surface "b"; push button switch on the sloping surface "a".) (See Fig. 1)
1	4	There are inadequate normal and emergency lighting levels on Back Panels 812 and 813, with the existing temporary system.
1	5	There is no emergency lighting available at the remote shutdown panel.
3	6	It is difficult to read the CRTs on Panels 603, 804 and the operator console because of low contrast caused by reflections.
3	7	There are shadows on the labels under the recorders on Panels 601, 603, 804, 805, which make them difficult to read.
1	8	The remote shutdown panel is not provided with communication with the control room or elsewhere.
1	9	The loudness of the paging system interferes with telephone conversation at the operator's console.
3	10	On the "c" panel of Panel-808, all recorders are too high for easy maintenance by a 5th percentile person. The most extreme case is SUPP, CHAM. BULK WATER TEMP. (See Fig. 1)
2	11	The magnetic tag-out buttons are subject to accidental movement and do not preclude inadvertent operation.
1	12	Administrative procedures for making permanent modifications to the control boards did not exist and could not be evaluated.

2. WORKPLACE ENVIRONMENT

Sketch showing locations of Control Board surfaces mentioned in the Description of Findings 2, 3, and 10.

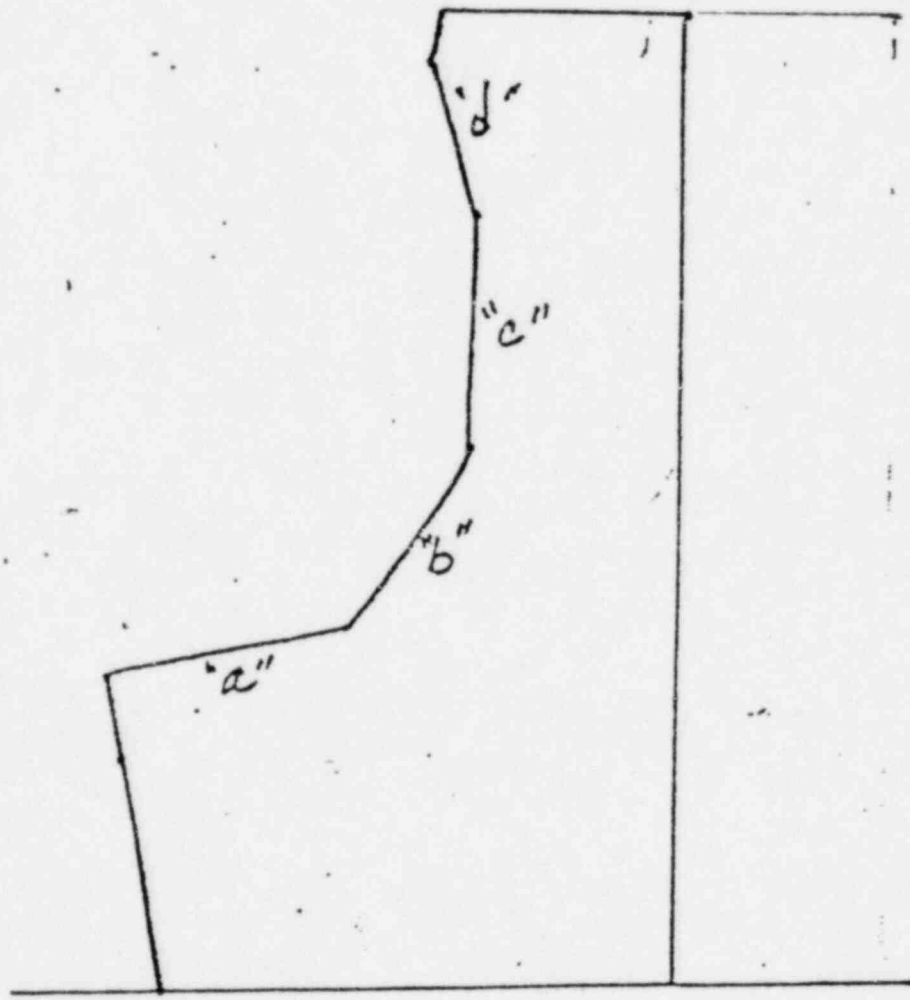

Figure 1

3. ANNUNCIATORS AND AUDITORY SIGNALS

PRIORITY RATING	FINDING	
3	1*	The locations of some annunciators are not optimally placed with respect to the related controls on Panels 806 and 807. ° Fire pump alarm (D-11, 12: E-11, 12) are on right matrix while related controls are on left side of panel B. ° Circulating water pump alarms are on Panel-806 while controls are on Panel-807.
2	2	The RPF Bus 1A power failure tile F2 is not located over Div. 1 React. Prot. Syst. Pwr. Source Sel. on Panel-809.
2[1]	3	The Annunciator panels do not have panel identification labels.
2	4	The single auditory alarm signal is not adequate to localize alarms on Panels 601, 602, 603, 804, 805.
3	5*	There is no "first-out" alarm feature provided for high priority alarms.
3	6*	There is no positive indication that an alarm has cleared.
3	7	Annunciator tile B-23 is inappropriately located on Panel 805 over the condensate feedwater panel. It should have been located on Panel-806.
