CONTROL ROOM DESIGN REVIEW

and

EMERGENCY PROCEDURE

FUNCTIONAL TASK ANALYSIS

SUMMARY REPORT

September, 1985

W N P - 2

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

CONTROL ROOM DESIGN REVIEW

AND

EMERGENCY PROCEDURE

FUNCTIONAL TASK ANALYSIS

SUMMARY REPORT

SEPTEMBER, 1985

Washington Public Power Supply System

WNP-2

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SECTION 1

WNP-2

SUMMARY REPORT INTRODUCTION

The Supply System has performed a Detailed Control Room Design Review (DCRDR) and Emergency Procedure Functional Task Analysis Program in accordance with NUREG-0660 and NUREG-0737, Supplement 1.

The approach has been to:

- Participate as an active member in the Boiling Water Reactor Owners' Group (BWROG) Detailed Control Room Design Review Program and BWROG Emergency Procedures Guideline Subcommittee.
- Establish a WNP-2 Task Force for detailed assessment and resolution of Control Room human factor concerns and to provide configuration control for on-going changes to the WNP-2 Control Room.
- Develop and maintain WNP-2 Emergency Procedures in accordance with the provisions of approved BWROG Guidelines.

This report, in conjunction with those reports listed below, provide a detailed account of the WNP-2 Control Room Human Factors and Emergency Procedure Functional Analysis program; these reports complete the WNP-2 Control Room Design Review Program Plan.

o BWR Owners' Group Control Room Design Review Program Plan	August, 1981
o WNP-2 Preliminary Control Room Human Engineering Design Report	January, 1982
o WNP-2 Control Room Design Review Preliminary Report	April, 1983
o NRC Human Factors Engineering Preliminary Design Assessment Audit	August, 1983
o WNP-2 Response to NRC Human Factors Engineering Preliminary Design Assessment Audit	October, 1983
o WNP-2 Detailed Control Room Design Review Program Plan	February, 1984
o NRC Review Comments on the WNP-2 Detailed Control Room Design Review Program Plan	May, 1985

Section 2.0 of this report provides an update for the WNP-2 Detailed Control Room Design Review Program Plan submitted in February, 1984.

Section 3.0 of this report responds to prior Survey Review Findings; this section:

- Documents the completion of open survey reviews not performed during plant construction.
- Documents the resolution of deferred findings.
- Documents findings whose proposed resolution and schedule has been modified from that response noted in prior reports.

Section 4.0 of this report identifies the scope and summarizes the results of the WNP-2 Emergency Procedure Functional Task Analysis Program.

SECTION 2

WNP-2

PROGRAM PLAN UPDATE

2.1 INTRODUCTION

This Section of the Summary Report provides an update for the WNP-2 Control Room Design Review Program Plan submitted to NRC in February 1984, and responds to NRC comments of May 1985.

2.2 OPERATING EXPERIENCE REVIEWS

Section 5.1.1 of the Program Plan stated that WNP-2 had no operating history. Therefore, a review of LERs and scram reports could not be performed under the BWR Owners Group Program. However, during the WNP-2 Task Force reviews, considerable input was obtained from experienced operators, from operating experience and from Control Room design review reports for other plants. Also, WNP-2 had established an onsite Nuclear Safety Assurance Group (NSAG) and a Human Factors Engineer's position within the Plant Engineering Department. NSAG and the Human Factors Engineer provide formal operating experience reviews of LER and scram reports related to WNP-2. Two of the WNP-2 Human Factors Task Force members are members of the WNP-2 NSAG and a third is the Human Factors Engineer. This ensures continuation of human factors input into WNP-2 Plant Operations.

Subsequently, a License Event Report Analysis was performed at WNP-2 in accordance to the BWR Owners Group Program Plan and NUREG-0700 guidelines. All LER's and Scram Reports since December, 1983, through May, 1985 were reviewed. Reports where operator error was noted or where human engineering enhancements appeared applicable were documented on the BWR Owner's Group License Event Report form. These selected reports were reviewed in conjunction with other applicable documents, such as, Plant Modification Requests (PMR's) and NSAG Assessment Reports. Each report was reviewed against prior deficiency findings and proposed resolutions, the Emergency Procedure Task Analysis and individually, for new deficiencies if the corrective action in the reports did not appear adequate. See Section 3.2 of this report for the results of this analysis.

2.3 POST-LICENSING REVIEW TEAM COMPOSITION

The WNP-2 Detailed Control Room Design Review Program Plan identifies the original review team composition.

Post-licensing DCRDR activity required that the team be revised to maintain an appropriate multi-desciplined organization. However, with the subsequent post-licensing changes in organizations and personnel, the Task Force Team was consolidated to key members and other members were placed in a supporting role as needed.

Subsequently, new members were added to augment or replace personnel to maintain the multi-desciplined organization required to complete the program. Figure 2-1 depicts the post-licensing team composition and Section 4.3 depicts the Task Analysis Review Team composition.

2.4 HUMAN ENGINEERING DEFICIENCY PRIORITIES

Assignment of priority to findings was described in Section 6.4 of the Program Plan. Priority categories have been modified to reflect post-licensing activities.

Program Plan Priority Rating	Schedule
1	Prompt/Prior to Fuel Load
2	Near Term/After Fuel Load
3	Correction Optional

Revised Priority Rating	Schedule
1	Prompt/Prior to First Refueling Outage
2	First Refueling Outage
3	After First Refueling Outage
4	Correction Optional

References to Fuel Load were modified to First Refueling Outage as the key milestone. Additionally, Program Plan Category 2 was split into two parts; revised Category 2 and revised Category 3. Since hardware findings normally require a planned outage to correct, Category 2 was used for outage related findings not requiring a more immediate response. Category 3 was used only where long term engineering evaluations or procurement cycles were readily apparent and a more immediate response was not required.

POST-LICENSING
TEAM COMPOSITION AND ASSIGNMENT

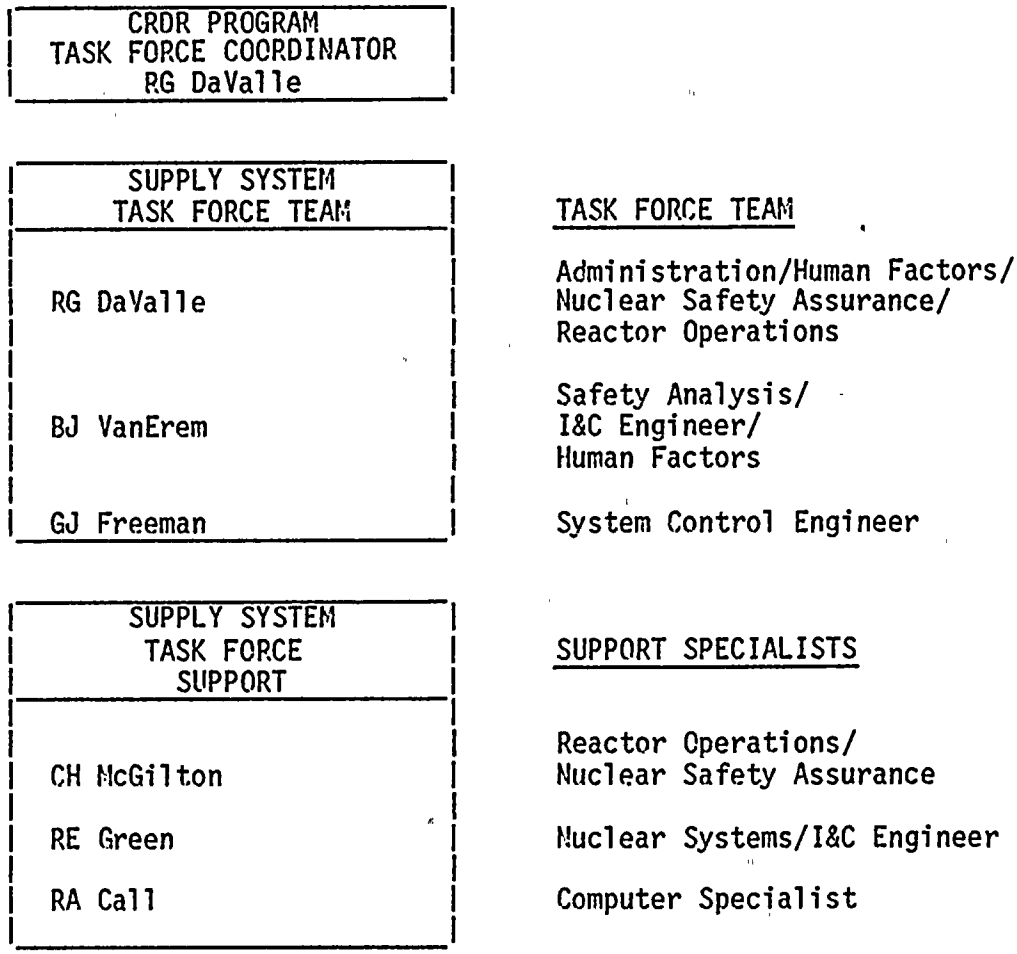


Figure 2-1

SECTION 3

WNP-2

SURVEY REVIEW PHASE

3.1 INTRODUCTION

This Section addresses findings that are from the control room "Survey Review Phase" of the WNP-2 Control Room Detailed Design Review Program Plan. These findings include:

- o Open findings whose resolutions and/or schedules for correction were deferred until this Summary Report.
- o Findings whose proposed corrective action were to be verified based upon operational experience and the results of the Emergency Procedure Functional Task Analysis.
- o New findings based on completion of open survey review checklist items and analysis of WNP-2 Licensee Event Reports and Scram Reports.
- o Changes to previously approved recommendations and/or schedules.

3.2 OPEN SURVEY REVIEWS

The following open survey reviews were completed in accordance to the WNP-2 Control Room Program Plan. New findings arising from the BWROG open survey reviews are included in Attachment B. All new items are denoted by the prefix "N" in the Supply System number box and are sequentially numbered N-1 through N-5.

a. BWROG Program Survey Checklist Items (listed in document G02-83-342, Control Room Design Review Preliminary Report, dated April 14, 1983. Because WNP-2 was still under construction at the time of the BWROG design review, a complete BWROG survey of the control room could not be performed and the BWROG program survey items listed below were considered open).

(25.3.1) BWROG Survey Checklist Items:

A1.3	B3.1	E1.5	E7
A2.5	B3.2	E1.7	G5
A2.6	C9	E2.1	
A2.9	D1.1	F1.1	
A2.12	D1.2	F2.6	
A5.2	D2.4	F4	
A6	D3	F6.5	
A7	D4	F6.8	

(25.3.2) The Remote Shutdown panels were reviewed against BWROG checklist items B4.1 and B4.3, as the panels were not energized at the time of the survey.

(25.3.3) The Remote Shutdown panels were reviewed for lighting, procedure storage, and communications capability.

(25.3.4) Hardware items not installed at the time of the survey were evaluated against Section B of the BWROG checklists.

b. BWROG Program Control Room Survey Supplement dated September 20, 1983. This supplement was intended to augment the BWROG Program Survey Checklist. The supplement contains additional reviews for compatibility with NUREG-0700 guidelines per NRC Generic letter 83-18, NRC Staff review of the BWROG Control Room Survey Program, dated April 19, 1983.

c. BWROG Program Survey Section II, Licensee Event Report Analysis. The purpose of the Licensee Event Report (LER) Analysis is to identify plant specific design deficiencies known to have previously contributed to operator errors and to document the need for further evaluation.

At the time of the BWROG Survey, WNP-2 was under construction and no operating history was available for completion of Section II of the Survey Program. A review of all WNP-2 LER's and scram reports was completed from December, 1983 (fuel load) through May, 1985. During the review, 18 LER's were noted as having potential human engineering design or procedural concerns and five were identified as including operator error. A review of Plant Technical and Nuclear Safety Assurance Group's evaluations and corrective actions was performed against each event. No new deficiency findings were noted that had not been previously identified with corrective action either completed or in progress.

3.3 OPEN FINDINGS FROM PREVIOUS DOCUMENTS

Open findings that have not been resolved to the NRC's satisfaction and verified during previous on-site audits are included in this report in Attachment B. This report addresses those findings identified in the following documents:

a. NRC Human Factors Engineering Preliminary Design Assessment Audit, dated August, 1983. Included are Section "C" findings which required verification during the DCRDR. See attached Table 1.

b. NRC Review Comments on the Supply System's Detailed Control Room Design Review Program for WNP-2, dated May, 1985. The document identifies those findings to be addressed in the WNP-2 DCRDR other than Section "C" noted above. See attached Table 1.

3.4 CHANGES TO PREVICUS APPROVED FINDINGS

Previous Supply System submittals identified corrective recommendations and schedules. Based on operating experience and additional evaluation, several recommendations and/or schedules have been modified. These are included in this report and listed by NRC Finding Number in Attachment B:

C6.84	E5.51	F3.76
D6.97	E5.53	F4.36
D7.3	E5.66	F5.73
D7.14	E5.70	F6.114

3.5 INDIVIDUAL FINDINGS AND RECOMMENDATIONS

See Attachment B, Survey Review Phase, Individual Findings and Recommendations.

TABLE 1

1. Section 3.3.a Items

C3.13 C5.64 C5.66 C6.84 C6.85 C8.7 C9.2

2. Section 3.3.b Items

A1.3	D6.105	E5.11	E5.70
D1.27	D7.3	E5.51	
D2.2	D7.6	E5.52	F3.76
D3.55	D7.14	E5.53	F5.72
D3.57	D9.6	E5.54	F5.73
D3.59	D9.8	E5.55	F5.75
D5.32		E5.56	F6.114
D5.38	E1.33	E5.58	F8.50
D5.39	E1.34	E5.59	F8.51
D5.47	E3.66	E5.62	F8.52
D6.91	E3.71	E5.63	
D6.97	E4.29	E5.66	

A complete review of annunciator control system design, location, and operation is also required as a part of the DCRDR. Findings that currently address the annunciator control system are as follows:

D 3.60	E 3.70	F 3.79
D 3.61	F 3.18	F 3.80
D 3.63	F 3.77	

All annunciator system findings are consolidated under one Finding Number, E3.70.

SECTION 4

WNP-2

EMERGENCY PROCEDURE FUNCTIONAL TASK ANALYSIS

4.1 INTRODUCTION

In accordance with Supplement 1 to NUREG-0737, the Supply System has performed a Function and Task Analysis for the WNP-2 Emergency Procedures. Revision 3 of the BWR Owners Group generic Emergency Procedure Guidelines (EPGs) provide the basis for the WNP-2 Emergency Procedures (EPs). The Function and Task Analysis was performed on the Emergency Procedures to identify the plant specific information and control needs and to determine the adequacy of existing information and controls.

The scope of review under the Function and Task Analysis Program was increased from that noted in Section 5.2 of the Program Plan. Listed below is the final list of procedures that were evaluated.

GENERAL

PPM 5.0.0, Emergency Procedure General Precautions
PPM 5.0.1, Emergency Operating Procedure Flow Chart

RPV CONTROL

PPM 5.1.1, RPV Level Control (RPV/L)
PPM 5.1.2, RPV Pressure Control (RPV/P)
PPM 5.1.3, Reactor Power Control (RPV/Q)

CONTAINMENT CONTROL

PPM 5.2.1, Suppression Pool Temperature Control (SP/T)
PPM 5.2.2, Drywell Temperature Control (DW/T)
PPM 5.2.3, Primary Containment Pressure Control (PC/P)
PPM 5.2.4, Suppression Pool Level Control (SP/L)
PPM 5.2.5, Secondary Containment Control
PPM 5.2.6, Radioactivity Release Control

EMERGENCY PROCEDURE CONTINGENCIES

PPM 5.3.1, Level Restoration (Contingency)
PPM 5.3.2, Emergency RPV Depressurization (Contingency)
PPM 5.3.3, Steam Cooling (Contingency)
PPM 5.3.4, Core Cooling Without Level Restoration (Contingency)
PPM 5.3.5, Alternate Shutdown Cooling (Contingency)
PPM 5.3.6, RPV Flooding (Contingency)
PPM 5.3.7, Level/Power Control (Contingency)

Section 4.2 briefly describes the methodology utilized in the Task Analysis. This particular method was described in detail and transmitted to the NRC in letter number G02-84-81, dated February 17, 1984.

