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April 8, 1985

Mr. H. Thompson, Director
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Thompson:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Supplement 1 to NUREG 0737
Detailed Control Room Design Review (CRDR)
Supplement to the Summary Report

Reference: Letter dated April 30, 1984, P. B. Fiedler to D. G. Eisenhut

In accordance with NUREG-0737 Supplement 1, the Oyster Creek CRDR Summary Report was submitted to the NRC on April 30, 1984. The report was subsequently reviewed by the NRC and its contractor; and, as a result meetings with GPUN were held on November 1 and 2, 1984 in Washington, D. C. and on November 28, 1984 at the Oyster Creek Station. The enclosed supplementary report provides additional information to clarify the CRDR Summary Report as well as other supportive information.

In previous discussions with you and members of your staff, GPUN has stated we are currently reviewing the Cycle 11 outage workscope as part of our long range planning effort. Please be advised that upon completion, schedular extensions may be requested for certain commitments contained in this submittal.

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Should you have any questions, please contact the Oyster Creek Licensing Manager at (609) 971-4643.

Very truly yours,

P. B. Fiedler
Vice President and Director
Oyster Creek

lr/1432f

cc: Administrator
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Supplement to the Summary Report on the
Oyster Creek Control Room Design Review

I. Introduction and Background

On April 30, 1984 the Oyster Creek Control Room Design Review (CRDR) Summary Report was submitted to the NRC in compliance with requirements of NUREG-0737 Supplement 1. This report was subsequently reviewed by the NRC staff and its contractors and meetings were held on November 1 and 2, 1984 in Washington D.C. and on November 28, 1984 at the Oyster Creek Station to review records of the review, answer questions of the reviewers and audit some of the deficiencies noted in the report by viewing arrangements in the control room. Due to the summary nature of the report, details of many of the deficiencies identified were not available and a review of the records and discussion with the participants was helpful in determining the adequacy of the CRDR.

This supplementary report provides additional information to clarify the Summary Report. The remaining sections of this report provide (1) Schedules for items listed in corrective action section of the Summary Report which required further evaluation or selection of various alternatives before final implementation; (2) A program plan for the implementation of revision 3 of the BWR Emergency Procedure Guidelines (EPG's) which includes task analysis of control room interfaces; (3) A description of the use of computer driven CRT displays to correct Human Engineering Deficiencies (HED's).

II. Supplementary Schedule Information

A number of the deficiencies identified during the review were of a nature that either (1) further evaluation was necessary to determine if corrective action was necessary or (2) several alternates of corrective actions were identified which could all adequately correct the finding. For both these cases the description of corrective actions indicated evaluation or consideration of alternatives and this section clarifies the schedule to complete these evaluations. The following list is keyed to the groups number of Table V-I of the summary report with the sequence number in each group indicated. As an example item 3-15 is the fifteenth deficiency in group 3. An update Table V-I has also been attached with this information.

Group 1 - Further evaluation required

1-1 The density compensation study will be completed in 1985.
1-2 The core region instrument was modified and tested. Periodic surveillance tests will be used instead of continuing operations with pumps running. Item is complete.
1-3 Modifications to add indications are scheduled over the next two refueling outages.
1-4 Study to be performed in 1985
1-5 Study to be performed in 1985

1-6 Study to be performed in 1985
1-7 Rod Worth Minimizer engineering is ongoing to support portions of system modifications in next refueling outage with total project to be completed in second refueling outage; scope of project includes new display design.
1-8 Study to be performed in 1985
1-9 Study to be performed in 1985
1-10 Study to be performed in 1985
1-11 Study to be performed in 1985
1-12 Study to be performed in 1985
1-13 Study to be performed in 1985
1-14 Evaluation to be performed during panel modification engineering to be completed in 1985.
1-15 Evaluation to be performed during panel modification engineering to be completed in 1985.
1-16 Recorder evaluation underway to be completed in 1985.

Group 2 - Relabeling and Demarcation

2-21 Evaluation to be performed during panel modification engineering to be completed in 1985.
2-42 The engineering of panel modifications includes a program to evaluate and improve all display scale graduation and labels. Some meters are too small to allow any improvement in these cases an evaluation will be completed which determines whether present display is adequate or requires replacement with a different instrument. Evaluation to be completed in 1985.
2-49 All indicator lights will be evaluated and those determined to be deficient will be changed to industry standards. Schedule to be determined after evaluation.
2-55 Standard specification for new labels specifies low glare Gravoply II labels; the only exception are those cases which are photo-engraved metal plates.
2-56 Evaluation to be completed in 1985
2-66 Same as 2-21
2-67 Same as 2-21
2-69 Same as 2-21
2-70 Same as 2-21. Major electrical system modification will take place in second refueling outage at which time changes to electrical system panel arrangement are scheduled.
2-71 Same as 2-21
2-74 Same as 2-21
2-75 A list of indications being evaluated for volume to level information labels are: Isolation condensers, reactor level, hotwell level, condensate storage tank, drain tanks and torus.

Group 3 - Administrative

3-1, 3-2 and 3-4 Review of design data and plant startup test data alleviated concerns for these deficiencies. Items complete.
3-9 Shift assistants have been assigned which resolve administrative burden as much as possible under present regulations. This item is complete.

3-15 It is a goal of the operations department to provide three CRO's per shift, however, the presence of this operator is not mandatory for emergency operations.

Group 4 - Hardware

4-8, 4-9, 4-10, 4-16 4-18, 4-41 4-42, 4-44 4-48, 4-56 4-66 These items refer to a consolidated display as corrective action. Many of these findings could be corrected by individual improvements to the displays, but and integrated solution appears to be the best alternative. The proposed solution is a conceptual grouping of parameters on a single location visible from different places in the control room. Evaluation of designs to correct the deficiencies will be completed in 1985. Portions of displays which are supported by projects in present outage will be installed in next outage. Final installation will occur in second outage.

4-17 Evaluation of alarms will be completed in 1985.