1	8*	Some annunciator tiles which should be high priority amber or red are given a low priority white color on Panel-602. (Tile D-3)
1	8a	Some unused tiles with priority colors should be replaced.
1	9	Inconsistent use of the priority color codes exists on Panel-810 where alarms having similar priorities use different colors. (D-11 is amber, C-10 is white)

[1] Given the ease of the corrective action involved relative to the potential for improving operator performance, we recommend that these items be addressed and corrected prior to loading fuel.

3. ANNUNCIATORS AND AUDITORY SIGNALS

PRIORITY RATING	FINDING	
3	10*	On Panels P809 and P810, Auto Close Annunciators are in same groupings as the Trouble Alarms.
2	11	The wording of "East" and "West" Turbine tiles on Panel-805 is inconsistent with the wording on the "North" and "South" Turbine tiles. (Tiles C-3, C-4, D-3)
1	12*	The blue tiles on Panels 601, 602, and 806 are difficult to read whether lit or unlit. This is caused by "wavy" cellophane and glare. (Panel-601, D-3, D-4; Panel-602, D-5, D-6, D-7; Panel-806, F-4, F-5)
3	13*	The annunciator on Panel-810 includes multiple inputs to a single tile. Individual breaker tiles would prevent an unnecessary alarm when a breaker is scheduled out of service.
3	14	Tile D-9 on Panel-601, alarms to indicate an ADS Safety Valve leak. The temperature recorder is in the relay room but there is no reference to the location of the leak on the panel. The location of the leak must be determined by the temperature recorders located in the relay room.
2	15*	There is no index readily available which will direct an operator from an alarm to the correct response procedure.
3	16	There is no positive means available to indicate to an operator when an alarm is out of service. Push buttons on the panel at the side of Panel-601 allow selection and indication of tiles removed from service; but the panel does not cover all alarms, and is not considered easy to recognize.
3	17	There is no auditory annunciator signal code which differentiates an alarm from an alert.
1	18	The evacuation signal system was not connected and could not be evaluated.

3. ANNUNCIATORS AND AUDITORY SIGNALS

PRIORITY RATING	FINDING	
1	19	The annunciator alarm audio levels relative to the normal ambient noise level could not be measured because of the temporary status of the ventilation system and control room floor.