Section 4.3 briefly describes the Task Analysis Review Team.

Section 4.4 presents a summary of the Task Analysis findings and a brief description of their proposed resolution.

Section 4.5 lists each finding individually with the proposed resolution and scheduled date of implementation.

4.2 TASK ANALYSIS METHODOLOGY

The Task Analysis separated each decision and action to facilitate identification of the control and information requirements. The Task Analysis method used is independent of existing WNP-2 instrumentation and controls; it first defines information and controls that are necessary, then the available information and controls are examined to ensure the requirements are satisfied and that they are compatible to the operator's needs. As shown in Figure 1, the Information (I), Decison (D), and Action (A) functions have been classified to facilitate the analysis. Following the formal Task Analysis, a walkdown/talkthrough of the EPs was conducted with WNP-2 Senior Reactor Operators, Simulator Training Engineers and other support personnel noted in Section 2.0 of this report. To illustrate implementation of the Task Analysis methodology, actual samples of the Task Analysis are included.

The Task Analysis consisted of three major functional steps, controlled by implementing Tables 1, 2 and 3, respectively, as described below:

Step 1) See Table 1 (shown as Figure 2): Identify each principal control function and their associated decision and action functions.

In formulating the symptom-based, generic EPGs, the BWROG Subcommittee identified the principal control functions, satisfying the "functional" portion of the Function and Task Analysis. In the WNP-2 plant-specific Task Analysis (Table 1) provided a line-by-line comparison of the plant-specific EPs to the generic EPGs, ensuring identification of the principal control functions and associated decision/action functions. The example of Table 1, illustrates the comparison of EPs to EPGS. Also, it identifies information requirements, both implicit and explicit, and decision and action functions according to the classifications shown in Figure 1.

Step 2) See Table 2 (shown as Figure 3): Identify control and information requirements for each decision and action function.

For each of the information requirements from Table 1, a Table 2 entry is formulated. The information requirements are classified as process variables (e.g., RPV pressure) in Table 2A, plant variable functions (e.g., Suppression Pool Load Limit) in Table 2B, and system instruments and controls (e.g., LPCS System) in Table 2C. All Table 2 entries followed this format. To the left of the heavy vertical line are listed the requirements or informational needs from the EPs, and on the right are the available information (meter scales, recorders, annunciators, etc.) in the WNP-2 control room for that parameter. This format permits easy comparison of required versus available information.

Step 3) See Table 3 (shown as Figure 4): Conduct walkdown/talkthrough with reactor operators and human factors engineering.

The previous steps described the method for comparing required information and controls versus available information and controls. However, the clarity and ease of performing the EPs were further evaluated by a walkdown/talkthrough with licensed reactor operators. This was performed, under the direction of the Control Room Human Factors Engineer, using the format of Table 3. The first four columns correlate the EP section number with the available information from Table 2. Any concerns noted during the walkdown are written in the remaining space. Supplemental notes were also taken during the walkdown/talkthrough as shown in Figure 5.

Performances of these three steps in this manner led to a list of "findings" concerning the EPs. The findings were compiled by (a) comparing the information requirements to the available information and controls, (b) comparing the plant-specific procedures and information requirements to a generic set or requirements, and (c) listing comments and observations from the walkdown/talkthrough. These findings are summarized in Section 4.4. A complete list of findings with recommended resolutions is provided in Attachment C.

4.3 TASK ANALYSIS REVIEW TEAM

A special Task Analysis Review Team was established to implement the Emergency Procedure Functional Task Analysis portion of the Program Plan. The composition of the review team and support members was as follows:

EMERGENCY PROCEDURE TASK ANALYSIS REVIEW TEAM

	TASK ANALYSIS REVIEW TEAM	
	RG DaValle	Administration/Human Factors/ Nuclear Safety Assurance/ Reactor Operations
*	FD Frisch	Operations Engineer
*	RO Vosburgh	Safety Analysis/Simulator Engineer

	TASK ANALYSIS SUPPORT MEMBERS	
	TC Messersmith	Simulator Training Engineer
	ML Westegren	Simulator Training Engineer
	MJ Mann	Senior Reactor Operator
	JR Sampson	Senior Reactor Operator
	DL Whitcomb	Nuclear Systems & Analysis Engineer

*See Attachment A for Resume Briefs.

Resume briefs for review team members not included in the Program Plan are noted in Attachment A.

The Task Analysis Review Team and the Post-Licensing Task Force Review Team reviewed the findings of the Task Analysis, evaluated the identifed deficiencies and recommended resolutions for applicability and accuracy, and then assigned priorities. A Human Engineering Deficiency (HED) report was used to document all findings, propose resolutions, assign priorities and propose correction schedules as per the Program Plan.

4.4 TASK ANALYSIS SUMMARY

The Functional Task Analysis extended the relationship of the generic EPG response function to identification of the plant-specific information needs necessary to perform each of those functions. By initiating the analysis from generic procedure guidelines, the analysis identified WNP-2 requirements independent of available WNP-2 control room instruments and controls. Although this Task Analysis generated over one hundred findings, none are considered serious enough to prevent execution of the WNP-2 Emergency Procedures.

The majority of the findings are due to application of a format and style that make the decision/action statements hard to separate from information/caution/condition statements. It is proposed that the EPs be revised to separate these types of statements while maintaining the intent of the EPGs. This will assist in providing the operators a clear and concise decision/action process path through the procedures. It is further proposed that the decision/action statements be designated as immediate or subsequent depending on the time and complexity of the action or decision. These proposed changes will be implemented by revising the WNP-2 Emergency Procedures Writer's Guide, Emergency Procedures and the Control Room EP Flow Chart.

Less than 25 findings are related to proposed hardware changes. These include providing a more exact RPV pressure readout, several engraving and human factor enhancement type improvements, and providing a different method for alternate boron injection. The BWROG Subcommittee will be notified regarding what is believed to be the use of an event-based statement (regarding Secondary Containment Control) in otherwise symptom-based procedures. Containment venting requirements under accident conditions will be guided by a subsequent revision of the EPG's.

4.5 INDIVIDUAL FINDINGS AND RECOMMENDATIONS

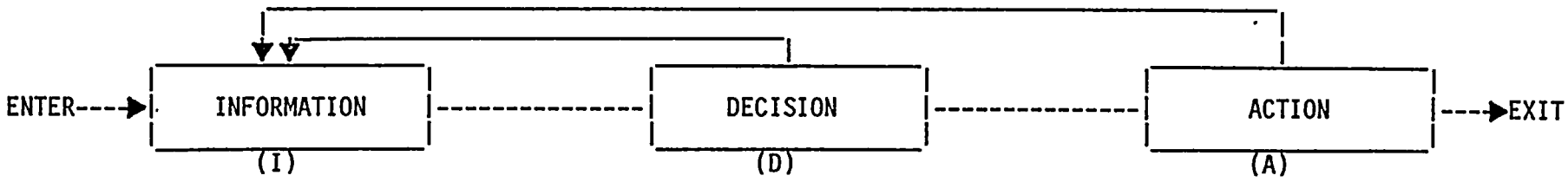
See Attachment C, Emergency Procedure Task Analysis, Individual Findings and Recommendations.

4.5.1 Those findings which are general in nature and may impact more than one EP. These findings are identified by the Supply System number of TA-G-1 through TA-G-14.

4.5.2 Those findings which are specific or unique to an individual EP. These findings have been identified by their specific EP number, e.g., Supply System Number TA-5.2.4.

FIGURE 1 - DECISION MAKING MODEL/KEY IDENTIFICATION

MODEL



FUNCTIONS

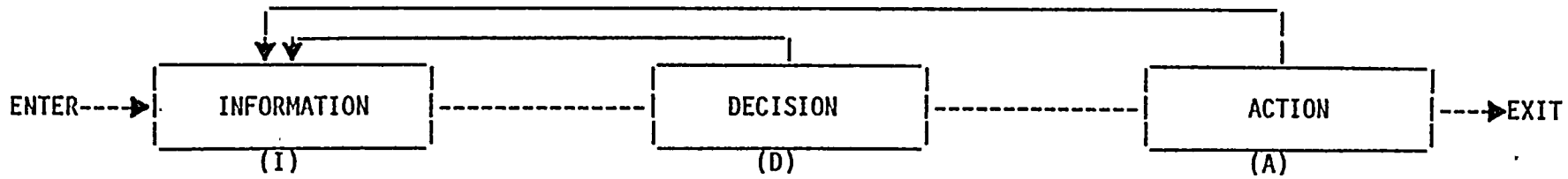
DETECT AND IDENTIFY AND PROCESS	VERIFY AND EVALUATE AND CHOOSE	MONITOR AND CONTROL

CLASSIFICATIONS

I1- Directly measurable plant parameters, such as RPV water level.	D1- Decision which requires comparison of a parameter to predetermined value or limit, such as "Above" or "Below".	A1- Action NOT directly conditioned upon an explicit decision process, such as "Open the Discharge valve".
I2- Parameters derived from one or more type I1 parameters, such as RPV saturation temperature or the heat capacity temperature limit.	D2- Decisions which requires knowledge of the present operating status of plant systems or equipment, such as "Open" or "Initiated".	A2- Actions that are directly based on the less complex decision functions (D1 or D2), such as "If pressure is below 10 PSIG, then stop the pump".
I3- Type I1 parameters as a function of time, such as RPV cooldown rate.	D3- Decisions based upon a procedural requirement, such as "If boron injection is required, ...".	A3- Actions that are directly based on the more complex decision functions (D3 and D4), such as "If reactor power is above the APRM downscale trip or cannot be determined, then trip the recirc pump".
I4- Parameters related to system status, such as valve position or breaker status.	D4- Decisions that are judgemental or which require an estimation of the future state of parameters or system status. Examples include, "If RPV water level cannot be maintained," "If RCIC is available, ...".	

FIGURE 1 - DECISION MAKING MODEL/KEY IDENTIFICATION

MODEL



FUNCTIONS

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I4- Parameters related to system status, such as valve position or breaker status.	D4- Decisions that are judgemental or which require an estimation of the future state of parameters or system status. Examples include, "If RPV water level cannot be maintained," "If RCIC is available, ...".	

EPG/EOP TASK ANALYSIS

FIGURE 2

TABLE 1: INFORMATION AND FUNCTIONAL (CONTROL) REQUIREMENTS

EMERGENCY PROCEDURE GUIDELINES (REV 3)	WNP-2 EMERGENCY OPERATING PROCEDURES	I	D	A	IMPLICIT INFORMATION REQUIRED	TYPE
CONTINGENCY #5 (CONT'D)	5.3.5 (CONT'D)					
C5-6 SLOWLY INCREASE LPCS OR LPCI INJECTION INTO THE RPV TO THE MAXIMUM.	STEP 6. SLOWLY INCREASE LPCS OR RHR INJECTION FLOW INTO THE RPV TO MAXIMUM.			A1	SEE TABLE 1-8: LPCS SYSTEM SEE TABLE 1-9: LPCI MODE OF RHR	●
C5-6.1 IF RPV PRESSURE	STEP 6.1 IF RPV PRESSURE	I1				
DOES NOT STABILIZE AT LEAST	DOES NOT STABILIZE AT LEAST		D1		RPV PRESSURE TREND	I3
[94 PSIG (MINIMUM ALTERNATE SHUTDOWN COOLING RPV PRESSURE)],	76 PSIG	I1				
ABOVE	ABOVE		D1		NONE	
SUPPRESSION CHAMBER PRESSURE,	SUPPRESSION CHAMBER PRESSURE,	I1				
START ANOTHER LPCS OR LPCI PUMP.	START THE LPCS OR ANOTHER RHR PUMP.			A2	SEE TABLES 1-8, 1-9 ABOVE.	●
C5-6.2 IF RPV PRESSURE	STEP 6.2 IF RPV PRESSURE	I1				
DOES NOT STABILIZE BELOW	DOES NOT STABILIZE BELOW		D1		RPV PRESSURE TREND	
[172 PSIG (MAXIMUM ALTERNATE SHUTDOWN COOLING RPV PRESSURE)],	120 PSIG,	I1				
OPEN ANOTHER SRV.	OPEN ANOTHER SRV.			A2	SEE TABLE 1-10: ADS/SRV STATUS	

EPG/EOP TASK ANALYSIS

FIGURE 3

TABLE 2: INFORMATION AND CONTROL AVAILABILITY

A. TYPE I1 & I3 (CONT'D)

EOP REQUIREMENTS			AVAILABLE INFORMATION AND CONTROLS				
No.	Parameter/Function	Range/Setpoint/Limit/Resolution	EPN No. (B22 MS)	Output Location	Output Format	Range/Setpoint/Limit/Resolution	Class
2-002	RPV Pressure	Range 0 - 1130 PSIG	⚠ B22-N051A	CR-Control Room - P601	Recorder LR/PR-623A	0-1500 PSIG / NA / NA / 5 MA/yr / 15 minute ±20 PSI Acc. ± 7.5 PSI Loop ± 20 PSI	1E
		Lowest SRV Lift (1075 PSIG)					
		Hi Scram Setpoint (1037 PSIG)	⚠ B22-N051B	↓	-623B	↓	↓
		Bypass Valves Open (930 PSIG)					
		Single SRV Steam Cool (700 PSIG)	B22-N007	CR-P603	Recorder PR/FR-609	850-1050 PSIG / - / NA / 1 MA/yr / 0 minute ± 5 PSI Acc. ½% Span	1E
		LPCS/LPCI Rated Flow (122 PSIG)					
		Max Alt. Shdn Cooling (120 PSIG)	MS-PS-23C,D C34-K636 (C34-R605)	CR-P603-A8	ANN (2-2)	"RPV Press High Trip" / > 1037 PSIG	
		HPCS/RCIC Isolation (60 PSIG)		↓	ANN (3-8)	"RFW RPV Press High Alert" / > 1095 PSIG	
		Min Alt Shdn Cooling (76 PSIG)					
		Min RPV Flooding (98 PSIG)	MS-PS-23A,B	CR-P603-A7	ANN (2-2)	"RPV Press High Trip" / ≥ 1037 PSIG	
		Min SRV Re-open (150 PSIG)		↓	ANN (6-3)	"RPV Press High Alert" / > 1027 PSIG	
		Min FW Operability (160 PSIG)					
		MSLC Operate (35 PSIG)					
		LPCS Shutoff Head (360 PSIG)					
		Condensate Supply Switch (100 PSIG)					
		Max. Fire Sys. Operability (90 PSIG)					
		Max. Cond. Flush Sys. Oper. (40 PSIG)					
		TREND					

⚠ - ON TDAS ALSO.

FIGURE 4

TABLE 3: DCRDR TASK ANALYSIS

EPG/EOP TASK ANALYSIS

EOP Number	Function Ident.	Required Info. & Control Explicit	Required Info. & Control Implicit	HED and/or Comments
CONTINGENCY #5 PPM 5.3.5				
Step 1.	A1		Table 1-9	
Step 2.	A1		See Below	
2.1	A2		Hend Vent Hv Position	
2.2	A2		MSIV Positions	
2.3	A2		MS-V-16 19 Position	
2.4	A2		RCIC Stm Isol Valve Position	
Step 3.	A1		SRV Control Switch Pos.	
Step 4.	A1		RPV Water Lvl Trend	
	I1	2-001		
	A1		Table 1-10	
Step 5.	A1		Table 1-8 Table 1-9	
Step 6.	A1		Step 5. Above	
6.1	I1	2-002		
	D1		RPV Press Trend	
	I1	2-002		Difficult to interpolate to 76 psig accuracy (above suppression pool press.)
	D1		None	
	I1	2-010		
	A2		Step 5 Above	
6.2	I1	2-002		
	D1		RPV Pressure Trend	
	I1	2-002		Should this also be ΔP above suppression pool?
	A2		Table 1-10	Can press be maintained 76-120 psig using pump on/off and SRVs?

ATTACHMENT A

RESUME BRIEFS

R.O. VOSBURGH, SAFETY ANALYSIS/SIMULATOR ENGINEER

Master of Science in Physics, BA in Physics and Mathematics. Experience includes 18 years in the nuclear industry: 5 years with Argonne National Laboratory as an operations supervisor and physicist on zero-power, fast breeder test facility; 8 years as a senior safety analysis engineer for a PWR vendor performing transient, containment, and steam-line break analyses; and 5 years in safety analysis at the Supply System. Present position is Manager, Safety Analysis and Simulator Engineering.