4-35 Selection of displays to be interchanged will be completed in 1985 in time to support work in next refueling outage.

4-37 Recorder study will be completed in 1985.

4-39 Recorder study will be completed in 1985.

4-40 Some improvements have been completed. Replacement of broken/missing labels is complete. Repainting of most frequently used control room panels is scheduled for next outage.

4-43 Evaluation will be completed in 1985.

4-45 Moving lights to front panel will fulfill confirmation function and eliminate mistaking a burned out light for a de-energized solenoid by the prominent positioning. If evaluations show lights do not need to be moved, the burnt out lightbulb problem will be addressed separately.

4-51 Reevaluation has shown that information is useful to operators and will be examined by labeling and demarcation modifications planned. No meters will be removed, item is complete.

4-57 Evaluation will be completed in 1985.

4-58 This item will be included in recorder evaluation to be completed in 1985.

4-59 Evaluation to be performed during panel modification engineering to be completed in 1985.

4-60 Evaluation to be performed during panel modification engineering to be completed in 1985.

4-61 Evaluation to be performed during panel modification engineering to be completed in 1985.

4-62 Evaluation to be performed during panel modification engineering to be completed in 1985.

4-63 Evaluation to be performed during panel modification engineering to be completed in 1985.

4-64 Evaluation to be performed during panel modification engineering to be completed in 1985.

Group 5 - Computer

Placement of deficiencies in this group is explained in Section IV of this report. Evaluation of these findings will be completed on a schedule to support installation in accordance with schedule category 3.

Group 6 - CR Environment

6-7 Evaluation will be completed in time to support installation by schedule category 3.
6-10 Humidity study will be completed in 1985.
6-12 Same as 6-7.

III. Implementation of Revision 3 of BWR EPG's

The present revision of the EPG's implemented as Emergency Operating Procedures at Oyster Creek do not include the revision 3 Secondary Containment or Radiation Control guidelines. It is the intent of the plant operating staff to implement these guidelines into plant procedures during the next refueling outage presently scheduled to commence in late 1985. This procedure revision is of such a magnitude to require special review of both the procedure format and useability and the characteristics of the control room as they affect the useability of the procedures.

The following elements of review are planned prior to implementation of this revision of the EPG's:

(1) A review of the operator functions and tasks for each step of the procedure which will establish control and display requirements to carry out each step. This review will also establish the specific characteristics of the controls and displays necessary to carry out the task.

(2) A survey of the control room instruments to be used to fulfill the requirements (1) above. A list of deficiencies, if any, will be developed for evaluation.

(3) A walkthrough of the new procedures in the control room or control room mockup with licensed operators to verify useability and identify deficiencies in either procedure format or control room characteristics.

(4) Evaluation of deficiencies identified to recommend satisfactory solutions to determine significance, to establish priority and to recommend schedule for correction.

These elements will supplement the normal technical review, safety review and operator training that is conducted for all plant procedure revisions.

IV. Use of the Plant Computer System to Correct Human Engineering Deficiencies (HED)

In the CRDR Summary Report Group 5 of Table V-1 summarized a number of deficiencies for which the corrective action was displayed via a computer driven CRT. Selecting this category for correcting a HED required several criteria to be met: (1) Since the computer is not a safety grade device, it could not be used as the sole display of a parameter to be used in an important to safety task; (2) For all other parameters, the loss of indication via the computer would not result in operator error since backup indication could be made available in enough time to prevent a plant upset; (3) Use of the computer would provide improved information because it was more clearly displayed, integrated with other information or placed in a more convenient position in the control room then alternate display devices.

Since these criteria minimize the safety significance and importance category of the corrective actions all the deficiencies were placed in a schedule category 3. Deficiencies 5-1 to 5-4 were given an importance category of B, but since each of these is also being considered in other corrective action programs or schedule category 2, these corrective actions were give schedule category 3.

ATTACHMENT 1

Updated table V-1 of Oyster Creek DCRDR Summary Report

This attachment updates the table to include comments from Section II of this supplemental report on descriptions of corrective actions and schedule categories.

New schedule categories used in the attached have the following meanings:

Schedule Category 1A	Evaluation or study necessary to resolve this item will be completed in 1985. If study requires a modification to the control room, it will be scheduled at that time.
Schedule Category 1B	Modification is scheduled to be installed in 1985-1986 refueling outage.
Schedule Category 3A	Evaluation or study necessary to resolve this item will be completed in time to support installation by schedule category 3.

For reference, categories from previous report have the following meanings:

Schedule Category 1:	Accomplish at the earliest opportunity, but in no case beyond the next refueling outage.
Schedule Category 2:	Accomplish by the end of the next refueling outage (1985).
Schedule Category 3:	Accomplish by the end of the 1987 refueling outage.
Schedule Category 4:	Accomplish as convenient, or after the 1987 refueling outage, or, if the need for corrective action is not established, on no definite schedule.