4. CONTROLS

PRIORITY RATING	FINDING	
1	1	The locations and shape of the controls for the annunciators on the front of the board make them subject to incorrect selection and operation when the operator is looking at the annunciators.
3	2	There are no covers to prevent dirt from falling into openings left when handles are removed from switches on Panel 810. (65F bus) The removed handle was hung on another handle.
2	3*	Some control switches do not move in the perferred direction for control action vs function; i.e., Clockwise for "raise", "on", "increase", and Counterclockwise for "lower", "off", "decrease". These discrepancies exist on Panels 603, 804, 808, 809, 810, 817.
2	4*	Switch handles tend to obscure the switch label on Panel-812, (B11) and Panel-805 (Tachometer select).
1	5*	The Panel-601 Relief Valve position indication uses the valve solenoid excitation instead of a positive position indicator.
1	6	The arrows on several switches on Panel-808 point between the mode being selected.
1	7	The push button switches on Panel-805 and 806, which are protected with a plastic cover, do not have black side borders. The unprotected switches located elsewhere do have black side borders.
1	8	On the Remote Shutdown Panel, ° The push button switches do not have black side borders as do similar switches located elsewhere. (RCIC Turbine Control Valve, CIC Steam Inlet Valves, etc.) ° The indicators do not have white side borders as do similar switches located elsewhere.
1	9	The "Slow" and "Fast" label is missing from the Full Flow Valve Switch (H-3018-F-608) on Panel-804.

4. CONTROLS

PRIORITY RATING	FINDING	
1	10	The position indicator line on the Reactor Feed Pump Turbine North Trip switch on Panel-805 is not visible.
1	11	Four black reset buttons on Panel-601 violate the green reset button color code. (ADS Initiation Dry-well High Pressure, ADS Div 1 Timer Logic, ADS Div 2 Timer Logic, Inboard MSIV Isolation)
2	12	The color code of the IRM recorder pens and the IRM scale selector switch position lines on Panel 603 is not consistent.
3	13	The tooth down key operated switch (Scram Discharge Volume Hi H_2O Level Bypass) on Panel-603 violates the tooth up plant convention position for key operated switches.

5. VISUAL DISPLAYS

PRIORITY RATING	FINDING	
2	1*	It is difficult to tell the difference between the "on" and "off" condition of the blue "power on" indicators used on Panels 809 and 810.
3	2*	Inappropriate scales exist on some meters, as follows:

Panel-602
° Drywell Pressure is scaled in "inches of H O".
° EECSW Hx flow is scaled in percent.
° Post Accident Reactor Pressure is in "inches of H_2O".
° Diesel Service Water Flow is scaled in percent.

Panel-603
° Coreplate d/p is scaled in percent.
° Start up Line is scaled in percent.

Panel-804
° H_2 cooler temperature uses a decimal scale and a scale and multiplier, which is not recommended.
° Condenser Vacuum is sealed in "psia", but the trips are known in "Inches of Hg".

Panel-808
° SGTS flow is scaled in percent.
° Turbine Building Atmosphere d/p is scaled in percent.
° Reactor Building Control Center d/p is scaled in percent

2	3	No scales exist on some meters as follow: ° Drywell Pumps level. ° Steam flow HED.
1	4	The RHR Exchanger A level control and Pressure Control meter on Panel 601 does not indicate units on percent scale.
3	5	A meter scale on Panel-806 that reads "lbs. per sq. in." does not clearly label that the pressures indicated are negative value.

5. VISUAL DISPLAYS

PRIORITY RATING	FINDING	
1	6*	Several scaling problems exist on Panel-602. ° Wide range water level scale is incorrect. ° HPCI suction and discharge pressure use same scale. (Suction pressure will be pegged low when operating.) ° Scale limits are not numbered for Post Accident Reactor and Torus level.
3	7*	In several cases the number of scale graduations between numbers is greater than the recommended 9. (Panels 603, 807, 810, 811, 816.) Unit graduations in some cases are not 1, 2, or 5 divisions.
1	8	The scale is missing on the "Interruptable Control Air" meter.
1	9	There are no unit markings on the RCP and Oil Cooler temperature controller indicator scales.
2	10*	Many meters/displays on various panels do not have normal, lower, or upper operating limit range markings.
3	11*	The Casing Gas Purity indicator on Panel-804 moves in a direction opposite to that recommended.
1	12	The indicator lights for the EDG 11, 12, 13, and 14 local controls have inconsistent color coding. ° EDG 11 and 12, uses all white. ° EDG 13 uses red, blue-white, red ° EDT 14 uses white, blue-white, white.
1	13*	Some inconsistent use of color codes are: ° On fire protection Panel-816, the "fire" light colors are not consistent, being blue in the "b" section and white on the "a" section. Blue is also used on the adjacent Panel-807 to indicate "bus energized". ° On turbine and FW control Panel-804, the mimic color for HD turbine exhaust steam is not consistent with the azure green Fermi-2 color code.