Responsible for performing assigned areas of the Emergency Procedure Task Analysis. Has performed the safety analysis for the Graphic Display System and participated in the individual plant application of the calculational base for the Emergency Procedures.

F.D. FRISCH, OPERATIONS ENGINEER

Bachelor of Science in Mechanical Engineering. Experience includes 26 years in the nuclear industry: 7 years with General Electric in research, engineering and shift operations at a high temperature pressurized-water testing facility and N-Reactor; 2 years with Douglas United Nuclear as Operations Shift Supervisor at N-Reactor; 7 years with General Electric as Startup Test Supervisor and Startup Operations Superintendent at Duane Arnold, Pilgrim, Millstone, Caorso, Italy, and Tarapur, India and, 10 years with the Supply System in Plant Startup, Technical and Operations. Present position is Principle Operations Engineer.

Responsible for performing assigned areas of the Emergency Procedure Task Analysis; assigned as the Plant Technical representative to the BWR Owners Group subcommittee for the development of Emergency Procedure Guidelines; and, responsible for the preparation of WNP-2 Plant specific emergency procedures.

ATTACHMENT B

'SURVEY REVIEW PHASE

INDIVIDUAL

FINDINGS AND RECOMMENDATIONS

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO.	SS NO. N-1

Finding:

Switch handles do not provide adequate visibility as to their position. Switches of concern are:

- P-800 - The Five Excitor Control Switches
- P-601 - The four Drywell/Wetwell Thermocouple Selection Switches

Response:

The five switch handles on P800 have arrow indents for position identification but are black against a black handle. The arrow indents were color-filled white.

The four switch handles on P601 are circular with small ridges for ease of gripping. One ridge is larger than the rest for position identification but is the same color (grey) as the switch, providing poor contrast. The raised ridge was painted white to provide contrast.

Switch handle position identification is now adequate.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO.	SS NO. N-2

Finding:

Damper control switch for WMA-AD-52-1/52-2 damper is intermixed with control room ventilation controls rather than associated with the fan control switch on Panel P826. Demarcation lines separate the two control groupings.

Response:

The damper control switch was relocated adjacent to its associated fan and its previous location hole plugged.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO.	SS NO. N-3

Finding:

1. Control switches for OG-V-129A and B on Panel P-820 were deactivated but not removed.

2. Position indicating lights for SW-TCV-11A and B on Panel P826 were deactivated but not removed.

Response:

Control switches, indicating lights and labels have been removed and holes plugged.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO.	SS NO. N-4

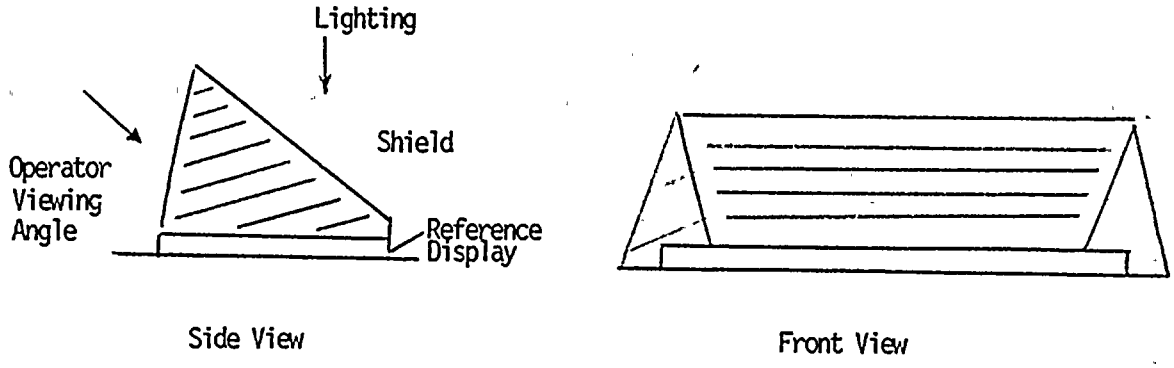
Finding:

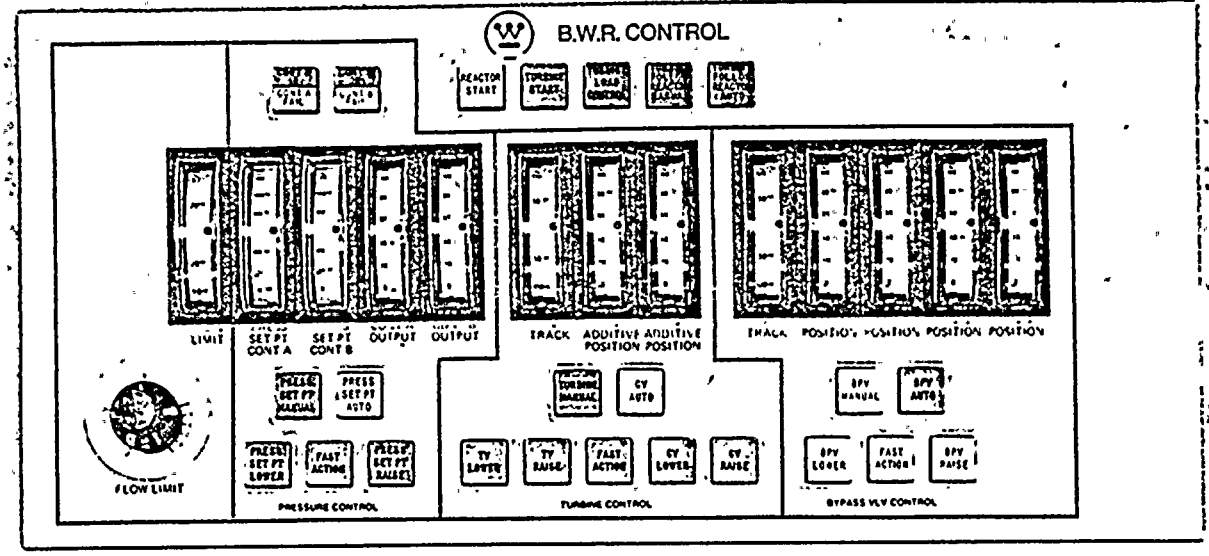
The reference displays on the DEH panel is subject to glare from overhead lighting, which reduces the contrast between the illuminated readout and the background of the reference display. See attached photograph.

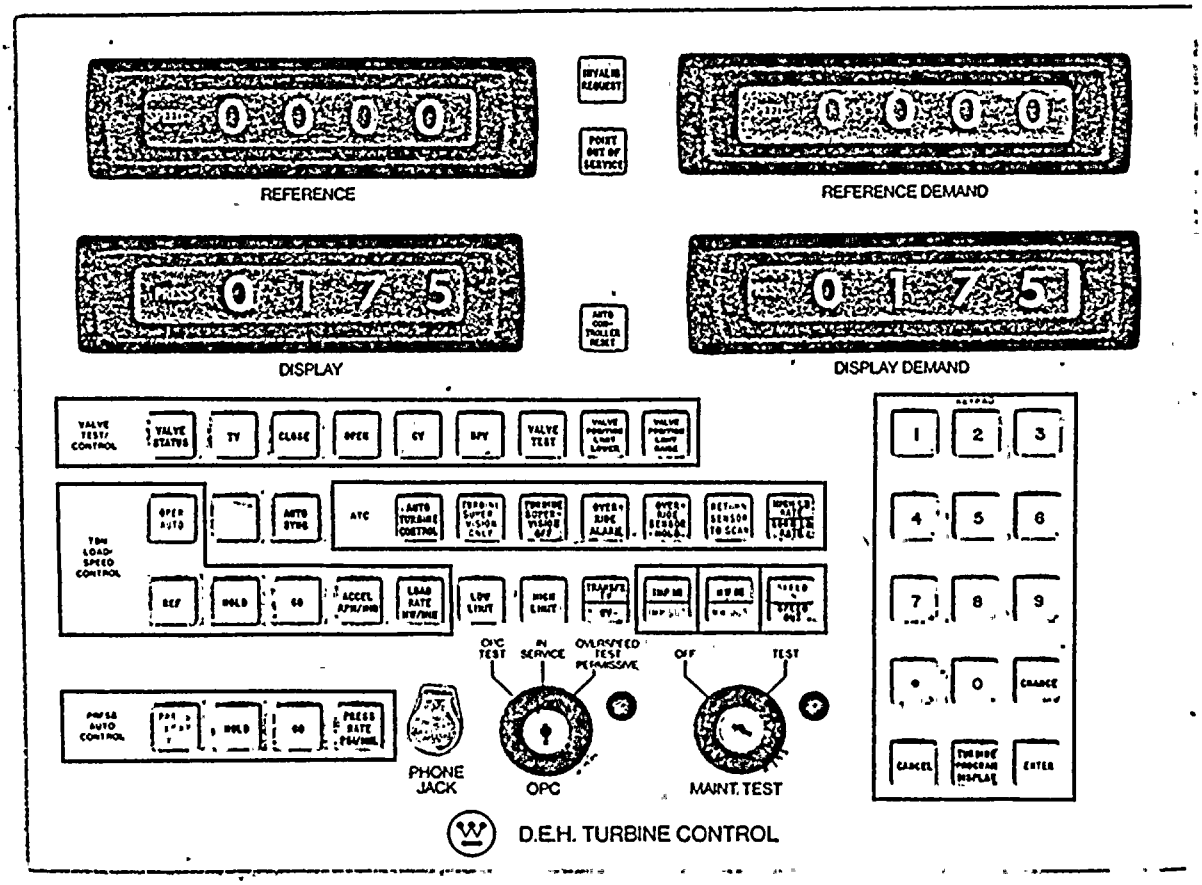
Response:

Temporary shields have been placed over each of the four reference displays to reduce the effect of overhead lighting glare. Permanent shields are being designed and will be installed by or during the first refueling outage.

EXAMPLE:




B.W.R. CONTROL
REACTOR START
TURBINE START
LOAD CONTROL
LIMIT
SET PT CONT A
SET PT CONT B
OUTPUT
OUTPUT
TRACK
ADDITIVE POSITION
ADDITIVE POSITION
TRACK
POSITION
POSITION
POSITION
POSITION
PRESS SET PT MANUAL
PRESS SET PT AUTO
TURBINE SHUTDOWN
CV AUTO
BPV MANUAL
BPV AUTO
PRESS SET PT LOWER
FAST ACTING
PRESS SET PT RAISE
TV LOWER
TV RAISE
FAST ACTING
CV LOWER
CV RAISE
BPV LOWER
FAST ACTION
BPV RAISE
FLOW LIMIT
PRESSURE CONTROL
TURBINE CONTROL
BYPASS VLV CONTROL


0 0 0 0
REFERENCE
REVALUE REQUEST
POINT OUT OF SERVICE
0 0 0 0
REFERENCE DEMAND
0 1 7 5
DISPLAY
AUTO CONTROLLER RESET
0 1 7 5
DISPLAY DEMAND
VALVE TEST/ CONTROL
VALVE STATUS
TV
CLOSE
OPEN
CV
BPV
VALVE TEST
TDH LOAD SPEED CONTROL
SPEED AUTO
AUTO SYNC
ATC
REF
HOLD
GO
ACCEL RPM/MIN
LOAD RATE MW/MIN
LOW LIMIT
HIGH LIMIT
TRANSFER
SPEED
PRESS AUTO CONTROL
HOLD
GO
PRESS RATE PSI/MIN
OVC TEST
IN SERVICE
OVERSPEED TEST PERMISSIVE
OFF
TEST
PHONE JACK
OPC
MAINT. TEST
1
2
3
4
5
6
7
8
9
•
0
CLEAR
CANCEL
ENTER
D.E.H. TURBINE CONTROL

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO.	SS NO. N-5

Finding:

Turbine related annunciators on Panel P603 use General Electric (GE) terminology for turbine valves while the actual plant turbine is a Westinghouse design and uses different terminology. Plant procedures, except for the related annunciactor response procedures, use Westinghouse terminology. General Electric identifies the valves as "control" and "stop valves" while Westinghouse identifies them as "governor" and "throttle valves".

Response:

The following annunciators and their response procedures were found to use improper terminology on Panel P603:

A7: 3-2, 4-4, 5-4
A8: 3-2, 4-4, 5-4

Annunciator window engravings and their related annunciator procedures will be modified by or during the first refueling outage.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. A1.3	SS NO. 19.1.1

Finding:

Control Room sound levels could not be reviewed.

Response:

A sound survey was performed in the WNP-2 Control Room primary operating area and remote shutdown room on 9/20/83. Using a Bruel and Kjaer Type 2218 Precision Integrating Sound Level Meter, ambient noise measurements were taken at fourteen locations. The sound survey was repeated on 7/25/85 during operation with the main turbine generator on line and all panel enclosures in place as was not the case during the 9/20/83 survey. The locations and their associated sound levels are listed below (all measures are in dB(A) units):

		9/20/83	7/25/85
1.	P601 (left)	61	61
2.	P601 (right)	59	58
3.	P602	62	59
4.	P603	62	58
5.	P840	63	60
6.	P820	61	59
7.	P800 (left)	60	61
8.	P800 (right)	61	60
9.	NSSS Operator's Desk	62	58
10.	BOP Operator's Desk	59	59
11.	SR Desk	63	58
12.	Remote Shutdown Panel (left)	62	53
13.	Remote Shutdown Panel (right)	61	54
14.	Remote Shutdown Panel (desk area)	62	54
	Average Ambient Noise	61.28	58.0

All measurements were below the minimum recommended 65 dB(A). These readings are considered typical for the normal Control Room environment. No deficiency findings were noted.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. C3.13	SS NO. 14.5.2.1

Finding:

Set points or limits for initiating the annunciator warning system should not occur so frequently as to be considered a nuisance and should be established to give the operator adequate time to respond.

Prior Response:

Present design to be reviewed during startup testing and verified during subsequent plant operation. No further action required.

NRC Comment:

To be verified during DCRDR.

Current Response:

Correction of setpoints or logic to prevent nuisance type alarms from frequently actuating has been an ongoing process as they are identified. Responsible System Engineers and Plant Operations are constantly in contact relative to troublesome alarms. Problems have been processed in accordance with plant administrative controls; e.g., Maintenance Work Request or Plant Modification Request. Independently, the annunciator system is being monitored by the Nuclear Safety Assurance Group to assure that troublesome alarms, such as the nuisance type noted above, are being identified and corrective actions pursued. A review of the control room annunciator system indicates that nuisance-type alarms have generally been corrected.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. C5.64/C5.66	SS NO. 12.3.2/12.3.3	Page 1 of 2

Finding:

12.3.2 (C5.64) Single indicating lights have been used in the following applications. This design should be avoided, as an abnormal condition might not be detectable, if the bulb were expended.

Panel 001	RCIC alarm lights
Panel 601	RCIC initiation light
	RCIC F064 isolation light
	ECCS logic and manual override lights
Panel 602	Recirculation system interlock lights
Panel 603	RFW interlock lights
Panel 672	Hydrogen analyzer alarm lights
Panel 800	Disconnect lights
	Generator lockout lights
Panel 811/827	Heater trip lights
Panel 820	Auto-stop trip latch light
	Seal water pump lights and air purge lights associated with circulating water system.

Prior Response:

The use of dual-filament bulbs was researched. Sixteen lamp manufacturers were contacted. Dual-filament bulbs of the size used in the control room are not currently on the market, and manufacturers noted that it was not feasible to manufacture them, because the globe size is too small to accommodate two filaments.

The use of lamp test or filament monitoring circuits were reviewed. There are approximately 6500 indicating lamps that are not testable. Approximately 3900 of these are in safety-related (Class 1E) systems. Installation would require 80-90 test switches, thousands of additional wires in already congested panels, and two or three additional panels to house the test logic. Estimated cost is $1 to $2 million.

Changeout of the present indicating lights to a dual-lamp style or push-to-test style would require extensive wiring changes, panel hole resizing, labeling, mimicking, and redesign of Class 1E system interfaces. Estimated cost is $0.5 to $1 million.