GROUP 1

FURTHER EVALUATION REQUIRED

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
1-1	Yarway and reactor protection level instruments are not density compensated causing unnecessary alarms if density-compensated recorder is used for control.	Evaluate removing density compensation from control level instruments.	1A	
1-2	Core region level instruments are not used.	Evaluate making core region instruments operational when pumps are running.	Complete	
1-3	Need temperature indications for elevations in drywell, torus and H & V system.	Upgrade temperature instrumentation.	2, 3	
1-4	Synchroscope operates counter to industry standard.	Evaluate making synchroscope rotate in standard direction.	1A	
1-5	The added facades may aggravate the problem of high temperature in the spaces behind panels.	Measure temperatures if facades are installed. Correct as necessary.	1A	
1-6	The differential pressure instrument currently provided for the containment spray system measures the difference between shellside and tubeside pressure and has no functional use. The emergency procedure calls for a shellside differential reading, which is only provided locally.	Evaluate use of present dp meter to display needed information.	1A	
1-7	Displays associated with Rod Worth Minimizer are distracting to operator. Rod Worth Minimizer displays and controls are not needed on front panel.	Consider relocating the electronics. (Note that a few of the indicator lights are used and would remain.)	3	
1-8	Condensate return valve control lacks ability to equilibrate heat removed by condenser and decay heat from reactor.	Operators can work with present on-off control. Evaluate throttle control.	1A	
1-9	Condensate demineralizers have limited capacity - especially at high powers.	A fluid system modification is necessary to correct this problem fully. Individual "runout" alarms for feed pumps would help. Evaluate after completion of demineralizer mod now being made.	1A	
1-10	Operator is deprived of a rate-of-makeup indication as flow increases.	Evaluate reranging CRD flow meter.	1A	
1-11	Low power feedwater control requires full-time operator attention and results in thermal cycles to reactor vessel nozzle.	Evaluate a fluid system modification (addition of Main Feed Regulator Block Valves) to correct.	1A	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
1-12	Excessive reach required to operate valve to control reactor level during startup.	Consider automatic control or improve location for manual control.	1A	
1-13	Need controls for diesel generator output breakers.	Analyze, not clear control is required.	1A	
1-14	Some controls are too sensitive.	Evaluate on a case basis.	1A	
1-15	Controls rotate opposite way expected.	Evaluate on a case basis.	1A	
1-16	Some variables values are not accurately measured by recorders.	Treat on a case basis.	1A	

GROUP 2

RELABELING, DEMARCATING AND OTHER IMPROVEMENTS

NOT REQUIRING MODIFICATIONS

TO ELECTRICAL CIRCUITS

OR FLUID SYSTEM CONFIGURATION

(Including Mimicing of Existing Arrangements)

- o CONTROLS/DISPLAYS
- o METER SCALES (Bands, Setpoints, Limits)
- o RECORDER SCALES
- o LENS CAPS (Colors, Legends)
- o NORMAL/OFF NORMAL STATUS
- o SBM ESCUTCHEONS