5. VISUAL DISPLAYS

PRIORITY RATING	FINDING	
3	14	The color coding of the vertical illuminated mimic display (RHRS) on Panel-601 is not consistent with the color coding of the mimic displays of the associated systems (RCIC).

6. PANEL LAYOUT

PRIORITY RATING	FINDING	
3	1	The main turbine shaft vibration recorder group would be more useful if relocated to front of Panel-804.
3	2	Some of the controls of the recirc. pumps on Panel-603 are mirrored.
2[1]	3	Recirc. pump B needs demarcation from the reactor feed pump on Panel-804.
2[1]	4	Demarcation lines are needed to group controls and indicators into smaller blocks on the back of Panel-805.
3	5	The switched 480 volt bus voltmeters are not located consistently with respect to the buses on Panel-809 and Panel-810 and should be separated by some kind of demarcation.
3	6	An air alarm at Panel-807 requires the operator to activate CMC on Panel-601 and Panel-602 and then return to Panel-807 to control air compressor CMC.
3	7	The thumbwheel and push-button controls for the CRT display are located within the Drain Systems mimic on Panel-804.

7. CONTROL/DISPLAY INTEGRATION

PRIORITY RATING	FINDING	
2	1	The fire zone indication on Panel-816 gives no location information.
3	2	The tank dump valves on Panel-816 are not positioned in numerical order. (i.e., 3, 4, 1, 2).
3	3	Verification of scram reset requires an operator to leave Panel-603 and go to the relay room.
3	4	The annunciator for the hydrogen recombiner is located to the far left of Panel-808 while the associated controls are to the far right.
2	5	It is not clear what the no flow warning between the first and second CMC switches for the battery room a/c-exhaust system is indicating on Panel-808.
3	6	Leak detectors on Panel-601 are numbered 1 through 8 without any indication of the location of the leak.
3	7	It is not clear which controls are related to which indicators for the RFPT North Turning Gear on Panel-805.
3	8	The breaker trip annunciator trip tiles for bus 72J and 72K are on Panel-810 while the associated controls are on Panel-809.
3	10	The recorders for the chlorination and service water levels are inverted with respect to their associated controls on Panel-807.
3	11	The IRM recorders and range switches on Panel-603 are arranged in an unconventional X pattern rather than a vertical pattern.
2	12	The EDG control on Panel-809 and Panel-810 turns left to raise while the indicator moves clockwise.
3	13	The turbine building exhaust fans select switches on Panel-808 do not clearly indicate the relationship between the exhaust fans and supply fans.

7. CONTROL/DISPLAY INTEGRATION

PRIORITY RATING	FINDING	
2	14	There are two different closed indicators on supp. chamber vacuum display - one for fully closed and the other for partially closed - without an indication of which is which.

8. LABELS

PRIORITY RATING	FINDING	
1	1	There is a two scale meter with one pointer for the off-gas PRMS, on the back of Panel-601, without an indication of which scale the arrow is using.
1	2	Units are not indicated on the PRMS recorder scale on the back of Panel-601.
1	3	The jack plugs on the back of Panel-601 are labeled with ink rather than a permanent label.
1	4*	The throttle valves on Panels 601 and 602 (Outboard Isolation Valve F005 A) do not have a distinct valve type designation.
2[1]	5	On Panel-602, the label for the Headspray Inboard Isolation Valve (FO-22) is misplaced and is located under a mimic flow path below the Containment Spray Header.
3[1]	6*	System designation is not shown on instrument name-plates on Panel-602.
3[1]	7	Labels on Panel-602 and Panel-804 have both black on white and white on black.
3[1]	8*	There is a lack of group demarcation in the mimic display of the PHIC on Panel-602.
2	9*	The labels of the recorders on Panel-603 tend to be obscured by the overhang.
1	10	The label for "in" and "out" motion is missing on the "Rod Out Notch Override" switch on Panel-603.
1	11	There is no label to describe the function of the meter group on Panel-603.
3[1]	12	Labeling for similar parameters on Panel-603 is inconsistent (i.e., recirc, vs recirculation; FW vs feedwater).
1	13	There is no label on the Turbine Overspeed Trip toggle switch on Panel-804.