Square engraved color coded lenses will be installed on the single lights prior to fuel load. One function of the square lenses is to help the operator define the normal light condition (white lamps should always be on and amber off). Shift turover procedures require a check of all indicating lamps for burnt-out bulbs and immediate replacement or tag-out of the control. This coupled with normal surveillance tests and control manipulation for viewing normally unlit lamps, reduces the potential for undetected burnt-out bulbs. No further action required.

12.3.3 (C5.66) No positive means of testing most panel indicating lights is provided (annunciators and out-of-service displays are exceptions).

Prior Response:

See Item 12.3.2 for response.

NRC Comment:

A review should be made part of the DCRDR.

Current Response:

Installation of color coded engraved square lenses, with additional administrative controls (shift turnover reviews and inclusion of lamp verification in surveillance tests) appears to be fairly effective based on operation experience in reducing the potential for undetected burnt-out bulbs. Engineering estimates noted previously are at least one order of magnitude low and market conditions have not changed relative to availability of dual-filament bulbs. Administrative controls are being maintained to minimize the above potential concern.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. C6.84/C6.85	SS NO. 5.3.13/24.6.4

Finding:

5.3.13 (C6.84) A computer trend recorder is enclosed by the Control Rod Drive (CRD) demarcation lines on Panel 603.

Prior Response:

Deletion of the recorder has been deferred until after fuel load to determine if an operational need exists. Enclosing the CRD system in one demarcation grouping was judged acceptable rather than cause a patch-quilt effect and redundant hierarchy labeling. The use of the trend recorder for other functions than monitoring CRD parameters did not concern the operators. The present arrangement is preferred. No further action required.

24.6.4 (C6.85) The computer trend recorders are intermixed with specific system indicator layouts.

Prior response:

See item 5.3.13 for response.

NRC Comment:

To be resolved in the DCRDR.

Current Response:

The process computer which drives the trend recorder is being deleted as part of a computor system upgrade. See Finding D7.3 for details. Reviews are in progress to determine the peripheral requirements of the new system, which may warrant the devices retention. If no function is determined, the trend recorder will be deleted during the computer system upgrade noted in Finding D7.3.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. C8.7	SS NO. 5.3.16.i

Finding:

The tower makeup pump controls and indicators on Panel P824 are arranged in a B-C-A-C sequence (it is believed that one of the "C" subsystems is mislabeled).

Prior Response:

Tower makeup Pump "C" can be operated from two different sources of power: "C-BUS 7" "C-BUS 8". Operators have experessed preference to the existing layout as the arrangement places supervisory system A controls and supervisory system B controls on the left and right sides of the panel, respectively. Resolution will be based on operational experience and noted in the Summary Report.

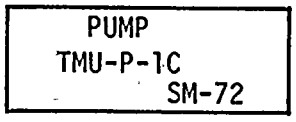
NRC COMMENT:

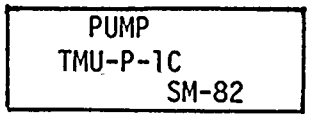
To be resolved in the DCRDR

Current Response:

Two concerns are noted above; the distinctive identification of the two "C" pump switches and the sequence arrangement of the four pump switches. Pump "C" can be operated from two different sources of power; one switch for each power source. Only one of the two power sources can be energized at any time; thus only one of the two switches are functional at any time. The operator can identify which switch is energized by observing two blue power available engraved indicating lamps; one located above each switch. Label plates for the two pump "C" switches were reworded to include their power source to improve switch identification.

Labels:





The arrangement of P824 is vertically divided by supervisory systems (Systems A and B) and by electrical power sources (Bus A and Bus B). Rearrangement would mix both supervisory systems and electrical buses. The panel is non-safety related and the systems are not required for abnormal or emergency situations. Plant and system responses to any perceived operator error; i.e., starting or stopping the wrong pump, is very slow allowing a considerable length of time to correct any error.

With the improved labeling, operators have not noted any concerns relative to the existing switch arrangement. Any rearrangement would provide only minimal improvement for the cost involved, and may be determintal by causing inconsistency in design layout and operator confusion when responding to supervisory system problems.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. C9.2	SS NO. 24.5.5

Finding:

Implementation of the RHR steam condensing mode requires operations on Panel 601, Panel 840 or 820, and Panel 614.

Prior Response:

Resolution will be noted in the Summary Report after operational and simulator experience has been obtained.

NRC Comment:

To be resolved in the DCRDR.

Current Response:

The RHR steam condensing mode has been deactivated at WNP-2 and is not considered operational. All controls, displays and alarms associated with the steam condensing mode of operation are scheduled for removal by the second refueling outage. The above finding is no longer applicable to WNP-2.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. D-1.27	SS NO.

Finding:

P-840, P-820, P-827, P-811, P-601 -- Parallax is a problem. Problems are found on all meters located in the lowest position on the vertical boards of P-840 and P-820. Problems exist on P-632 because of an indicator that is too high (about 72" above floor). On P-827 and P-811 heater coil meters have problems because they are mounted too low (about 31" above floor). On P-602 RWCU is too far up on benchboard and RECIRC system is too low on vertical board.

Prior Response:

A review was performed on the meters in question. P820/P840 meter design is such that the pointers are located at the right hand edge of the scales directly in line with the edge of the scale face. There is no raised distance between the pointer and scale face. With this design, there is essentially no apparent displacement as seen from two different heights. Panel P632 is not considered an operating panel and has only one miniature meter monitoring floor sump leakage flow of 0-6 gpm. Alarm annunciators monitor for excess leakage. Operators would not normally use this panel or meter. The meter does not have the full curvature of the larger meters making the upper scale range readily readable and precision readouts are not required. Parallax is not a problem on P632. The meters on P811 and P827 are used as backup indication and for testing the heater circuits. The heater switches have circuit "on" lamps to identify energization. Precise readings are not required as values change depending on heater status and air flow parameters. Parallax is not a problem as these conform to the meter design noted above. No changes are required. Also see NRC Finding E-5.59 response.

Current Response:

The above review was expanded to also include Panels P-001, P-602 and P-800, and to review these panels for readability concerns due to viewing angle as well as parallax. As noted in the prior response, no parallax problems were noted. Additionally, for the above meter on P632, the sump leakage flow is also monitored by a recorder on the same panel that is within anthropometric limits. This recorder is the primary monitoring device used by the operator, not the miniature meter.

A review for readability based on viewing angle due to meter curvature was also performed on all the above panel meters. Individual meters were reviewed as to their accuracy requirements and portion of scale range used during normal and abnormal operation. This also included a review of operating experience to date and discussions with operators. Results indicate that the readability and accuracy of these meters are well within operational requirements and selected color banding is visible (see Item E5.59).

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-2.2	SS NO.

Finding:

SRO Desk -- communications to kitchen and restroom are inadequate. The telephone currently provided in the kitchen is not sufficient.

Prior Response:

An audio and/or visual device activated from the SRO Desk, either by a simple pushbutton or switch, will be installed in the kitchen and restroom areas prior to commercial operation.

Current Response:

A hands free intercom was installed prior to commercial operation between the control room supervisors desk and the kitchen and restroom. The intercom can be activated from either locations. An audio quality check indicates that speech intellegence is very good.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. D-3.55	SS NO.

Finding:

FP-1, FP-2, FP-3 - Annunciator tiles are not laid out in a consistent manner, principally between these three boards. There are also some inconsistent layouts within panels.

Prior Response:

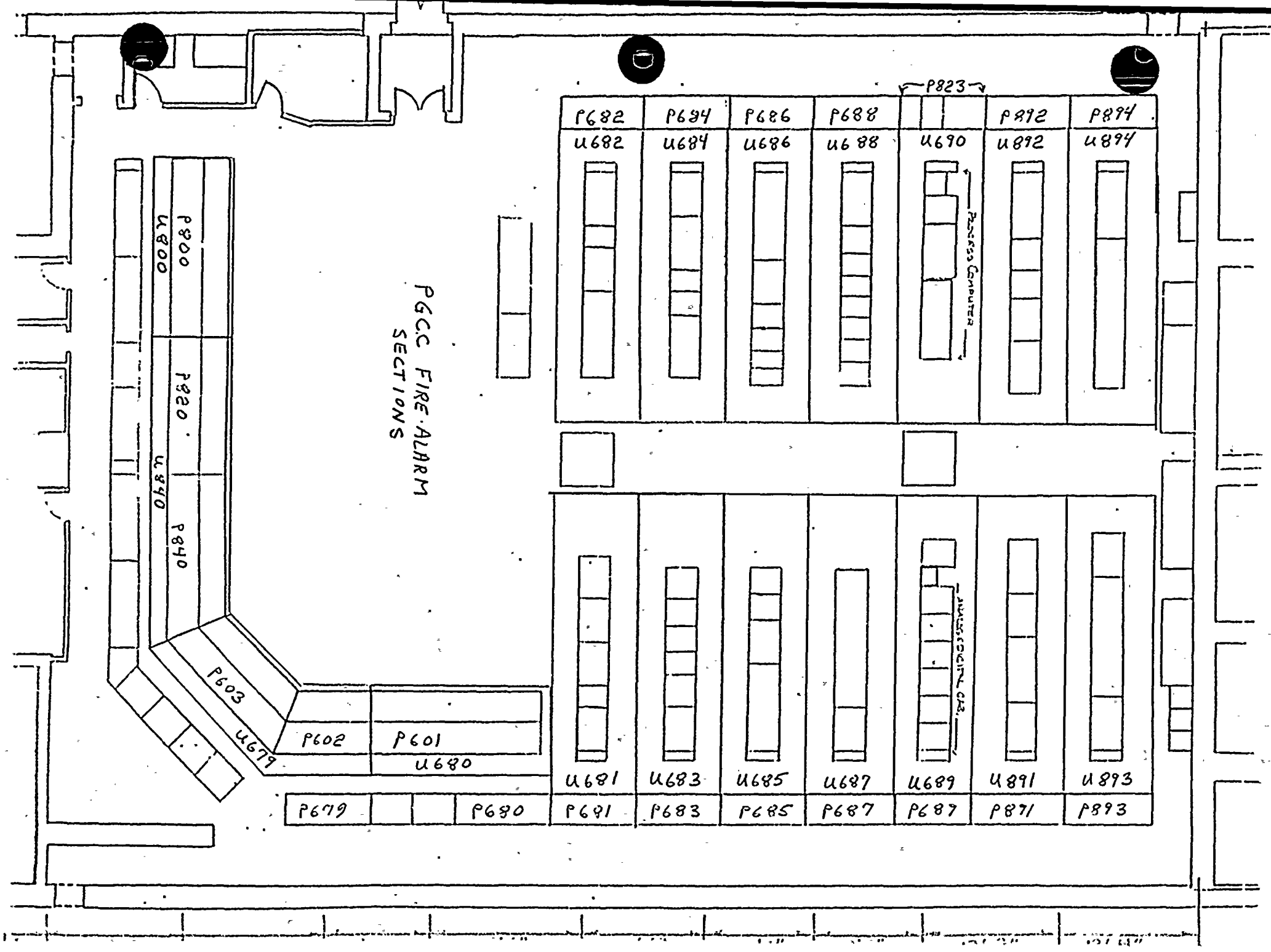
The fire control annunciator panels alarm are arranged by subsystem; namely:

. Standard (FP-1)	The Standard alarms are fire alarms which monitor areas which are not specifically protected by a suppression system.
. Functional (FP-2)	The Functional alarms are fire alarms which monitor areas which are specifically protected by a suppression system.
. Supervisory (FP-3)	The Supervisory alarms monitor the overall suppression systems and equipment status.

Each annunciator panel is laid out with respect to building area. No changes are required.

Current Response:

Each annunciator panel is laid out with respect to building area and, to the extent possible, similarity of alarm layout is maintained between the three panels. Within each building area, the only area of concern was relative to determining the spread of a fire from one control room floor module to another. A review of the three panels indicates that these alarms on each panel are arranged in sequence from front to near of the control room; first the left side, then the right side. Each floor module number is identical to the panel number located at the end of the floor module for visual recognition (e.g., U682 verses Panel P682) and individual fire alarm trouble panels and buzzers are located with each floor module to provide additonal monitoring and alarm audio directivity. Based on these reviews, the existing alarm arrangement appears adequate.


P823
P682
P684
P686
P688
P872
P874
U682
U684
U686
U688
U690
U892
U894
PROCESS COMPUTER
P800
U800
P820
U840
P840
P603
U679
P602
P601
U680
P679
P680
U681
U683
U685
U687
U689
U891
U893
P681
P683
P685
P687
P687
P871
P893
P.G.C.C. FIRE ALARM
SECTIONS

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. D-3.57	SS NO.

Finding:

P-840, P-820, P-800 - split screen tiles result in 70 tiles on 8 panels and 60 tiles on 5 panels.

Prior Response:

A review of each alarm panel on P-840, P-820, and P-800 shows only seven alarm panels that actually have more than 50 alarms total. Each panel was reviewed for the following areas:

1. Grouping of alarms by system/function
2. Wording clarity, consistency, accuracy
3. Readability from a distance
4. Prioritization visibility

Modification have been made over the last two years to improve the operator's ability to clearly identify and respond to the alarms. These changes have significantly reduced the effect of the large number of alarms in these panels to an acceptable level. Alarms have been well grouped by system or function within each alarm panel; the character heights have been improved from 0.187" to 0.218" and their height-to-width ratios have been brought into conformance with NUREG-0700 requirements; alarm window wording has been revised for clarity, consistency, and abbreviations, and in many cases shortened to reduce congestion; a divider bar has been engraved to provide separation contrast between upper and lower window halves on all alarm windows; and a review of each alarm window based on the WNP-2 annunciator color code prioritization standard indicated that only nine alarms are of high priority (red). These have been color coded and are all located on the top row of each panel where their importance is readily discernable.

With the significant improvements noted above, with the dark board concept employed and that these panels do not monitor NSSS systems, the deviation from NUREG-0700 guidelines is considered minimal. The panels are acceptable. No changes are required.

Current Response:

Based on operating experience to date and discussions with operators, the number of alarms and their split screen design does not appear to hinder their ability to identify and respond promptly and accuractly. The prior noted upgrades to the system has improved their ability to perform and minimized the effect of the NUREG-0700 deviation.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-3.59	SS NO.

Finding:

On all panels - the abbreviation list (combined Standard and Limited Use) has some dual and triple meanings. It is poor HF practice to have separate "limited use" abbreviations which may duplicate "standard" abbreviations. This requires a memory process which gets very little practice and is therefore prone to error. Abbreviations are not used consistently throughout all control room applications (e.g., annunciators, computer printer, procedures, labels, meter faces, etc.).

Current Response:

A Human Factors Engineering Standard (HFES-1) was issued to specify authorized abbreviations and acronyms and is administratively controlled. HFES-1 incorporates all findings noted in the prior Supply System response report of August, 1983.

One open finding remains: "computer programs will be reviewed and brought into conformance to the abbreviations standard to the extent practical by the first refueling outage". See Finding D7.14 for further details on this review.

NOTE: Prior response was not included for brevity.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-5.32	SS NO.

Finding:

P-601 - Heat Exchanger Vent valve controls do not have indicators to tell if valves are open or closed. Operators feel they are needed.

Prior Response:

Position indicating lamps are not required. Valves are equipped with analog position meter indications located directly above the valve controls.

Current Response:

These controls are not used or required for abnormal or emergency procedure implementation. Their primary function was for heat exchanger venting during the steam condensing mode of RHR operation. This mode has been deactivated. Operations now use these controls to reduce system pressure to normal subsequent to surveillance tests. Discussions with operators indicates that accuracy of analog readout is not a concern, only their operability. Based on operating experience to date, operators have had no problems with the existing control setup and location and they prefer to maintain the analog indications for position identification.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-5.38	SS NO.	Page 1 of 3

Finding:

There are many meters with non-recommended major scale divisions, such as:

0-30, 60, 90, 120
0-40, 80, 120, 160
0-25, 50, 75, 100, 125

Prior Response:

All scales will be brought into conformance with NUREG-0700 guidelines by the first refueling outage.