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
2-1	No warning labels to prevent startup of 2nd stage (booster) core spray pump before 1st stage pump is on.	Add appropriate labels. (G1)	1	
2-2	No ready means on either rod display or selector mimic to identify the group to which reach rod has been assigned.	Improved labeling and demarcation; including possible temporary group labels should mitigate. (G1)	2	
2-3	The rod display mimic is difficult to correlate because of the difference in shape from the rod select mimic.	Improved labeling and demarcation; including possible temporary group labels should mitigate. (G1)	2	
2-4	Difficult to determine axes of symmetry; hard to make quick visual check of rod position.	Improved labeling and demarcation; including possible temporary group labels should mitigate. (G1)	2	
2-5	Nomenclature for the locater - labels in the rod mimic for the SRM detectors and IRM detectors is obscure.	Improve labeling. (G1)	2	
2-6	Indicator Lights for IRMs and APRMs are not clearly tied to specific channels.	Label and demarcate. (G1)	2	
2-7	Labeling is not clear for key operated "rod out permissive" switch.	Relabel. (G1)	2	
2-8	Status lights not clearly labeled.	Relabel. (G1)	2	
2-9	Turbine steam flow recorder is mislabeled	Relabel.	2	
2-10	Reheat and extraction steam displays are hard to pick out on panel 7F.	Provide labeling and demarcation. (G1)	2	
2-11	Controls for air ejectors and related equipment confusingly arranged.	Relabel. Rearrangement not recommended. (G1)	2	
2-12	Gland seal displays hard to see among other indicators on 7F.	Relabel. (G1)	2	
2-13	Some level meters have confusing scale divisions.	Provide consistent and improved meter scales. (G2)	2	
2-14	Control system water level signal recorder is calibrated in feet (versus inches for nearby meters).	Correct recorder scale. (G2)	2	
2-15	Level set points for alarm or protective actions are not indicated on level meters themselves.	Provide appropriate red and green bands on level meters, or other set point display. (G4)	2	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
2-16	Core spray system labels lack clarity.	Relabel. (G1)	2	
2-17	Status lights for EMRVs not accurately labeled.	Relabel (G1)	2	
2-18	Difficult to correlate electrical displays with controls on benchboard.	Provide new labeling and demarcation. (G1, G5?)	2	
2-19	Some electrical displays and controls are mirror-imaged causing confusion.	Provide new labeling and demarcation. (G1, G5?)	2	
2-20	Emergency service water controls and displays are confusingly labeled.	Relabel. (G1)	2	
2-21	Arrangement and labeling of ventilation system controls is confusing. Mimic would help.	Relabel and consider incorporation of limited mimic. (G5)	2-Relabel 1A-EML	
2-22	Because of design modifications, many controls and displays are add-ons (such as recorder and meter scales).	Upgrade jury-rigged recorder and meter scales. (G2)	2	
2-23	Controls for radioactive off-gas are obscurely labeled.	Relabel. (G1)	2	
2-24	Dilution system controls obscurely labeled	Relabel. (G1)	2	
2-25	Chemical poison system pressure and flow meters are unlabeled.	Label. (G1)	2	
2-26	Chemical poison system indicator lights confusingly labeled.	Relabel. (G1)	2	
2-27	Label plates of fire detection system difficult to read and interpret.	Relabel. (G1)	2	
2-28	Nomenclature for fire protection system controls inconsistent and confusing.	Relabel. (G1)	2	
2-29	No setpoints or limits are formally incorporated on Oyster Creek displays.	Add red and green range bands or setpoint/limits label plate. (G4)	2	
2-30	Displays are rarely labeled with system headings.	Relabel. (G1)	2	
2-31	Controls used under "off-normal" conditions are not distinctively labeled.	Relabel. (G1, G6)	2	
2-32	Inadvertent actuation of wrong control has occurred.	Relabel. (G1)	2	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
2-33	Labels not easy to read - dirt, wear, letter size, etc.	Relabel. (G1)	2	
2-34	The identifying component number is not engraved on most label plates.	Relabel. (G1)	2	
2-35	Difficult to coordinate backboard displays with related benchboard controls.	Addition of demarcation lines, system overview labels, and better individual labels will correct this deficiency. (G1)	2	
2-36	Displays on panel backboards have horizontal oriented progression, while related controls on adjacent benchboard have vertical progression.	Inconsistency does not appear to create significant operational difficulties; relabeling and demarcation should alleviate this problem. (G1)	2	
2-37	Some meters have excessively fine scale graduations.	Correction of display meter scales is best handled on a case basis. (G2)	2	
2-38	Water level meters and recorder have inconsistent units and zero.	Correct scale units, use consistent zero for meters and recorder.	Completed	Levels referenced to TAF
2-39	Meters do not have color bands nor limit markers.	Add color bands where appropriate. (G4)	2	
2-40	Several meters and recorders employ odd scale divisions or multipliers.	Correct odd scales. (G2)	2	
2-41	"Reheat" and "Intercept" valve positions are displayed on common dual scale meters. The indicators are very confusing and should be color coded.	Color code label plate and meter pointers.	2	
2-42	Some display scale graduations and unit labels are too small and difficult to read.	Scale graduations and labels will be improved, where meter size permits. Uncorrected meters will be evaluated for replacement. (G1, G2)	2 1A	
2-43	There are many instances where operators and technicians have hand-lettered meter scales.	Replace meter scales as necessary. (G2)	2	
2-44	Labels not easy to read; letter size criteria not met.	Relabel. (G1)	2	
2-45	Display labels are located <u>below</u> display, while control labels are <u>above</u> controls.	When displays are relabeled, labels should be moved above respective displays. (G1)	2	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
2-46	Information on detector which drives the display is seldom provided.	Provide information on new labels. (G1)	2	
2-47	Descriptive labels for individual meters are confusing to read.	Relabel. (G1)	2	
2-48	Control room displays do not have limits and setpoints in a clear, unambiguous manner.	Correct as part of general meter upgrading. (G4)	2	
2-49	Yellow color code has various meanings.	All indicators will be reviewed and changed to the color commonly used in the utility industry. (G6)	1A	
2-50	ATWOS control display labels are not oriented horizontally.	Reorient. (G1)	Completed.	
2-51	Recorder scales are often difficult to read.	Provide improved scales. (G2)	2	
2-52	Recorders are supplied with temporary dynotape labels, one of which indicates the file number of the recording. The purpose of the other number is unknown.	Provide permanent label plates. (G1)	2	
2-53	A number of recorder scales and variables are hand-lettered.	Replace scales. (G2)	2	
2-54	On a number of 2-pen recorders on panels 10F and 12XR, the color code of the recorder pens is not correlated with the label plate that identifies the variable.	Relabel with color coded plates. (G1)	2	
2-55	Glare on benchboard label plates.	Replace label plates with low glare black-on-white plates. (G1)	2	
2-56	Pump and valve indicator lights are less than 10% brighter than their backgrounds.	Replace old and discolored lens caps. Evaluate solutions to light variability problem.	2, 1A	
2-57	Some controls have temporary labeling.	Relabel. (G1)	2	
2-58	Temporary aids do not look professional.	Relabeling program will include the replacement of temporary operational aids. (G1)	2	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
2-59	The alarms which provide the first cue as to a condition requiring entry into the emergency operating procedure do not have unique identifications and/or locations	Add unique identifiers for reactor and containment control emergency operating procedures to alarm panels, and elsewhere as appropriate.	2	
2-60	Labeling of the alarms for drywell temperature high is inappropriate.	Relabel alarm title.	2	
2-61	The alarm currently labeled "containment spray auto start disabled" is mislabeled.	Relabel.	2	
2-62	The 3 indicator lights on the controllers for the 5 electromatic relief valves are labeled misleadingly.	Relabel. (G1)	2	
2-63	The containment spray system control currently labeled "dynamic test" is misleadingly labeled.	Relabel. (G1)	2	
2-64	It is not clear that the ammeters provided for the containment spray system apply to the emergency service pumps and not to the containment spray pumps.	Relabel. (G1)	2	
2-65	It is not clear that the flow-meters provided for the containment spray system are total containment spray flow and not emergency service water flow.	Relabel. (G1)	2	
2-66	Drywell vent and purge controls are located on a back panel and arranged in a confusing way with inadequate labeling.	Relabel and demarcate. Consider rearranging to provide mimic. (G1, G5)	2, 1A	
2-67	Control switches for valves in cleanup system are confusingly arranged.	Relabeling will mitigate; mimicing should be evaluated. (G1) (G5)	2, 1A	
2-68	Controls on containment spray system are mirror-image.	Relateling will reduce chance for error; control operations are deliberate. (G1, G5?)	2	
2-69	The condenser backwash controls are mirror imaged.	Relabel, evaluate rearrangement and/or mimicing. (G1, G5)	2, 1A	
2-70	Electrical system displays not well grouped.	Labeling may mitigate. Consider selected rearrangements. (G1, G5?)	2, 1A	
2-71	A mimic would be useful in checking valve lineup (Condenser Backwash Controls).	Consider rearrangement or mimicing. (G5)	1A	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
2-72	No universal color code for "off-normal" condition.	Where "off-normal" status is operationally useful, employ yellow or amber color. (G6)	3	
2-73	No indication of "normal" lineup of valves and other controls for ease of checking.	No corrective action recommended (problem has been lived with).	4	
2-74	For certain angular positions, the needle of the GE circular electrical meters can obscure the number adjacent to the scale mark to which it is pointing.	Consider replacement of meter scales. (G2)	4	
2-75	Differences in units exist between rate and integral displays for fluid system.	Evaluation will be done to add labeling showing tank capacities and relationship between volume and level.	1A	

GROUP 3

ADMINISTRATIVE

- MODIFY PROCEDURES (Provide visual aids)
- TRAINING
- MAINTENANCE PRACTICES
- HOUSEKEEPING
- TESTS