8. LABELS

PRIORITY RATING	FINDING	
1	14*	The Panel-804 keylock labels are above the switch while they should be below to be consistent with plant convention. Also position indication is missing.
2	15	The labels of the recorders on P-805 tend to be obscured by the overhang.
3[1]	16	Labels for center, north, and south feedwater heater levels on Panel-805 are confusing.
3	17	Valve symbols used are not consistant on the conden mimic on Panel-805.
1	18	There are incorrect labels for valves on Panel-805.
1	19	The NM CNDR vacuum normal range pressure label does not match the meter scale on Panel-805.
3	20	Borders that differentiate controls from indicators are not consistantly placed on Panel-808, i.e., some are located above and below rather than to the left and right.
3[1]	21	Hierarchical labeling is not used on EDG for the group on Panel-808/
1	22	The labels are incorrect for CMC switches for Battery Room a/c-Exhaust System on Panel-808.
1.	23	Some labels on the mimics and meters on Panel-809 are incorrect.
1	24*	Some switch positions are either temporary or not labeled. ° Panel-811 - Brownstown 3 Line Phase Selector Brownstown 2 LN Phase Selector (Note inconsistent labeling of "LN " vs "Line".) ° Panel-812 - 72E, 72F, 480V Bus Sel. 72W, 72N, 480V Bus Sel.
3	25	The contrast between lettering and background on backlighted push button switches in inadequate on Panel-811.

8. LABELS

PRIORITY RATING	FINDING	
1	26	The primary containment atmospheric radiation monitoring system on Panel-812 has no indication of which pen records which parameter.
3[1]	27*	The label "Filter Fire" on Panel-812 is not sufficiently descriptive.
1	28	The resin and "solka-floc" switches on Panel-816 have no label on covers.
3[1]	29	Labels on CO_2 systems switches on Panel-816 are not clear.
3[1]	30*	Hierarchical labeling could be used effectively on Panel-816.
3	31	Demarcation lines on Panel-816 are easily dislodged.
1	32	The fire labels on Panel-816 are blue on the level B indicators while they are white on the level A indicators.
1	33	Switches on Panel-816 have no indication of what component is being controlled.
3[1]	34*	Lines of demarcation are not used to separate the control matrix on Panel-817.
1	35	The indicators and controls for the RCIC turbine control valve and other valves on the Remote Shutdown panel do not line up with the mimic symbols and are without labels.
3	36	The same color codes are used on mimics to indicate several different functions.
3	37	The lighted mimic on Panel-601 does not use the same color coding as corresponding mimics on sub panels.

8. LABELS

PRIORITY RATING	FINDING	
3	38	There is ar inconsistent use of track widths to indicate primary and secondary flow paths on the Panel-601 mimic.
3	39	The mimic flow arrows are not distinct on Panel-601.
1	40	Color codes on the steam supply mimic on Panel-804 ar Panel-3 are inconsistent.
3	41*	The mimic on Panel-804 should show starting and end points.
1.	42*	There are inconsistencies in the mimic colors for "Main Steam From Control Valve", which should be moss gree and the turbine shaft, which should not be the e color as the steam on Panel-804.
2	43	There are many instances where the flow directions, indicated on the mimic on Panels 805 and 808, are missing or incorrect.
3	44	Mimic components on Panel-805 are not always tied to the mimic lines.
3	45	The gray mimic lines on Panel-805 are in poor contrast with the green panel background.
3	46	There are mimic lines missing on Panel-805.
3	47	The initiation and termination points of the mimic on Panels 804, 805, and 806 should all be labeled and should be consistent.
3	48	The reactor feed pumps and related displays on Panel-805 a offset and therefore should have demarcation nes.
3	49*	Portions of the mimic on Panel-806 are missing.
2	50	The relationship between the DG and SWGR supply/exhaust fans on Panel-808 is unclear, and mimic or demarcation lines are needed.