Current Reponse:

Based on operating experience, discussions with operators and Emergency Procedure Task Analysis results, a review of all control room and remote shutdown room meter and recorder scales was performed relative to Findings D-5.38, D-5.39 E-5.55, E-5.56 and E-5.66. Attached (Table 1) is a listing of those scales that are being modified to bring the WNP-2 design into conformance with NUREG-0700 guidelines. Several minor deviations were allowed. The first for phase angle or wind direction instruments whose normal parameters are read in multiples, such as 30^0, 90^0, etc. Minor markings were verified as less than nine per multiple. Another deviation allowed were for those scales using multiples of 3 only where two submajors were used to provide easy extrapolation.

Discussions with operators based on operating experience to date indicates that these deviations, with proper submajor markings, are very readable and easily extrapolated. These deviations from NUREG-0700 guidelines are considered minor and well within the operators ability to use. Also, a Human Factors Engineering Standard was prepared to provide guidance on future design changes; HFES-7, Visual Display Standard. This standard conforms to NUREG-0700 guidelines. The attached table lists 53 instruments whose scales will be upgraded by or during the first refueling outage.

TABLE 1

INSTRUMENT SCALES TO BE CORRECTED

PANEL	INSTRUMENT	NOTED DEFICIENCIES
P601	CMS-PR-7 CMS-PR-8	Major numbers missing
	MS-LI-610	Major multiples of 40
	HPCS-AM-S1/3	Major multiples of 15
P800	W-TR-N2	Major multiples of 8
	VM-INC Bus 1-6 VM-RUN Bus 1-6	Multiples of 1.5
P820	MS-FI-25A MS-FI-25B	Only one minor per major giving units of 2.5 per minor
	RCC-PO1-4A RCC-POI-4B RCC-POI-4C	0-125% valve position scale. 125% full open to be changed to 100%.
	SW-FI-9B	Major multiples of 3 with only one submajor
P840	SW-FI-9A	Major multiples of 3 with only one submajor
	RFT-SI-1A RFT-SI-1B	Major multiples of 1.5
	RFT-PI-2/1A RFT-PI-2/1B	Major multiples of 40
	CBD-AR/FR-10	Major multiples of 15
	BS-PI-4A BS-PI-4B BS-PI-4C	Multiples of 15
P603	SLC-PI-600	Major multiples of 3 with only one submajor
P001	RCIC-FI-1R/1	Major multiples of 70

P672	OG-TIS-641A OG-TIS-641B	Major multiples of 40
	OG-TRS-610 GY-TRS-630	19 minors per major
P811/ P827	SGT-AM-1A1/1 SGT-AM-1A1/2 SGT-AM-1A1/3 SGT-AM-1A2/1 SGT-AM-1A2/2 SGT-AM-1A2/3 SGT-AM-1B1/1 SGT-AM-1B1/2 SGT-AM-1B1/3 SGT-AM-1B2/1 SGT-AM-1B2/2 SGT-AM-1B2/3	Major multiples of 4
P812		Top Scales: 1A scale (0-10) is not similar to 1B (0-100) and 1B has 19 minors per major.
	REA-DPR-1A REA-DPR-1B	Bottom Scales: mixed major multiples of 3 and 2.
P813	CMS-PI-7	Major numbers missing
P821	MSLC-FI-3A MSLC-FI-3B MSLC-FI-3C MSLC-FI-3D	Major multiples of 0.25 with monor multiples of 0.0625.
P823	MET-WSR-4	Major multiples of 15
P825	RCC-FI-4 RCC-FI-8	Major multiples of 8

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. D-5.39	SS NO.

Finding:

There are many meters with non-recommended minor unmarked scale subdivisions, such as:

- 12.5, 2.5
- 0.5 minor marks when major marks are 0, 1.5, 3.0, and 4.5.

Prior Response:

All meter scales will be brought into conformance with NUREG-700 guidelines by the first refueling outage.

Current Response:

See Finding D-5.38 for response.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-5.47	SS NO.

Finding:

P-672 - Two dissimilar scales on recorder OG-FR-620 are log scales, and the paper does not match either scale.

Prior Response:

New chart paper has been ordered and will be installed upon delivery.

Current Response:

The two Scales are 3-30 CFM and 30 to 300 CFM - all major and minor markings are identical except by a factor of 10. This recorder reads off-gas system flow. Combining the two scales into one was considered, however, based on WNP-2 and industrial operating experience to date, both wide range and narrow range are useful for determining main condenser inleakage and off-gas system performance.

The two scales have been made similar to the extent possible and the correct chart paper installed.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-6.91	SS NO.

Finding:

P-100 - The Spray Pond B level indicator has two unidentified elevation markings on the face.

Prior Response:

The two elevation markings represent the elevation at which the spray pond will overflow and the elevation of the spray pond floor (which is above the pump pit bottom). These have been applied as additional operator aids to monitor spray pond status and to help cross-correlate water supply availability with the circulating water pump and basin. All spray pond level indicators (A and B) in the control room and remote shutdown and marked similarily.

Current Response:

These level indicators have additionally been color banded to reinforce the elevation markings and Technical Specification limitations. (See Finding E5.62)

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-6.97	SS NO.

Finding:

The description of function 11 on process computer operation matrix is incorrect. Says: EDIT CORE ANALYSIS LOG. Should describe: [Fuel] "Preconditioning Interim Operating Management Recommendations".

Prior Response:

Immediate changeout of the function 11 label is not required as operators do not use this program. The program is used by the plant technical staff with specific procedures. The label will be upgraded by the first refueling outage as this is a special procurement item. The whole labeling matrix will need to be re-engraved to correct the function 11 description.

Current Response:

The process computer control panel which contains the function display matrix is being deleted as part of a computer system upgrade. See Finding D7.3 for details. Function selection and display will be performed by advanced CRT/Keyboard interaction rather than the existing control console. Schedule for correction is noted in Finding D7.3. The existing label for functin 11 is adequate until the new system is installed as only plant technical staff with specific procedures use this function and erroneous selection of this function or another function would not impact the safety or reliability of the plant. Such selection would only initiate the wrong data output which would be readily recognizable by the technical engineer.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. D-6.105	SS NO.

Finding:

P-603 - The position letters on the joy stick labels are not placed consistently.

Prior Response:

The sequence of positions is not unique to the WNP-2 plant. The same sequence and type of switch are found on a number of GE-BWR plants. This is a nuclear steam supplier design; therefore, this change if made should be a generic change by the supplier. A letter from the Supply System to GE has been processed requesting GE to investigate this issue. Resolution, if required, and schedule for correction will be noted in the Supply System's Summary Report.

Current Response:

This deficiency and Items D9.8 and E4.29 were evaluated based on the following:

1) A review of License Event Reports (LERs) and Operating Experience Reports (OERs) does not indicate that there have been any problems concerning operators placing the subject switches in other than the intended position.

2) A review of GE Product Experience Reports (PERs) does not indicate any problems concerning inadvertent positioning of the subject switches.

3) Discussions with Operations have indicated no concern regarding the sequence of positions or arrangement of the subject switches.

4) The subject switches do not require prompt positioning during plant operation and are monitored by annunciator alarms and individual position status lights.

5) Inadvertently placing the subject switches in other than the intended position would not place the plant in an unsafe condition.

6) The cost of replacing the subject switches with switches having a sequence of positions that conforms to population stereotypes would be significant since the current switch design is fixed by electrical and mechanical separation requirements.

Based on the above, no change is recommended due to the minimal benefit which would be derived verses the potential cost and complexity of the design change.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-7.3/D-7.6	SS NO.

Finding:

D-7.3 Moderate glare is present on CRTs. Lowering CRTs as proposed will probably make this worse because standing or even sitting operators may need to tilt CRT back for convenient viewing.

D-7.6 CRT displays are on moveable mounts. Present height is satisfactory for stand-up operation but requires about a 90 degree turn from console to view CRTs. CRTs also block STA line-of-sight to boards. Lowering CRTs will result in a readability problem. Major problem is that alarm CRT be visible from P-603 operating position -- this is a greater than 90 degree turn for the operator.

Prior Response:

Lowering of the CRTs will not be implemented. a review of the two black-and-white CRTs for glare indicate that readability is still adequate for temporary functional use of the devices where presently located. Also, backup typers are located adjacent to the CRTs. Permanent positioning of these CRTs has been postponed until the first refueling outage. Presently, the preferred location is above Panel P-603 angled downward about 30°. This would provide excellent orientation and visibility for the NSSS operator either from the work location (desk) or from the P-603 control manipulation area. Siesmic and structural evaluations are presently under way. Any deviations from the above will be reported in the Supply System's Summary Report.

Current Response:

The previous response noted that the two large CRTs would be relocated above Panel P-603 during the first refueling outage. Subsequently, operational experience has indicated the need to replace the Honeywell computer system of which the CRTs are a part. Procurement of a new computer system has been initiated but cannot be installed until after the first refueling outage due to fuel program/computer compatibility concerns. This upgrade will allow smaller desk mounted units individually programmable to be located at the operators desk. These will be swival mounted for flexibility and convenient viewing. The new system eliminates the need to place the existing CRTs on P-603 and the extensive engineering and construction efforts involved due to siesmic concerns. The long term use or placement of the large CRT units in conjunction with the smaller units is presently being reviewed. They may either be deleted or relocated to an improved location. At present, these units have been located where they do not block visibility to the main control panels and are located near the control console for good display/control access and visibility, and in easy line of sight to both the Station Technical Advisor (STA) and the Control Room Supervisor. Glare in this location is minimal. The existing locations are adequate until the above modifications are complete.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-7.14	SS NO.

Finding:

Alarm typer/CRT messages do not appear to have one-to-one correlations with specific annunciator tiles nor contain the information presented in the illuminated annunciator tile.

Prior Response:

The alarm typer/CRT messages and information content will be reviewed against their corresponding annunciator tiles and made consistent to the extent programming space allows. All revisions will be performed by the first refueling outage.

Current Response:

Annunciator engravings are allowed to contain from 38 to 56 characters depending on whether the alarm is a split title or single tile. Available space on the computer description field is 24 characters. Also, annunciator windows are grouped by system and located above their system controls and displays. This relationship allows for some flexibility in wording to allow the tile engravings to be concise with as few words or abbreviations as possible. Computer descriptions must stand individually on their own and the condition statement (e.g., TRIP, HIGH, LOW, etc.,) is not printed with the description field but rather printed in a adjacent alarm status field. Differences in design and application between the computer and annunciator systems make an exact one-to-one correlation extremely difficult. A review was performed to ensure clarity of wording, similarity to annunciator tiles, and consistency in use of abbreviations. Scheduling of the above is being coordinated with the installation of the new computer system noted in Finding D-7.13.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-7.14	SS NO.

Finding:

Alarm typer/CRT messages do not appear to have one-to-one correlations with specific annunciator tiles nor contain the information presented in the illuminated annunciator tile.

Prior Response:

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Current Response:

Annunciator engravings are allowed to contain from 38 to 56 characters depending on whether the alarm is a split title or single tile. Available space on the computer description field is 24 characters. Also, annunciator windows are grouped by system and located above their system controls and displays. This relationship allows for some flexibility in wording to allow the tile engravings to be concise with as few words or abbreviations as possible. Computer descriptions must stand individually on their own and the condition statement (e.g., TRIP, HIGH, LOW, etc.,) is not printed with the description field but rather printed in a adjacent alarm status field. Differences in design and application between the computer and annunciator systems make an exact one-to-one correlation extremely difficult. Instead, a review was performed to ensure clarity of wording, similarity to annunciator tiles, and consistency in use of abbreviations. Scheduling of the above is being coordinated with the installation of the new computer system noted in Finding D-7.13.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. D-9.6	SS NO.

Finding:

P-601, RCIC Isolation Valve (F063) Annunciator, Warmup Valve (F076) Annunciator, Isol Valve Vac Break (F086) Annunciator are more than 10' to the left of valve controls.

Prior Response:

Electrical system design requirements specify separation of division 1 and 2 signals. The above alarms are all RCIC division 2 alarms and were located on the closest division 2 alarm panel to the RCIC system. A review was performed on the above alarms to ascertain their operational use.

- Warmup valve (F067) - Annunciator procedures state that this is an "Informational Alarm, no action required". The operator may choose to leave the valve as is or to close it, depending on system status.

- Isolation valve (F063) was deleted as an annunciator alarm and incorporated into the RCIC division 2 system status monitoring subpanel as required by RG-1.47. This is an informational display only.

- Isolation valve vacuum breaker (F086) alarms when automatic closure of the valve is initiated. The operator action is to verify that the valve is closed.

The two remaining alarms (F067 and F086) are color prioritized as white. These are not high priority alarms (red or amber). Since the above alarms are informational, of low priority and require no direct operator response, the present locations are acceptable.

Current Response:

Emergency Procedure Task Analysis did not indicate any findings against these alarms. Based on operating experience to date and discussions with operations, only a minimal benefit would be derived by their relocation. The existing locations are considered acceptable.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. D-9.8	SS NO.

Finding:

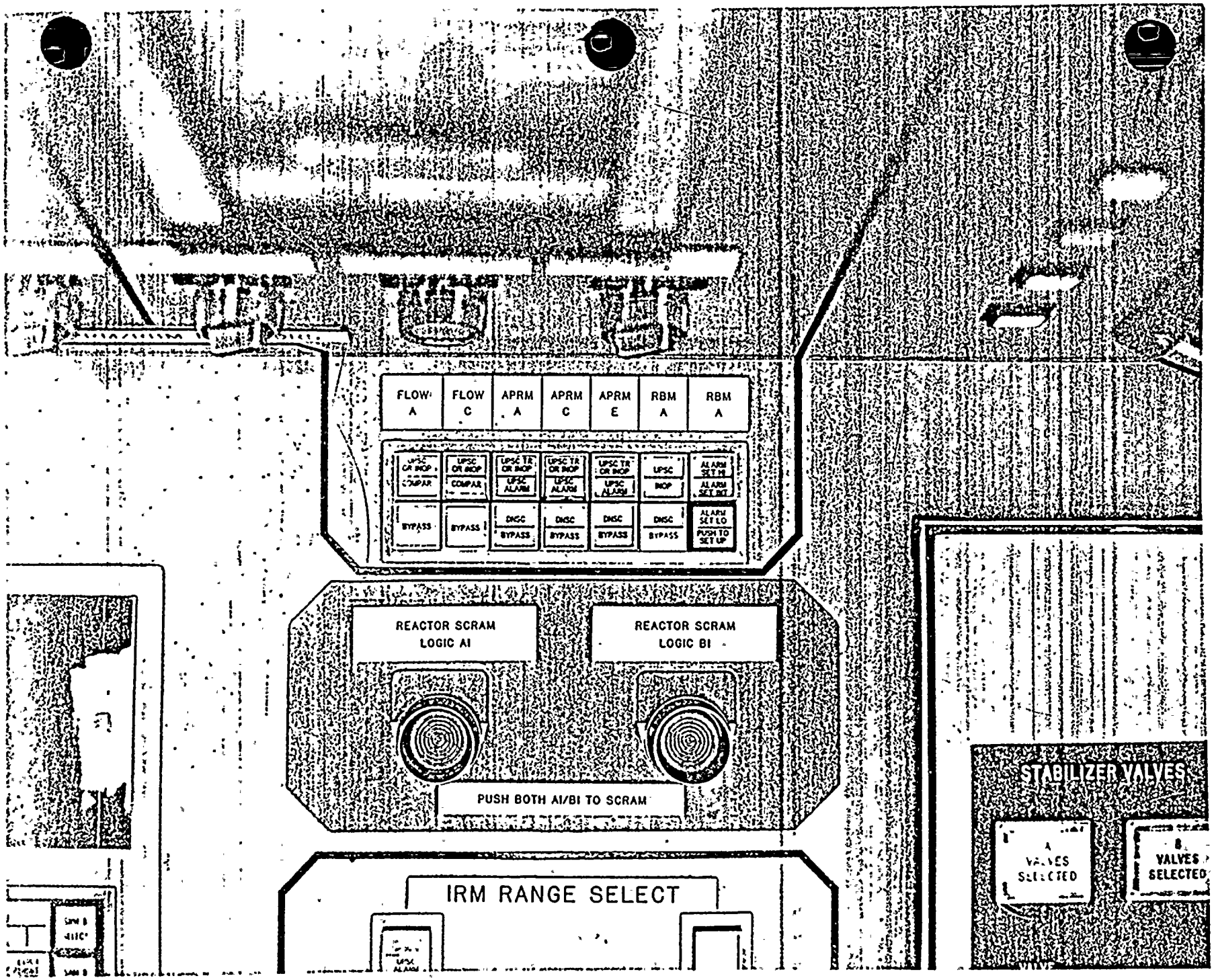
P-603 - Controls and displays are criss-crossed for APRM BYPASS and FLOW UNIT BYPASS systems A and C.