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
3-1	Single selectable CRD flow control valve has limited capacity.	No hardware change recommended at this time. Test of CRD system as makeup source is recommended.	Complete	
3-2	No procedural guidance or test basis for setting maximum flow from CRD pumps.	No hardware change recommended at this time. Test of CRD system as makeup source is recommended.	Complete	
3-3	Procedures are not heavily used in many off-normal evolutions.	Symptom oriented emergency procedures are being developed for OCNGS.	Complete	Procedures implemented.
3-4	Need valve controls, suction pressure and total flow indication for CRD pumps.	Run CRD makeup test. Develop plan of modifications, if shown necessary by the test.	Complete	Test data and design review resolved.
3-5	Walkie-Talkie communications have not been fully tested when repeater power has been lost.	Perform test.	Complete	Additional battery powered radios made available for loss of power events.
3-6	Not obvious which of the outputs of the 4 instruments measuring torus water temperature represents the bulk average torus water temperature needed for the containment control procedure.	Provide specific instructions.	1	
3-7	Reactor operators appear to misinterpret the "failure to scram" entry condition to the reactor control procedure.	Training item.	1	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
3-8	The conditions for exiting the procedures are not explicitly defined and operators think they can exit from a specific second level procedure before they can exit from the procedures as a whole.	Training item	1	
3-9	Simultaneous implementation of the site Emergency Plan with the emergency operating procedures places an excessive burden on the Shift Superintendent.	Consider assigning direction of the emergency plan to the director of operations or his designate, who could be on call.	Complete	Shift Assistants added to each shift.
3-10	The scale units and zeros on the newly-added wide range torus water level indicators are not consistent with those for the narrow range level indicators. Also, the wide range limits in the procedure are inconsistent with the narrow range limits.	o Provide dual scale information in procedure (short-term).	1	
		o Provide dual scale information on meters and recorders. (G2)	2	
3-11	Appropriate warning regarding the consequences of lining up the core spray system valves needed in the procedure and on the control panel.	o Include appropriate warning in procedure and training.	1	
		o Add appropriate warning labels.	2	
3-12	Speed/load changer switch works in opposite direction expected.	No action recommended because of risk if changed. Traning allows operators to adapt.	Complete	Training compensates.
3-13	Present emergency plan format is cumbersome to use.	Provide summary action level matrix.	2	
3-14	Control room operators do not carry a pass key to control room.	Make keys available to operator.	1	
3-15	A third control room operator is desirable.	On many shifts one is provided. Evaluate providing one on all shifts.	Complete	Extra operator will be made available as policy. Not a safety requirement.
3-16	Lack of regular calibration program with some instruments.	Upgrade calibration program for nonsafety related equipment.	2	
3-17	Chart paper is not correctly matched to scales on a number of recorders.	Provide better stock of recorder paper, appropriately indexed, and readily accessible to control room operators.	1	
3-18	Filters were not in place at the fan suction.	Maintain filters in place.	1	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
3-19	Set of operating procedures on desk is worn and dirty.	Replace procedure binder and tabs.	1	
3-20	It is difficult to establish accurately the existence of power level above 2 percent if the actual power level is the order of 2-5 percent and the reactor operator uses the Average Power Range Monitor recorders to read power level.	Provide appropriate training for operators to use intermediate range instruments.	Complete	
3-21	The operator has no instrument by which he can directly read the level reached when flooding the drywell.	Add appropriate instructions. Add instrument, if necessary. (Consider use of drywell pressure instrument and wide range torus water level instrument.)	1, 3	
3-22	Emergency operating procedures must be stored in the control room.	Provide storage space in the control room.	1	
3-23	Scrams may result if operator incorrectly switches IRM ranges.	Training compensates.	Complete	
3-24	Off gas flow recorder on 10F not used because of lack of experience and knowledge.	Training item.	1	
3-25	Generator power output meter is inaccurate.	Calibrate "nonsafety" instruments more frequently.	Complete	
3-26	Changes in plant operating practice are not reflected in written procedures.	Revise written procedures to reflect present plant status and practice.	Complete	
3-27	Some procedures have not been revised to reflect practices shown to be effective.	Revise written procedures to reflect present plant status and practice.	Complete	

GROUP 4

HARDWARE

- REMOVAL (Unused, non-functioning)
- REARRANGEMENT/RELOCATION (Meters, Switches, etc.)
- MODIFICATION (Control Logic, Interlocks, etc.)
- REPLACEMENT (Recorders, Switch Handles)
- ADDITION (Integrated-Consolidated Display, etc.)
- FLUID SYSTEM CHANGE