8. LABELS

PRIORITY RATING	FINDING	
3	51	Mimics on Panel-809 and Panel-816 should show flow directions.
3[1]	52	The EDG controls should be distinguished from the mimic on Panel-809.
3	53	Arrows indicating direction of flow should be added, where appropriate, to the mimic on Panel-809.
2	54	There are unlabeled end points on the mimic on the remote shutdown panel.

9. PROCESS COMPUTER

PRIORITY RATING	FINDING	
1	1	The software was not available to review the command language.
2	2	The operators keyboard combines a standard QWERTY keyboard with function keys.
3	3	The numeric keyboards are not pushbutton telephone layout.
2	4*	CRT display items are identified by log number, rather than by system or program name.
1	5	The CRT control console has temporary labels.
3	6*	There is no Fermi 2 unique color standard for CRT displays.
3	7	The bottom of the screen on Panel-804 is not visible to a 5th percentile operator.
2	8	The number of significant digits displayed in CRT data is not consistent with instrument accuracy.
2	9	The decimal point on CRT displays is not right or left justified in a standard format.
1	10	The computer CRT output is 120 characters per second which is too slow for the 300 lpm line printer.

10. DATA RECORDING

PRIORITY RATING	FINDING	
1	1*	The alarm points are not identified on recorder scales.
1	2*	All panels with recorders did not have the recorder scales marked with the normal or abnormal, safe or unsafe, or expected or unexpected range.
2	3	The scale lengths on some recorders differ from the paper scale.
3	4	The multipoint recorders use more than four colors, have as many as 20 channels, and are hard to differentiate.
2[1]	5	The reactor core differential pressure recorder uses a percent scale rather than absolute units.
3	6	Many recorders do not have frosted glass covers and reflection can be a problem.
2[1]	7	The Drywell and Torus Air and Water Temperature recorders on Panel-601 and Panel-602 have inconsistent labels.
2[1]	8	The Pressure recorders on Panel-602 have obscured scales when the face is closed.
2[1]	9	On many recorders there is no indication of units.
3	10*	The 12 point recorders on Panel-816 use two sets of six colors and are difficult to read.
2	11	The recorders on Panel-602 have different scales on the same recorder. Paper can only match one scale.

HUMAN FACTORS STRENGTHS OBSERVED

The control/display integration on all panels is very good and is particularly good for the ECCS system.

Good use was made of push button valve controls and indicator lights to verify control position.

The use of color-coded, multiple position switches was good.

The lighting capability in the control room is generally very good.

The maintenance tagging procedures used helped avoid clutter on the control panels; however, some means of avoiding inadvertant activation of controls (e.g., a strip of tape over the control) would improve the procedure.

The mimic layouts were generally very good, showing system functions and system sequence of operation.

Generally, the location of the annunciators and the intelligibility of the wording were good.

Most labels were clear and easy to understand.

The majority of the components on the control boards were well located and within acceptable anthropometric limits.

The capability to switch to the remote shutdown panel without concern for valve position settings in the control room was very good.

Almost all controls and indicators were located on the main panels without causing overloading.

The avoidance of excessive use of abbreviations made labels easy to read and interpret.

SYSTEMS THAT COULD NOT BE EVALUATED

Temperature, humidity and ambient noise level could not be evaluated because the permanent HVAC system was not installed.

Administrative procedures for making permanent modifications to the control boards did not exist.

Most software was not available for review.