Prior Response:

The joy sticks (FLOW-APRM-IRM) are physically located in a mirror immage fashion. The operator is located at the center of the panel, thus lending this particular operation toward the mirror image fashion as compared to left-right concept. This arrangement is also a generic design on GE-BWR type plants; therefore, any change if made should be a generic type by the nuclear steam supplier. A letter from the Supply System to GE has been processed requesting GE to investigate this issue. Resolution, if required, and schedule for correction will be noted in the Supply System's Summary Report.

Current Response:

The displays are status monitoring indicating lights that are arranged in a 2 X 7 matrix (see attached photo). The matrix would normally be dark (unlit) during plant operation which allows for quick visibility when a status light is energized within the dark matrix. Also, the APRM and flow system status lights perform no control function. Prior to commerical operation, the control room was upgraded with the addition of lines of demarcation and improved labeling techniques (white material with black letters, larger characters with bolder letters). These have helped improve control and display relationships and operator selection response. Based on the above information and the response to Finding D6.105, resequencing either the lights or controls would provide only a minimal benefit verses the cost involved.


FLOW A
FLOW C
APRM A
APRM C
APRM E
RBM A
RBM A
REACTOR SCRAM LOGIC AI
REACTOR SCRAM LOGIC BI
PUSH BOTH AI/BI TO SCRAM
IRM RANGE SELECT
STABILIZER VALVES
A VALVES SELECTED
B VALVES SELECTED

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-1.33	SS NO.

Finding:

The main control benchboards deviated from anthropometric standards in the following respects:

The depth of the apron section is 1.5 inches greater than the recommended maximum of twenty-eight inches.

Prior Response:

No controls are located within the last one and one-half inches of the horizontal portion of the benchboard. For those controls on the veritical portion, an anthropometric review was completed. The lowest vertical section requires a slight lean by the 95th percentile man to operate controls. For the 5th percentile woman, the whole vertical section requires a slight lean or reach to operate controls. A 5th percentile woman was located and the degree of comfort and accessibility was judged adequate. The individual had no difficulty operating controls and was comfortable in her reaching. A review of the controls on the vertical panel sections indicated none of the controls required frequent operator use. Also, for trip switches, the extra apron distance provides some added protection from inadvertent operation. No action required.

NRC Comment:

All vertical panels associated with benchboards should be reviewed with operators having a 5th percentile female reach to verify control operability and to evaluate the potential for inadvertent actuation of benchboard-mounted controls. Photographs should be provided.

Prior Response:

A review for potential areas of inadvertent control operation was performed per Supply System Finding 13.3.7. This review was performed with one of the concerns being the affect of an operator leaning over the panels edge to reach controls. Resolution and correction schedule for findings noted under 13.3.7 were noted for Item "C" in the Supply System April, 1983, report and for Items A and B under NRC Finding F-4.32.

No 5th percentile female operator is presently employed at WNP-2. The shortest operator is 5'7", and his functional reach is greater than that of the 5th percentile female. Attached are photographs of a 5th percentile female at the benchboards as additional verification of the Supply System's previous response.

Height 5'0" without shoes, functional reach 25-1/2". No further action required.

Current Response:

A review of the vertical portions of the main benchboards based on operational experience to date correlated to a 5th percentile female operator did not identify any control or indicator that cannot be adequately reached or read by a 5th percentile female operator. The main benchboards are considered acceptable.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-1.34	SS NO. 3.3.2.f

Finding:

Most vertical panels have both controls and indicators mounted outside of recommended height ranges. Annunciator response controls are located below lower recommended height ranges.

Prior Response:

Reviews of all vertical panels were performed based on frequency of operation, need for precision control and readout, and safety implication of the device. The following areas were found to be of concern:

> Annunciator response controls make up the majority of the lower guideline concerns. These were reviwed with General Physics Corporation Human Factors personnel. Most panels have little available room to relocate the controls within anthropometric limits and, if done, would not be at a consistent height. Relocation would mix them within control areas, reducing their visibility and possibly adding to operator confusion. As they are, most are consistent in height and location. Color padding is planned for all annunciator response controls to improve visibility. No further action required.

NRC Comment:

trol shapes and color padding should be identical to treatment planned for mary operating area annunciator controls (see Finding E3.71).

Prior Response:

Color padding has been installed around all annunciator response controls in the control room and remote shutdown room. Mushroom heads will be installed on all main benchboards acknowledge controls prior to fuel load. Mushroom heads will be installed on all vertical panels and remote shutdown room panels by the first refueling outage.

Current Response:

Mushroom heads have been installed on all acknowledge controls; in the control room and remote shutdown panels. Operating experience to date and discussions with operators has indicated that these enhancements have significantly improved annunciator control visibility and operator response.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. E-3.66	SS NO. 14.3.1

Finding:

The following aspects of annunciator window grouping could be improved:

Panel 601

The division between the leak detection and RHR B/C alarms on box A2 could be more logically defined.

The leak detection Division II alarms are divided between boxes A2 and A12.

"RHR PUMP B ROOM WATER LEVEL HIGH" Panel 601-A2 window 2-8 should be moved to a position adjacent to the other RHR B/C alarms.

RCIC alarms "RCIC TO RHR B STEAM TRAP HIGH LEVEL" and "RCIC TO RHR AB STEAM TRAP HIGH LEVEL", Panel 601-A2 windows 5-3 and 6-3 should be moved with the other RCIC alarms. RCIC alarm 602-A4 window 4-1 is also out of place.

Prior Response:

Leak detection and RHR B/C alarms have been grouped by system to the extent panel configuration and space allowed. Further rearrangement would not enhance group recognition sufficiently to be cost effective. No action required.

System alarms, such as RHR, ADS, and LPCS, are of primary importance, and emphasis was placed on their location adjacent to related system controls. Leak detection alarms were considered secondary in importance and were grouped to the extent available space allowed. No action required.

Resolution as to the location for window A2-2.8 will be noted in the Summary Report.

RCIC to RHR steam trap alarms were located on A2 and A4 per Operations request. These alarms could be grouped with either system, but operators related them to the steam condensing mode of RHR. No action required

NRC Comment:

Resolution should be provided prior to licensing.

Prior Response:

Annunciator drop A2-2.8 will be moved from its present position to A2-2.7. The drop which presently resides at A2-2.7 will be moved to A2-2.8. This swap will be accomplished by the first fueling outage.

Current Response:

Relocation of A2-2.8 is scheduled for the first refueling outage.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-3.70	SS NO. 14.5.5.2.a	Page 1 of 6

The WNP-2 Annunciator Control System design, location and operation was reviewed against NUREG-0700 guidelines. All findings were reviewed based on plant operating experience, discussions with plant operators, visual observation during plant transients and SCRAMs, and engineering evaluations of the existing design and proposed changes. Findings noted in prior reports where recommendations and implementation were reviewed and concurred with by the NRC are not repeated here. Only those areas of the annunicator control system design, location and operation whose resolution were considered open or new findings are included below:

1. A review of the annunciator system controls relative to location and arrangement was completed. Findings D-3.60, D-3.61, D-3.63, E-3.70 and F-3.77 were still found to be valid.

Finding:

Control sets should have the same arrangement and relative location at different work stations. Deviations noted are:

P-601 Controls are vertically arranged rather than horizontally arranged along the panel edge. The controls are not centered in the panel but located toward the panels right side.

P-820 Controls are located on the left side of the panel rather than centered.

P-840 Controls are located on the right side of the panel rather than centered and located in close proximity to annunciator controls on P-820. Operators have responded erroneously to the opposite panel controls due to their closeness.

Finding:

The operator should be able to read all the annunciator windows from the position at the work station where the acknowledge control is located. The viewing angle is less than 45^{0} on panels P-601, P-603, P-800, P-820 and P-840.

Response:

P-601 This panel is 16 feet long and has 6 annunciator alarm panels. One control set centered on the panel will not provide adequate viewing visibility to all alarm panels. Two control sets located at about the 25% and 50% panel length positions is preferred. The existing control set is presently located at the 68% position. A redundant control set will be installed at about the 16% position. These locations provide an excellent viewing angle and alarm window readability with only a minor viewing angle deviation of 40^{0}. The redundant set will be installed during the first refueling outage.

The possibility of horizontal placement along the front panel edge was reviewed. No existing space is available and relocating existing controls would affect the configuration layout and control symmetry of systems important to safety. The existing control set is arranged with the acknowledge control closest to the panel's edge for easy reach. The redundant control set will be arranged in the same vertical orientation and sequence except for the test control. Only one test control per panel is needed. Based on discussions with operators, the existing control set is considered easily accessible and readily visible, especially since all control room control sets have been color padded and acknolwedge controls modified with white mushroom heads (see Finding E-1.34).

P-603

Panel P-603 is located directly in front of the NSSS operator's work station from which during steady state operation all alarms are readable. During most of the panels operational evaluations, two operators are seated at the panel center, where the horizontal line of sight is 45^{o} or greater, within NUREG-0700 guidelines. However, the horizontal viewing angle from the annunciator acknowledge control is about 30^{o}, outside the 45^{o} minimum. This deviation from horizontal viewing angle is considered minimal at this panel based on its operational evolutions and visibility from the NSSS operator's work station.

P-800

Panel P-800 has left and right horizontal viewing angles of about 22^{o} and 41^{o}. Operational evolutions on this board are not centralized and not all alarm windows are readable from the BOP operator's desk. A redundant set of annunciator response controls will be installed on the left side of the panel during the first refueling outage. The 41^{o} horizontal viewing angle is considered a minimal deviation from NUREG-0700 guidelines, and the present set will be left where they are. As in P-601, a redundant test control will not be included.

P-840

A redundant set of response controls will be provided at the panel's left side near the RFW system to increase visibility of annunciator windows and to increase operator access and respond to RFW alarms from P-603 without having to leave the P-603 area. See attached layout drawings. As in P-601, a redundant test control will not be included. The redundant set will be installed during the first refueling outage.

P-820 The response controls will be relocated to the center of the panel, horizontally arranged along the panel edge for consistency. See attached layout drawing. Besides improving alarm visibility, the proposed relocation will also remove the confusion with the P-840 controls. The relocation will be performed during the first refueling outage.

2. The auditory system was reviewed against NUREG-0700 guidelines. The following deficiencies were noted:

Finding:

Silence control for the alert auditory signal should be separate from the acknowledge control.

Finding:

It is not posisible to silence an auditory alert signal from any set of controls in the primary operating area.

Finding:

Clear auditory alarm signals are not of finite duration.

Response:

NUREG-0700 guidelines identify a four pushbutton control scheme; alert "silencing", alert "acknowledge", "reset", and "test". WNP-2 uses a three pushbutton control scheme which combines both the alert "silence" feature and alert "acknowledge" feature into one control. The four control scheme allows the operator to quickly silence the audible alert alarm while allowing additional time to review the alert alarms prior to acknowledging the visual alarm circuit.

A separate "silence"/control along with the alarm's viewing angle to acknowledge control relationship is designed to reduce the potential of inadvertent acknowledging alert alarms prior to their identification.

Modifying the WNP-2 control set design to add separate "silence" controls for the audible "alert" signals does not appear feasible on the main ECCS, RFW, and T-G panels where the feature may most be wanted (P-601, P-840 and P-820).

Layout changes on these panels would be necessary to provide room, which would adversely affect system configuration control and layout. The addition of the "silence" control to other panels would cause inconsistency in design and layout and be of little added value without incorporation on the ECCS, T-G, and RFW panels. Also, the three-control scheme is standard throughout the plant at local panels. To reduce the potential of inadvertent acknowledging of alarms while silencing the alert tone, the audio alarm system was modified by splitting the control room audio system into samller groupings.

The operator is thus less prone to be focusing outside the alarms audio group when silencing the alarm.

The audio tone groups were split into four groups:

Previous Auditory Grouping	New Auditory Grouping
1) P-601, P-602, P-603	1) P-601 2) P-602, P-603
2) P-800, P-820, P-840, and back vertical panels	3) P-800, P-820, P-840 4) Back vertical panels

Any acknowledge control within a tone group area at WNP-2 can silence the audible alarm for the tone group but only the individual acknowledge control where the alarm is located can reset the visual alert circuit. For example, an alarm on P-800 can be silenced by use of the acknowledge control on any panel within Group 3 above, but acknowledging of the visual circuit can only be done at Panel P-800. Thus, the operator will always be at the proper panel prior to acknowledging.

The potential for an operator not to have all alert alarms within a readable viewing range prior to acknowledging is only apparent at Panels P-601, P-840 and P-800. Per the control location and arrangement findings noted above, these panels will have redundant control sets at each end of the panel to reduce this concern. A design review was also performed relative to splitting the acknowledge feature of these control circuits such that the above panels could be split into two halves. That is, the annunciators on the left side of the panel visual alert feature could only be acknowledged by the panel's left side acknowledge control and visa-versa.

WNP-2 has two different control circuit designs for the NSSS and BOP annunciator panels. To split the acknowledge feature would require extensive redesign of the control and interface cards and realigning of circuits. Based on operating history to date, discussions with operators and the proposed control set changes noted earlier, additional changes to either a separate silence control or further splitting of the acknowledge feature would provide only a minimal improvement per the engineering efforts and costs involved.

Another concern was relative to providing overall silencing capability. An operator should be able to silence an auditory alert signal from any panel in the primary area. As noted above an operator can only silence within the specific tone group. Silencing between tone groups does not exist within the primary operating area. Discussions with operators and visual observations during several transients and SCRAMs indicate that individual silencing of tone Groups 1, 2 and 3 do not present a concern.

Normal control room manning consists of one Shift Manager, one control room supervisor and two reactor operators. Even with reduced manpower, sufficient operators are at the main benchboards and always within easy reach of the "silence/acknowledge" controls. However, Group 4 requires that an operator either leave the main benchboard area to silence the alarm tone group at Panel P-851 or let the audible tone continue. Two proposals are being evaluated by engineering to provide audio tone silencing for both the alert and clear tones in Group 4; addition of a silence control to be located on P-603 for easy access and/or the addition of a automatic silencing feature upon a SCRAM which would prevent the audio alarms from functioning for a interval from 3 to 20 minutes. This change will be implemented during the first refueling outage.

Another concern is that, in accordance with NUREG-0700, a "clear" alarm auditory signal should be of finite duration. At WNP-2, the clear tone is a continuous signal and requires that the "reset" control be depressed rather than automatic reset after a finite duration.

No duration control exists at WNP-2 to provide duration control for the "clear" tone, the audio response circuits in each annunciator control card would need to be extensively modified.

NUREG-0700 also states that the "reset" feature should silence and clear the illuminated window only at the work station for the panel where the alarm initiated. Similar to the WNP-2 acknowledge control, the reset control at WNP-2 silences the audio tone from any panel within the group but only clears the illuminated window associated with the reset control. Both "acknowledge" and "reset" controls are similar in their control function. An alternative reviewed was to modify the reset controls to allow the operator to silence the "clear" tone from any set of response controls in the primary operating area. Based on the discussions with operators and observations of transients and SCRAMs noted above, only Group 4 audio was of concern to the operators. Tone Group 4 will be modified as noted previously to reduce this concern during the first refueling outage.

3. The design and operation of the annunciator control system was reviewed. This included discussions with operators, observations of operator response, and comparison against NUREG-0700 guidelines. The following deficiencies were noted:

Finding:

P-851 Annunciator directional panel does not provide direction as to the individual back vertical panel for a cleared alarm within Group 4.

Finding:

Interactions required to acknowledge and reset a back panel alarm is redundant. A typical sequence of events would be: 1) Acknowledge the audio tone at P-851, 2) acknowledge or reset the illuminated lamp, at appropriate vertical panel, and 3) again at P-851, reset the illuminated lamp.