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
4-1	Operator is unable to confirm by meter reading the "triple-low" water level.	Display output in terms different from downcomer water level or correlate to other instruments.	1	
4-2	Need displays of frequency for diesel generator.	Provide frequency displays.	1	
4-3	Local drywell temperatures that are recorded and alarmed in the control room are the 5 temperatures at the five drywell coolers - near the bottom of the drywell.	Provide specific instruments (as necessary) and instructions on which drywell temperature should be used as an entry condition.	1	
4-4	There are many differences among the various reactor water level instruments in terms of the process variables they respond to and their sensitivity to the drywell temperature.	Provide reference leg temperature measurements and clear instructions on how to use them to correct reactor water level measurement.	1	
4-5	LPRM trend recorder is seldom used by operators.	Remove recorder. (G10)	2	
4-6	Blank vertical meter on 4F backboard distracting.	Remove meter. (G10)	2	
4-7	Order of instruments is not natural.	Interchange steam flow and condenser vacuum displays.	2	
4-8	Steam pressure recorder not easily seen on control board.	Provide integrated easily viewed consolidated display. (G11)	2	
4-9	Hard to view pressure recorder while using turbine bypass controls.	Provide consolidated display. (G11)	2	
4-10	Lack of reactor coolant temperature information on Oyster Creek control board.	Provide consolidated display. (G11) Add satuation temperture to CRT.	2 3	
4-11	Direction of motion of turbine control switches work the opposite way expected.	Modify switches. Consider change when replacing pressure regulator.	4	
4-12	Circular meter pointers move opposite the motion of associated control switch.	Correct if control switches are modified.	4	
4-13	Should be a protective cover on vacuum breaker control.	Provide protective collar.	2	
4-14	Some controls are not used on generator section of control board.	Remove unused (or disconnected) controls. (G10)	2	
4-15	Question usefulness of second MVAR meter.	Remove the "add-on" MVAR meter. (G10)	2	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
4-16	Water level indicators are not easily viewed from clean-up system letdown valve controls.	Add consolidated display. (G11)	2	
4-17	No display or alarm for reactor building sumps or torus room sump in control room.	Consider adding appropriate alarms or displays in control room.	1A	
4-18	Reactor water level meters hard to read from 1F/2F where core spray controls are located.	Add consolidated display. (G11)	2	
4-19	Arrangement of control switches for recirc. pump isolation and bypass valves confusing and not same as used elsewhere.	Modification to valve interlocks and control arrangement is planned for long term.	2	
4-20	A complicated procedure required to bring cleanup system on line due to valve control logic.	Correct anomaly in isolation valve control logic.	2	
4-21	Valve to operate recirculation valve is in high radiation zone.	Move valve operation switch to low radiation location or make system automatic as originally designed.	3	
4-22	No information displayed for vital 480VAC motor control centers.	Provide improved status information on vital power.	3	
4-23	Controls and displays for emergency diesel generators are confusingly arranged.	Rearrange (it may be necessary to operate controls under marginal lighting conditions). (G5)	2, 3	
4-24	The raise-lower control for diesel generators works opposite way expected.	Consider rewiring control to make correct.	3	
4-25	Few indications of status of vital low voltage (120VAC, 125 VDC) power distribution systems.	Improved status information on vital power was planned by modification. Some has been provided by alarm system changes. Provide missing status information.	3	
4-26	Newly added fire protection system controls haphazardly arranged (pond pump 2 and backup fire pump).	Rearrange. (G5)	2	
4-27	Status lights for fire system jockey pump still remain, though unused.	Remove. (G10)	2	
4-28	Need auto-manual transfer control of condenser hotwell control.	Provide transfer function in CR.	3	
4-29	Many instances where displays needed to support operations in off-normal situations are not conveniently located.	Handle on a case basis.	2, 3	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
4-30	Valve position indicators generally follow a convention of red for open (flowing) and green for closed (not flowing). Valve positions displayed on panel 10XF, however, use amber for the open positions.	o Change lens caps to appropriate color. (G8) o A change to the intensity of the indicator lamp may also be necessary.	2 3	
4-31	Recorders are unreliable, hard to read, hard to maintain.	Replacement of some multipoint recorders is planned. Evaluate need for trend information on remaining recorders (both multipoint and 2-pen). Provide replacement recorders or other means of displaying trend information (e.g., computer trend) where required. (G3, G9)	2, 3	
4-32	Handle is removed from the spare exciter field thermostat control on panel 8F/9F.	Remove this never-used device. (G10)	2	
4-33	Control switch handles should be coded (size, shape, color).	Correct by coding (size, shape, color) switch handles.	2	
4-34	Some controls are not adequately identified nor protected.	Replacement of switch handles with redundantly coded handles, e.g., shape and color, is recommended.	2	
4-35	Progression of multiple displays is inconsistent with normal conventions (left to right progression).	Can usually be corrected by interchanging the location of a few displays. (G5)	1A	
4-36	There is some chance of misreading the 2-pen, 2-scale recorders used throughout the control room.	Replace. (G3) New recorders should color code pens with labels, to facilitate identification of variables.	3	
4-37	Design and operation of strip chart recorders is inadequate.	Replacement of some multipoint recorders is considered. Evaluate need for trend information on remaining recorders (both multipoint and 2-pen). Provide replacement recorders or other means of displaying trend information (e.g., computer trend) where required. (G3, G9)	1A	
4-38	Recorders are mechanically unreliable.	Replace recorders.	2, 3	Recorders have been reviewed and prioritized. Some were replaced in last outage. Others will be replaced in next two outages.