There was no record of the standard color code scheme.

The control room emergency evacuation alarm was not operable.

The following sections are numbered to conform to the guidelines of the January, 1981, draft version of NUREG-0700 and summarize the team's observations of the control room design and layout and of the control room operators' interface with the control room environment.

ENCLOSURE 2

REQUESTS FOR ADDITIONAL INFORMATION IN THE SAFETY REVIEW

ENRICO FERMI ATOMIC POWER PLANT UNIT 2

DOCKET NO. 50-341

Requests by the following branches in NRC are included in this enclosure. Requests and pages are numbered sequentially with respect to previously transmitted requests.

110.0 Mechanical Engineering Branch

110.20 Provide the following information used in the design of the Fermi 2 safety relief valve (SRV) piping:

a) The latest SRV hydraulic transient time history loads generated in the SRV piping due to the imbalanced pressure waves resulting from an SRV actuation. Also, include the latest time history loads due to the discharge of the water column from the submerged piping and quencher device.

b) Provide a tabulation of the loads (forces) used for the interim design of the supports of the SRV piping inside the torus wetwell.

c) Re-evaluate the adequacy of the SRV piping and supports inside the torus wetwell for the latest SRV hydraulic pressure transient and water slug loads. The re-evaluation should consider the combination of normal, SRV, LOCA, and seismic loads using the response combination method provided in NUREG-0484 Revision 1.

212.69A (4.6) Since the initial discovery of cracking in boiling water reactor (BWR) control rod drive return line (CRDRL) nozzles, General Electric (GE) has proposed a number of solutions to the problem. One solution GE has proposed is a system modification that involves total removal of the CRDRL and cutting and capping of the CRDRL nozzle. From your response to Q212.69, Enrico Fermi-2 plans this modification. Address the applicable items and staff concerns specified in the letter from D. Eisenhut, NRC, to R. Gridley, GE, dated January 28, 1980, on the subject of control rod drive return line (CRDRL) removal and capping CRDRL nozzles.

212.0 REACTOR SYSTEMS BRANCH

212.182 Calculations of NPSH available to ECCS pumps in BWRs are normally provided with reference to the pump suction. We are concerned that under certain post accident conditions the potential may exist for damage to ECCS pumps from cavitation because of local flashing in the system suction lines. The potential can result for example from local elevation changes in the piping runs. Calculations of NPSH available at the pump suction may erroneously assume liquid continuity up to the point of pump suction. We require therefore that the applicants provide calculations demonstrating that all points in all safety related suction piping, the NPSH available is adequate to preclude local flashing under the worst postulated conditions.

222.55 (3.2) (9.5.4) (9.5.5) (9.5.6) (9.5.7) (9.5.8) The FSAR text and Table 3.2-1 states that the components and piping systems for the diesel generator auxiliaries (fuel oil system, cooling water, lubrication, air starting, and intake and combustion system) that are mounted on the auxiliary skids are designed seismic Category I and are ASME Section III Class 3 quality. The engine mounted components and piping are designed and manufactured to DEMA standards, and are seismic Category I. This is not in accordance with Regulatory Guide 1.26 which requires the entire diesel generator auxiliary systems be designed to ASME Section III Class 3 or Quality Group C. Provide the industry standards that were used in the design, manufacture, and inspection of the engine mounted piping and components. Also show on the appropriate P&ID's where the Quality Group Classification changes from Quality Group C.

222.56 (9.5.5) You state in section 9.5.5.2 each diesel engine cooling water system is provided with an expansion tank to provide for system expansion and for venting air from the system. In addition to the items mentioned, the expansion tank is to provide for minor system leaks at pump shaft seals, valve stems and other components, and to maintain required NPSH on the system circulating pump. Provide the size of the expansion tank and location. Demonstrate by analysis that the expansion tank size will be adequate to maintain required pump NPSH and make up water for seven days continuous operation of the diesel engine at full rated load without makeup, or provide a seismic Category I, safety class 3 make up water supply to the expansion tank.