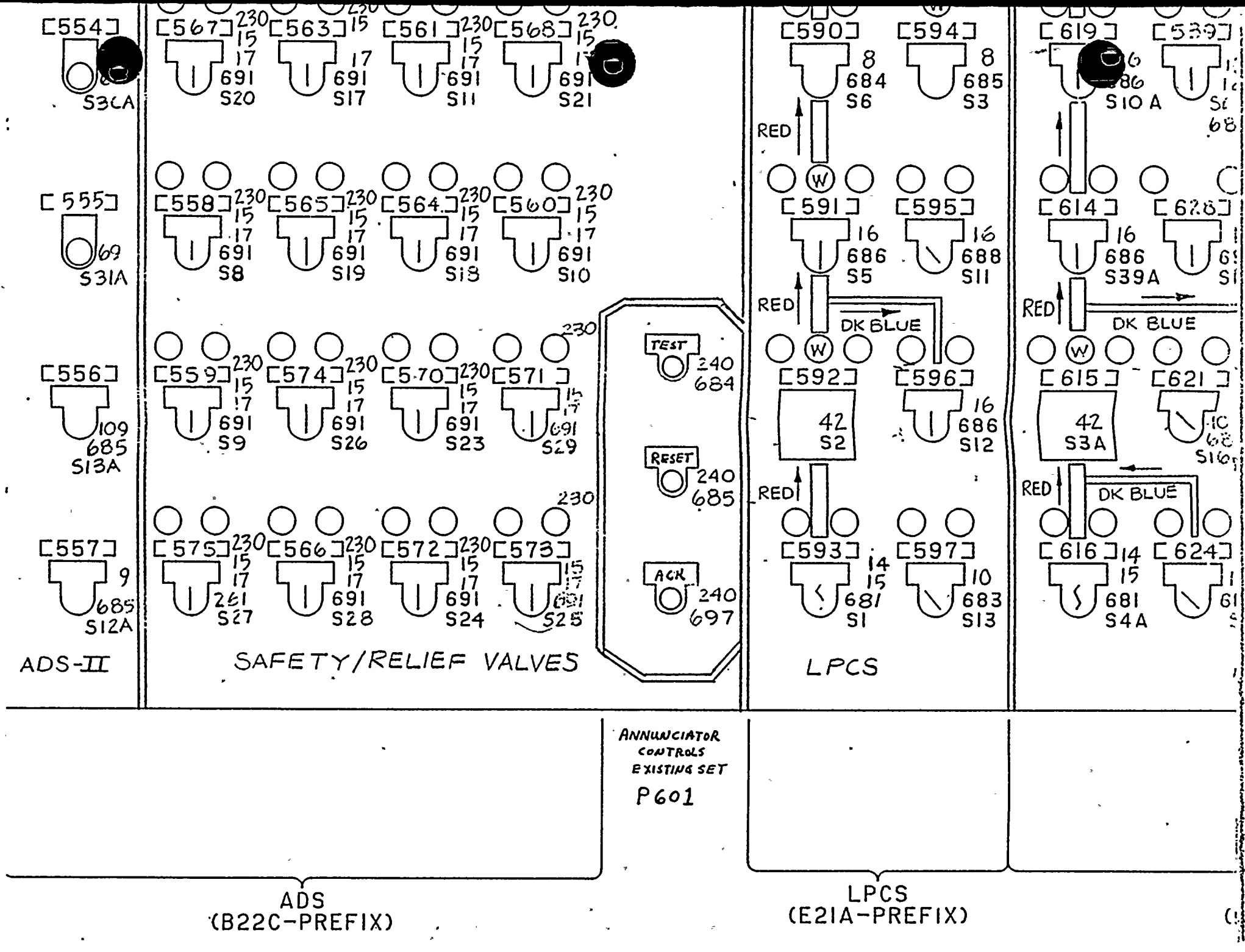
Response:

Engineering is evaluating the above findings and, if practical:

1. The directional alarm Panel P-851 will be modified to inform the operator of which back vertical panel has a clear alarm.

2. Group 4 control design will be modified to reduce the number of interactions required by the operator.

Proposed recommendations and corrective actions are scheduled for implementation during the first refueling outage.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ANNUNCIATOR CONTROLS EXISTING SET
P601
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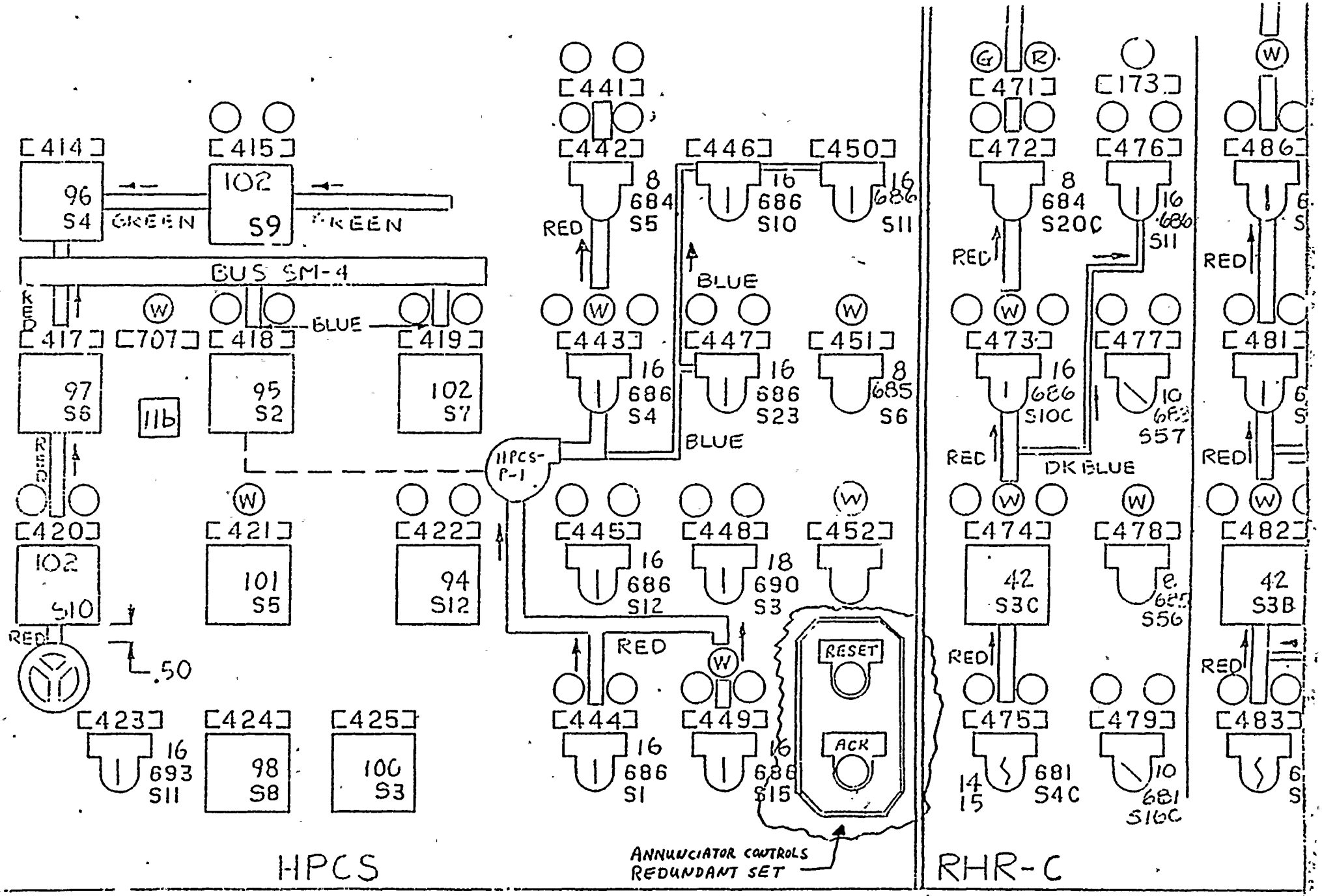
(B22C-PREFIX)
LPCS
(E21A-PREFIX)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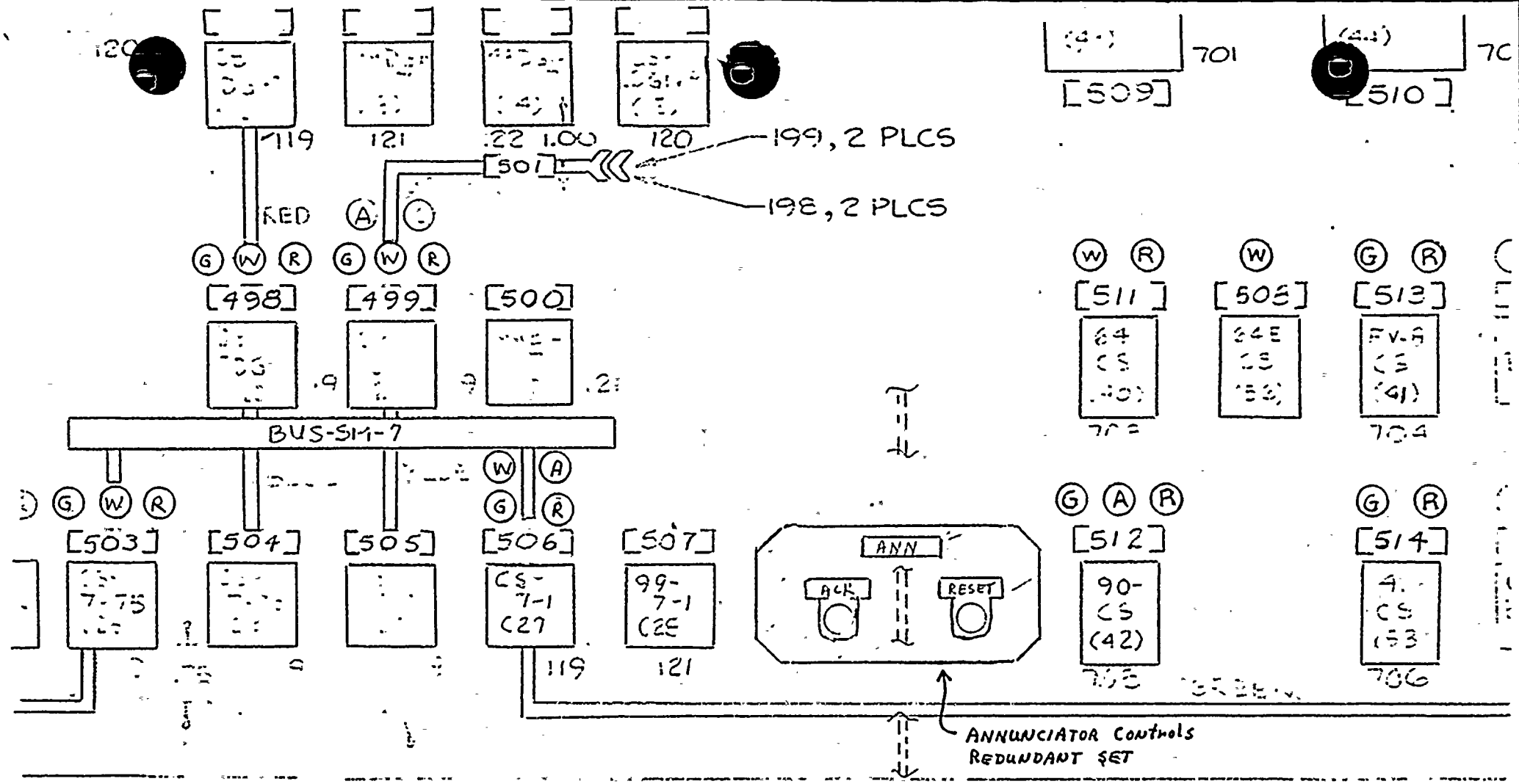
PANEL P601



-194, 8 PLACES PANEL P800

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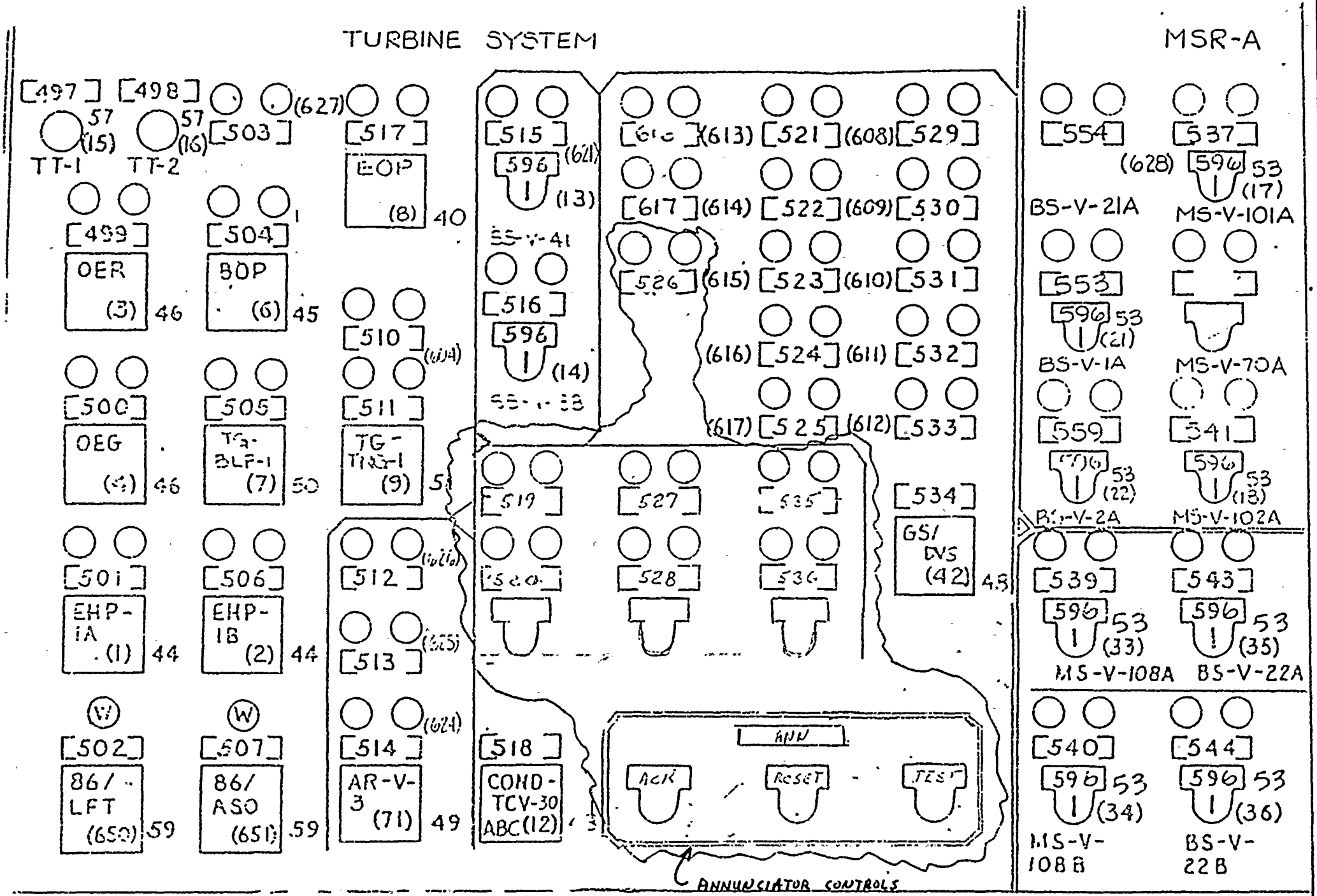
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ANNUNCIATOR CONTROLS
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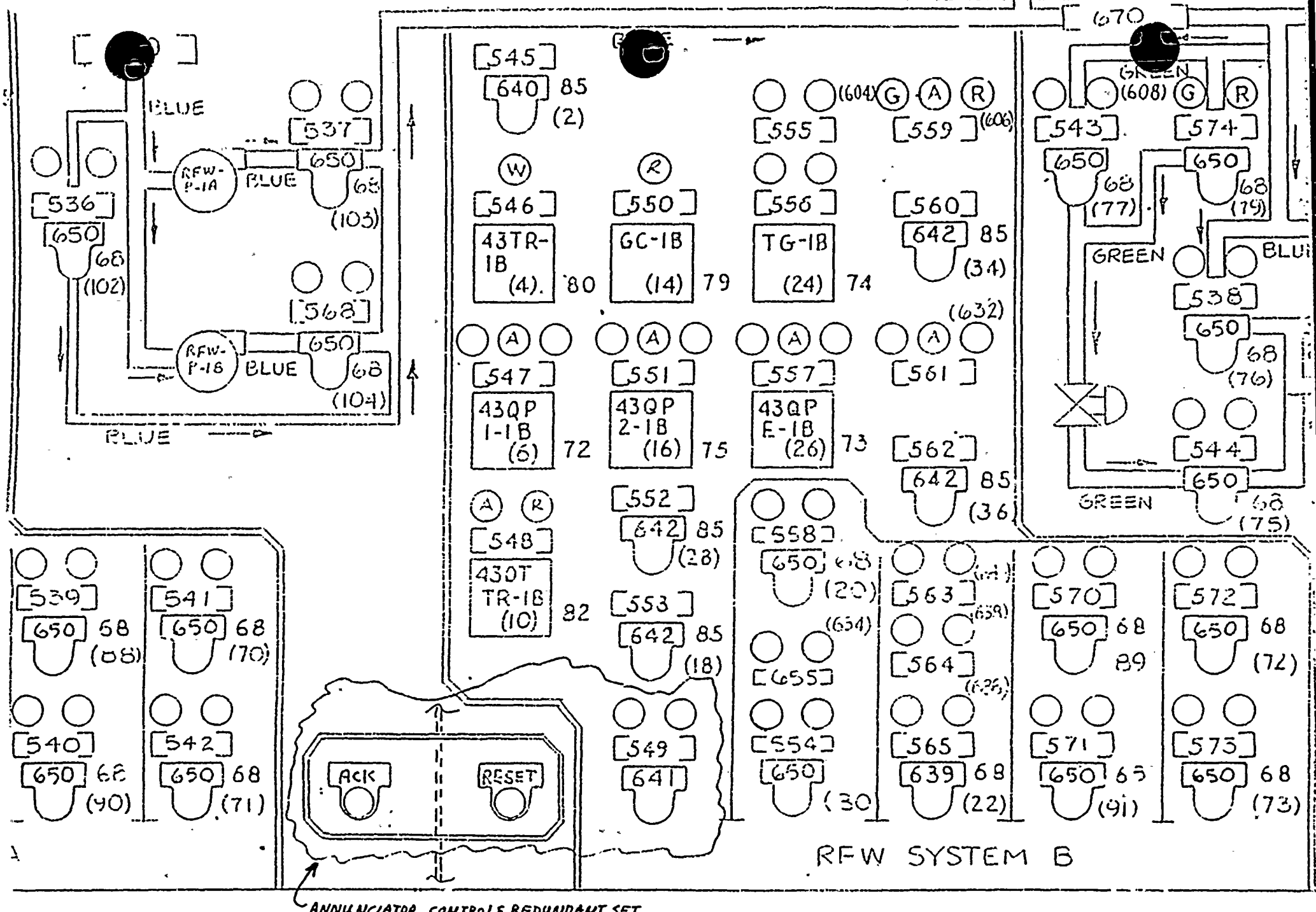
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RFW SYSTEM B
ANNUNCIATOR CONTROLS REDUNDANT SET