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
4-39	Selection of time scale and recorder speed often do not allow the rate of change information the operator needs to be inferred from the recording.	Replacement of some multipoint recorders is considered. Evaluate need for trend information on remaining recorders (both multipoint and 2-pen). Provide replacement recorders or other means of displaying trend information (e.g., computer trend) where required. (G3, G9)	1A	
4-40	Panel components in poor condition.	Refurbish as required.	1B	
4-41	High drywell pressure must be confirmed by consulting a back panel indicator.	Locate narrow range drywell pressure indicator on front panel or incorporate in consolidated display. (G11)	3	
4-42	Rate and direction of change of drywell pressure over a wide range must be read from a newly-added back panel recorder.	Add wide range drywell pressure recorder on front panel or incorporate rate of change information in consolidated display or on computer display. (G11, G9)	3	
4-43	All the torus water level instruments utilize a common standpipe.	Investigate means for ensuring standpipe is full.	1A	
4-44	The senior operator and the shift technical advisor have difficulty in visually collecting the data they need to execute their overseeing responsibilities.	Add consolidated display with EOP entry variables. (G11)	2, 3	
4-45	Operator must confirm the de-energization of the 8 scram solenoids by checking the 8 indicator lights on one of the back panels. In addition, burned out indicator light bulbs can lead operator to make a serious error.	Indicator lights should be put on front panel.	1A	
4-46	Control of the CRD pumps is lost if power to panel 4F is lost.	Being corrected as part of another modification.	2	
4-47	Water pressure meters do not indicate presence or absence of water in water boxes.	A fluid system modification is necessary to ensure that water boxes are full. Remove present meters which are not useful.	4	
4-48	Reactor pressure indicator is redundant to two heat exchanger pressure indicators.	Consider removing unnecessary pressure meter, or make scales consistent, or replace with consolidated display. (G10)	1A	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
4-49	Controls for electrically operated relief valves (EMRVs) are illogically arranged.	Rearrange. (G5)	2	
4-50	Display for condensate demineralizer dp is poorly located.	Relocate to 5F/6F. (G5)	2	
4-51	Distracting extraneous power information is provided for many buses.	Evaluate need for meters, remove unnecessary meters. (G10)	2	
4-52	Voltmeters are above ammeters for A & B batteries, below for C battery.	Rearrange. (G5)	2	
4-53	Ground detecting indicator, voltmeters and ammeters inconsistent arrangement.	Rearrange. (G5)	2	
4-54	Recorder displaying closed cooling water temperatures to reactor building machinery and turbine building machinery is confusingly labeled; temperature information is difficult to read; there are no CCW alarms.	Improve labeling. Recorder modification, (planned 1983 outage) may enhance readability of these variables. Long term: consider adding CCW alarms. (G3)	Completed	
4-55	Excessive reach to valve controls and test buttons (too high) on panel 11F.	Relocate.	2	
4-56	Need containment purge and vent controls and displays on front panel.	Evaluated incorporating displays in integrated display.	2	
4-57	ATWOS reactor recirculation pump trip displays/ controls are not needed on front panel.	Consider relocating.	1A	
4-58	Two-pen recorders fail as is and the absence of chart motion may not be immediately obvious.	On replacement 2-pen recorders, consider use of "power on" light. (G3)	1A	
4-59	Controls difficult to reach, (ATWOS and Steam line valve controls too high, others too low).	Consider relocation of steam line valve controls, for others, no corrective action recommended at this time.	1A	
4-60	Vacuum pump controls on panel 13R are opposite the normal left-to-right sequence.	Consider rearrangement, relabeling. (G5, G1)	1A	
4-61	Certain valve controls on panel 12XR are out of normal sequence.	Consider rearrangement, relabeling. (G5, G1)	1A	
4-62	Control for the 3 feedwater pumps are in a horizontal array, while the controls for the 3 condensate pumps that supply them are arranged vertically.	Consider rearrangement, relabeling. (G5, G1)	1A	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
4-63	MSIV test Pushbuttons are hard to operate.	Relocation of these pushbuttons (to a lower location) may improve operability. (G5)	1A	
4-64	On panels 13R, left and right, test selection switches for the reheat stop valves and the selectors for the turbine bypass valves rotate through 360.	Consider switch replacement.	1A	
4-65	Inconsistent positioning of "auto" or "normal" of several switches.	No recommended actions since action is deliberate; consequences are minor and do not affect safety.	4	
4-66	The fuel zone reactor level recorder is located several feet away from other reactor level displays.	Consider providing on consolidated level display or on computer driven CRT. (G11 or G9)	2, 3	

GROUP 5

COMPUTER SYSTEM ADDITION

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
5-1	Dispersion of controls and displays causes difficulty in obtaining coherent picture of state of torus and drywell variables.	Provide coordinated displays on plant computer CRT. (G9).	3	
5-2	2-pen recorders do not display trend information effectively.	Consider use of CRT display for needed trend. (G3, G9)	3A	
5-3	Important variables are displayed only on multipoint recorder, where they are difficult to read.	Provide selectable computer driven readouts for operators. (G9)	3	
5-4	The recorders used to display the output of individual radiation monitors are unreadable.	Replace the recorders or display output on computer driven CRT. (G3, G9)	3	
5-5	Operator cannot easily determine if change in flux is that expected for rod movement.	Provide feedback via Computer Driven Displays. (G9)	Completed	
5-6	Perturbations in power demand arise that result in reactivity requirements outside the range foreseen in the night orders.	Provide feedback via Computer Driven Displays. (G9)	Completed	
5-7	Reactor engineers may err, calculationally or typographically, formulating night orders.	Provide feedback via Computer Driven Displays. (G9)	Completed	
5-8	Reactor operator may err, reading night orders and translating them into action.	Provide feedback via Computer Driven Displays. (G9)	Completed	
5-9	No single reactor power level indication.	Display average neutron power on CRT. (G9)	3	
5-10	Circ water flow, and other variables not available on front panels.	Display circ water temperature differential, pump current and steam flow on plant computer CRT. (G9)	3	
5-11	Circulating water inlet temperature not displayed on front panel.	Provide on plant computer CRT display. (G9)	3	
5-12	The automatic control for two valves involved in hot well level is outside control room, no indication of valve position is displayed in control room.	No short term action recommended on control location. Provide valve position record on plant computer. (G9)	3	
5-13	Conductivities displayed on recorders are difficult to read.	Display conductivities in plant computer driven CRT. (G9)	3	
5-14	Voltage information is sparse - especially for the 480 buses.	Provide Bus Voltage display from plant computer. (G9)	3	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
5-15	Little temperature information for service water.	Display service water temperature on plant computer CRT. (G9)	3	
5-16	No emergency service water temperatures are displayed.	Display ESW temperatures on plant computer, CRT. (G9)	3	
5-17	Multi-point recorders for radiation monitors are unreadable.	Operators currently use output meters on panels 1 and 2R. Provide radiation monitor display on computer CRT. Remove recorders. (G9)	3	
5-18	Outputs of instrument channels are displayed on meters outside operator's field of view.	Operators currently use output meters on panels 1 and 2R. Provide radiation monitor display on computer CRT. (G9)	3	
5-19	Two-pen recorders for radiation monitors are unreliable and require frequent maintenance.	Replace 2-pen recorders or provide needed trend information on computer CRT or by other means. (G9)	3	
5-20	Need condensate dump and vacuum drag valve positions, or flow rates.	Consider adding to computer CRT.	3A	
5-21	Need closed cooling water system temperature displays on front panel.	Provide on computer CRT. (G9)	3	
5-22	Need displays for bearing, winding and water temperature for main generator, reactor recirculation pump and CRD on front panel (on demand).	Provide on computer CRT. (G9)	3	
5-23	Need radiation monitoring readouts on front panel (on demand).	Provide on computer CRT. (G9)	3	
5-24	Need turbine information to monitor operation of machine on front panel (on demand).	Provide on computer CRT. (G9)	3	
5-25	Some reactor recirculation pump electrical displays are not needed on front panel.	Remove from front panel, provide on CRT. (G9, G10)	3	
5-26	Some auxiliary electric power displays are not needed on front panel.	Remove from front panel, provide on CRT. (G9, G10)	3	