222.57 (9.5.7) For the diesel engine lubrication system in Section 9.5.7 describe the protect features (such as blowout panels) provided to prevent unacceptable crankcase explosion and to mitigate the consequences of such an event;

222.58 (9.5.8) Describe the instrumentation, controls, sensors and alarms provided in the design of the diesel engine combustion air intake and exhaust system which alert the operator when parameters exceed ranges recommended by the engine manufacturer and describe any operator action required during alarm conditions to prevent harmful effects to the diesel engine. Discuss systems interlocks provided. Revise your FSAR accordingly. (SRP 9.5.8, Part III, item 1 & 4).

222.59 (9.5.8) Provide the results of an analysis that demonstrates that the function of your diesel engine air intake and exhaust system design will not be degraded to an extent which prevents developing full engine rated power or cause engine shutdown as a consequence of any meteorological or accident condition. Include in your discussion the potential and effect of fire extinguishing (gaseous) medium, recirculation of diesel combustion products, or other gases that may intentionally or accidentally be released on site, on the performance of the diesel generator. (SRP 9.5.8, Part III, item 3).

222.60 (9.5.8) Discuss the provisions made in your design of the diesel engine combustion air intake and exhaust system to prevent possible clogging, during standby and in operation, from abnormal climatic conditions (heavy rain, freezing rain, dust storms, ice and snow) that could prevent operation of the diesel generator on demand. (SRP 9.5.8, Part III, item 5).

222.61
(9.5.8) Show by analysis that a potential fire in the diesel generator building together with a single failure of the fire protection system will not degrade the quality of the diesel combustion air so that the remaining diesel will be able to provide full rated power.

222.62 (3.2) (9.5.4) (9.5.5) (9.5.6) (9.5.7) (9.5.8) The FSAR text and Table 3.2-1 states that the components and piping systems for the diesel generator auxiliaries (fuel oil system, cooling water, lubrication, air starting, and intake and combustion system) that are mounted on the auxiliary skids are designed seismic Category I and are ASME Section III Class 2 quality. Figures 9.5.2 and 9.5.3 show certain lines for these systems as being designed nonseismic and Quality Group D. Text, table and drawings seem to be in conflict, clarify this discrepancy, and in particular for the following items provide the requested information and/or comply with the stated positions:

a. In Figure 9.5.2 the diesel oil storage tank fill and vent lines are shown as non-seismic, Quality Group D piping. This is unacceptable. These lines are necessary for continued emergency diesel engine operation and should be designed seismic Category I, Quality Group C. Comply with this position.

b. In Figure 9.5-2 Sheets 1 and 3 show the clean fuel drain lines from the injector nozzles and dirty fuel drain lines as being designed non-seismic Quality Group D. It is unclear from the figure and the FSAR text the purpose of these lines. Provide a discussion on the purpose of the lines and to where they are routed. If they are used during engine operation they should be designed seismic Category I, Quality Group C. Comply with this position.

c. Figure 9.5-2 shows a lube oil tank and connecting lines to the diesel generator as non-seismic, Quality Group D. The FSAR text states that the tank is used to replenish lube oil to the enigne sump during engine operation. A seismic event would result in the spillage of lube oil in all diesel generator rooms causing a fire hazard. The tank and associated lines seem to be used during engine operation. Therefore, the lines should be designed seismic Category I, Quality Group C. Comply with this position, andprovide lube oil tank capacity and location.

d. Figure 9.5-3 shows the jacket coolant water system vent lines (two) and the equalizing line to the expansion tank as non-seismic, Quality Group D. This is unacceptable. A seismic event would result in the loss of water to all diesel generators. These lines are necessary for continued emergency diesel engine operation and should be designed seismic Category I, Quality Group C. Comply with this position.

e. Figure 9.5-3 shows the diesel engine exhaust lines as non-seismic Quality Group D. This is unacceptable. The exhaust system should be designed seismic Category I, Quality Group C. Comply with this position or provide justification for non-compliance.