GROUP 6

CONTROL ROOM ENVIRONMENT

- REFURBISH PANEL FRONTS (i.e., Painting, etc.)
- LIGHTING
- VENTILATION
- NOISES
- ACCESS CONTROL
- REARRANGEMENT

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
6-1	Poor workmanship on newly installed fire system switches.	Refurbish.	2	
6-2	Modifications are not consistent with original arrangement codes.	Refurbish modifications not professionally done.	2	
6-3	Room is dusty and floor is gritty.	Clean ducts, maintain filters. If problem persists, provide dust removal in air intake.	2	
6-4	Operators claim high background sound noise level.	Remove continuous air monitor from control room. Consider addition of carpet.	Completed	
6-5	Poor condition of paint on console benchboard.	Repaint.	1	
6-6	Paint on walls has deteriorated.	Repainting of room is planned.	1	
6-7	Equipment operators and maintenance technicians somtimes interfere with the operators vision of control board.	A rearrangement of the desks in the control area is under consideration. Relocation of Blocking and Tagging to reduce this problem will be considered.	3A	
6-8	Location of GSS office inhibits an efficient overview function.	Relocate GSS office to room currently occupied by Prime Computer.	4	
6-9	Some controls can be jarred by walking by.	Rearrange traffic pattern by relocation GSS office, Blocking and Tagging desk.	3	
6-10	There is no means for adding or controlling humidity.	Evaluate installing reliable humidifier.	1A	
6-11	Air conditioning system is unreliable.	Install and maintain filters, clean ducts, maintain records. If records indicate compressors a problem, replace and upgrade system. Control Room habitability modification will correct.	3	
6-12	Hard to control traffic, noise and confusion in control room.	Relocate tagging operator's station. Relocate shift supervisor's office to control access.	3A	
6-13	Present location of GSS/GOS office is unable to prevent casual entry to control area by personnel who have no reason for being there.	Relocate GSS office to room currently occupied by Prime Computer.	4	

GROUP 7

NO ACTION REQUIRED OR

DEFICIENCY CORRECTED

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
7-1	Core spray valve controls cannot be used to throttle flow.	Modify controls.	Corrected	
7-2	Interplay of breaker and auto start logic complicates the water level control operation on core spray.	Modify logic.	Corrected	
7-3	Auto start logic train status incompletely displayed on alarm panel.	Modify status display.	Corrected	
7-4	Effective confirmation of high drywell temperature and high torus temperature requires that replacement recorders be added.	Add replacement recorders, with selectable digital readouts of individual data points.	Completed	
7-5	IRM and LPRM sensitivities are unable to meet requirements that APRM channels be on scale before entering "run" mode.	Corrected by GPUN Mod "Range 10 Addition".	Corrected	
7-6	Transmissivity of annunciator tiles varies severely.	Annunciators are being replaced.	Completed	
7-7	The conditional statements imposed on the operators appeared only once in the original version of the procedures and are not easily remembered.	Reformating of the procedures has corrected this.	Completed	
7-8	The tables of valve lineups and other data tended to disrupt the information flow of the procedures.	Reformating of the procedures has corrected this.	Completed	
7-9	Some operators have difficulty coping with logical branches (the "If...then" step of a procedure) deciding whether or not to proceed to the next step.	Reformating of the procedures has corrected this.	Completed	
7-10	There is some difficulty in allocating responsibilities to operators so that they control only one key variable at a time.	o A specific "division of labor" system has been worked out.	Completed	
		o Procedures for the key variables have been organized by operator responsibility in color-coded, spiral binders which are stored in a 3-ring binder.	Completed	

ITEM No.	DEFICIENCY	DESCRIPTION OF CORRECTIVE ACTION	SCHEDULE CATEGORY	RESOLUTION
7-11	Inconsistent color used for the position displays and positions of air operated scram valves for each rod.	Operators have adapted; no action recommended.	---	
7-12	Difficult to determine on what channel output is displayed by pen recorder because of different IRM ranges.	Corrected by procedural guidance and training.	Completed	
7-13	Isolation condenser control switch is on 5F/6F instead of 1F/2F.	Not a serious problem: no corrective action recommended.	---	
7-14	Operators have never used controls to control the condensate makeup and discharge valves manually.	No action required.	---	
7-15	Surplus of electrical displays could confuse operators.	No evidence of operator confusion. (G10)	---	
7-16	Recirculation cleanup flow controller is never used in automatic mode.	No change recommended.	---	
7-17	Controls for turbine and reactor building closed cooling water pumps and discharge pressure displays are out of operator's normal field of view.	No corrective action necessary. Alarms alert operator to trouble.	---	
7-18	Undisplayed steam line radiation channels could lead to half or full scram.	Back panel indication is adequate.	---	
7-19	Service air compressor controls are not needed on front panel.	No action required.	---	
7-20	Electromagnetic noise problem with some nuclear instruments.	No corrective action recommended; not a safety program.	---	
7-21	Neutron flux recorders for IRMs and APRMs have ranges difficult to use.	No action recommended. Training compensates.	---	
7-22	Inconsistency among scale units exists with temperature displays (C^{O} and F^{O}).	Operators have adapted.	---	
7-23	The highest temperatures are founding access-ways, but no cross-ventilation provided.	No action at this time. When air conditioning runs, temperatures O.K.	---	
7-24	The exhaust opening is much smaller than the intake opening causing increased air pressure.	No action recommended.		