PANEL P840

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-3.71	SS NO. 14.5.5.2.b	Page 1 of 2

Findings:

Control coding techniques for easy recognition of controls should be used. Recommended techniques are color, color shading, demarcation, and shape.

Controls are not distinquishable in shape.

Color coding is inconsistent:

- 24 controls have black pushbuttons with silver collars.
- 61 controls have silver pushbuttons with silver collars.
- One control has a silver pushbutton with a yellow collar.
- The fire control panels use "red" escutcheon plates for the "ACK" control rather than black, and the shutdown Panel P-100 has no escutcheon plates.

Prior Response:

Shape: White mushroom heads will be installed prior to fuel load on Acknowledge Controls on the main benchboards. Placement of additional mushroom heads on vertical panels will be based on operational experience and noted in the Final Report.

Control Color: Silver pushbuttons will be used except for the Shutdown Panel P-100, fire panels, and P-851; these will use black. Locking ring and escutcheon colors will be consistent with other plant controls. Since the fire panels and P-851 form one panel area (row) and all controls are consistently black and are about the only controls on these panels, no conflicts or confusion is expected. The same rational applies to Panel P-100. These corrections will be completed after fuel load and noted in the Final Report.

Color Padding: To provide contrast and improve visibility, color padding will be applied around the annunciator response controls prior to fuel load.

NRC Comment:

Shape: The use of mushroom heads should be made consistent throughout the control room prior to licensing.

Control Color: Should be completed prior to licensing.

Color Padding: Acceptable -- should be reviewed and verified prior to licensing.

Prior Response:

Mushroom heads will be installed on the main benchboards for acknowledge controls prior to fuel load. The benchboards were selected to reduce the potential of blind reaching over the horizontal area of the panels. Installation on the vertical panels was deferred until the first refueling outage as the affect on safety or reliability on the panels is considered minimal. Also, see NRC Finding E-1.34.

Control Color: See Supply System response to Item F-6.116. In review of the annunciator controls, the three black pushbuttons on Panel P-821 and the one black pushbutton on P-820 will be changed to silver prior to commercial operation. The black pushbutton on the Remote Shutdown panel, fire panels, and P-851 are distinctively color padded, are the only pushbuttons on the panel, and are consistent within their functional area. No change is required on these panels.

Current Response:

See Item E-1.34 for response to mushroom heads for acknowledge controls. Control color changes were completed, in accordance to the WNP-2 Operating License, within four months of its issuance. A review of those black pushbutton controls noted above that were considered acceptable was performed based on operating experience to date. No difficiencies were noted and discussions with operators has not indicated any confusion or concern relative to use of the remaining black pushbuttons. The use of color padding has sufficiently enhanced their visibility.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-4.29	SS NO. 13.3.1.b

Finding:

The sequence of positions of the IRM bypass switches (Panel P-603) do not conform to population stereotypes.

Prior Response:

Item 13.3.1.b controls are unique and have distinctive job-stick style handles. Normal conventions are difficult to apply due to switch design. Discussions with the operators have indicated no convention orientation concerns. No action required.

NRC Comment:

The explanation as to why the current design cannot be improved on is not satisfactory. A further review and discussion of this HED, including possible alternative solutions, should be provided prior to licensing.

Prior Response:

The sequence of positions is not unique to the WNP-2 plant. The same sequence and type of switch is found on a number of GE-BWR plants. This is a nuclear steam supplier design; therefore, this change if made should be a generic change by the supplier. A letter from the Supply System to GE has been processed requesting GE to investigate this issue. Resolution, if required, and schedule for correction will be noted in the Supply System's Summary Report.

Response:

See Item D-6.105 for response.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. E-5.11	SS NO. 24.4.5

Finding:

Steps I.2 of PPM 5.1.3 and E.2 of PPM 5.3.1 direct the operator to prevent ADS actuation by repeatedly pressing the timer reset buttons. No indication is available to the operator by which he can verify that the logic has been reset.

Prior Response:

Emergency procedures have been modified to read "reset every ninety seconds" to qualify the term "repeatedly". Need for further action will be based on operational training and simulator experience. No further action required at this time.

NRC Comment:

The response does not address the question of verification that reset has been accomplished.

Prior Response:

As the operators activate the "reset" pushbuttons, "ADS LOGIC A (B, C, D) INITIATED" annunciator alarms will clear. These four alarms (two for each reset control) are located above their respective ADS systems for clear visibility. During abnormal operation when inhibiting system activation is required, the alarms will clear as the "reset" control is activated then return to alert status as the "reset" control is released, providing the operator with reset indication.

As a long-term upgrade, ADS logic will be modified by or during the first refueling outage to include a bypass switch to enable the operator to inhibit ADS actuation. The need to verify timer reset is not of concern here, only the ability to prevent timer time out which would result in ADS actuation. The above modification will resolve this concern. ADS system logic reset prior to unbypassing the inhibit control can easily be checked by the operator verifying that the ADS trip annunciator alarms have returned to normal.

Current Response:

ADS actuation bypass switches have been installed and procedures updated to reflect this modification. The modification included indicating lamps with square engraved lenses (e.g., ADS DIV 1 INHIBITED) as part of the ADS systems bypass and inoperable status alarm display. Verification of both switch and system status is now available to the operator.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.51	SS NO. 10.3.4 Page 1 of 2

Finding:

Indicators and recorders should be scaled in units which directly relate to system operation. The following inconsistencies were noted:

a. The containment instrument air differential pressure indicator on Panel 840 is scaled in psig rather than psid.

b. The circulating water plenum level indicators on Panel 840 are scaled in feet elevation (referenced to sea level). A level referenced to the bottom of the plenum would be preferred (as on the spray pond pit level indicators).

c. LPRM indicators in the four rod display on Panel 603 are scaled in "% heat flux." Usually, these indicators are actually scaled in watts/cm^2.

d. The SLC tank "level" indicator on Panel 603 is scaled in "gallons" (volume).

e. Some feedwater heater shell pressure indicators on Panel 840 are scaled in psig, while others are scaled to psia.

f. The condenser vacuum indicators on Panel 820 are scaled in "in. Hg absolute"; whereas, alarm points and action levels relative to condenser vacuum are normally specified in "in. Hg vacuum".

g. The recombiner differential pressure indications on Panel 672 are scaled in "inches". The labels should more correctly specify "inches H_2O".

h. The tower makeup flow recorder on Panel 824 is scaled in percent. Indication of the actual flow, in gallons per minute, may be more useful.

Prior Response:

Item a. is a differential pressure display. The legend plate wording will be corrected prior to fuel load. Items b., f., g., and h. will be corrected prior to fuel load. Item e. is correct as is. Low and high pressure feedwater heaters have different pressure range requirements. The "PSIA" indicators are grouped apart from the "PSIG" indicators such that display conflict should be minimal. Resolution to items c. and d. will be noted in the Summary Report.

NRC Comment:

Items c. and d. should be resolved and corrected prior to licensing. Items a., b., e., f., g., h. are acceptable but should be verified prior to licensing.

Prior Response:

Item c. - the four-rod LPRM flux scales are identified as "% Heat Flux" with a 0-125 scale range. The use of watts/cm^2 suggests definitive values can be applied. In actuality, these meters are only used as a comparison of heat flux around a rod selected for movement. Specific values are not required by procedures nor is specific data recording performed.

There are no specific actions or limits identified with these meters, and the use of watts/cm^2 as a specific value is highly dependent on frequent calibration. The use of the term "% Heat Flux" is more descriptive of the functional use of these indicators. No action required.

Item d. - the use of gallons for the SLC storage tank enables the operator to quickly verify that adequate amounts of boron have been injected into the reactor during plant abnormal conditions and to monitor subsequent batches without conversion tables if required. The distinction between the use of gallons versus inches for level is inconsequential in this application. No changes are required.

Current Response:

The term "level" was replaced with "volume" in the label plate for the SLC tank volume indicator to provide consistency between the label plate and tank volume indicator. The new labels have been installed. All items within E-5.51 have been completed.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. E-5.52	SS NO. 24.4.1

Finding:

RHR and LPCS pump discharge pressures are not instrumented.

Prior Response:

Emergency procedures for WNP-2 do not require RHR and LPCS pump discharge pressure displays. No action required.

NRC Comment:

This item should be addressed as part of the DCRDR Task Analysis.

Prior Response:

RHR and LPCS pump discharge pressures are indicated locally but not in the control room. This is consistent with the NSSS design and FSAR.

Current Response:

The Functional Task Analysis did not identify the need for RHR of LPCS pump discharge pressure indicators for emergency procedure implementation.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.53	SS NO. 24.7.6

Finding:

There is currently no way of definitely determining when the RHR shutdown cooling interlock has cleared, other than attempting to line up the system. A permissive light may be useful in this application.

Prior Response:

RPV pressure recorders, adjacent to the RHR systems on Panel P-601, are available to the operator to determine when pressure is below the interlock point. addition of annunciator alarms or indicating light would not further enhance the operator's ability to perform. Possible addition of scale set point additions or color banding will be reviewed per Item 10.3.1 response (see Finding E-5.62) No action required.

NRC Comment:

This item should be addressed as part of the DCRDR Task Analysis.

Prior Response:

The RHR shutdown cooling interlock clears at 135 psig reactor pressure. The operators are directed by the latest SCRAM procedure not to initiate RHR shutdown cooling mode until reactor pressure reduces to at least 75 psig. This is well below the interlock pressure setting. The interlock is for equipment protection and is not a specified pressure point for any automatic or manual action by systems or operators. Visual identification of interlock clearance is not required.

Current Response:

Functional Task Analysis has identified the need for RHR shutdown cooling interlock status to be displayed to the operator. See Item TA-G-6, in Attachment C of this report, for a description and schedule of corrective action.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.54	SS NO. 10.3.9

Finding:

Labels on recorder scales specifying units of measurement and labels on controller scales specifying scale multipliers are often small and difficult to read.

Prior Response:

A review of indicator scales was completed for readibility. In general, font size variations did not prove distracting and existing font size appeared adquate for visibility. No action required.

NRC Comment:

Font sizes should be checked against the readability guidelines of Section 6.5.1.3 of NUREG-0700.

Prior Response:

A nominal viewing distance of 30 inches was used as the criteria for the review of font sizes. Based on NUREG-0700, this defines a required 0.125 character height minimum. Smaller recorders (one, two, and three pen) use pen color/description labels for noting the above parameters. See NRC Audit Finding D-5.50. These presently meet the above criteria. All scale unit of measurements and multipliers will be brought into conformance by the first refueling outage.

Current Response:

A review of the control room and remote shutdown room indicates that all scale units of measurements and multipliers have been brought into conformance with the above criteria either by inclusion on label plates, pen description label plates or font size improvements on the scales.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.55	SS NO. 10.3.18

Finding:

Nonstandard numerical progressions were noted on many instruments.

Prior Response:

A review was completed of all indicators and recorder scales in the control room. See Item 10.3.17, Finding E-5.50, for response. Most of the remaining scales use major progression steps of three, with two submajor and twelve minor lines, or are nonlinear due to hardware design. Readability and extrapolation were found as adequate on these scales. No further action required.

NRC Comment:

The response does not justify the no further action decision.

Prior Response:

Except where specific application require nonstandard progressions (i.e., phase angle or wind direction are normally noted in 30^{0} increments), all scales will be brought into conformance with NUREG-0700 guidelines by the first refueling outage.

Current Response:

See Finding D-5.38 for response.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. E-5.56	SS NO. 10.3.17

Finding:

Many instruments are scaled with more than the recommended nine intermediate graduations between numbered divisions.

Prior Response:

A review was completed of all indicator and recorder scales in the control room. Seventeen scales were found inadequate and required changeout, and four will be deleted prior to fuel load. Extrapolation capability and readability were found adequate on all other scales. No further action required.

NRC Comment:

The response does not justify the no further action decision.

Prior Response:

All scales will be brought into conformance with NUREG-0700 guidelines by the first refueling outage.

Current Response:

See Finding D-5.38 for response.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. E-5.58	SS NO. 10.3.19

Finding:

Color coding might be used to differentiate scales on dual-range recorders, such as the turbine-generator temperature recorder on Panel P-820.

Prior Response:

Color banding and setpoint identification coding will be initiated after fuel load when sufficient operational experience has been obtained. Resolution will be noted in the Final Report.

NRC Comment:

The response does not appear to address the HED.

Prior Response:

Color coding is used at WNP-2 to differential scales only where scale differentiation is required for the safety and reliability of the plant due to the complexity of parameter control. The IRM/APRM recorder scales use red and black to identify narrow and wide band ranges. This is a very specific and controlled application. No other application is planned at WNP-2.

Current Response:

Based on operating experience to date, the response noted above is still applicable. No further application of color coding for differentiating scales on dual-range recorders appears warrented.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.59	SS NO. 10.3.3

Finding:

Parallax was noted on the following indicators:

- RCIC controller, Panel 001
- Horizontal indicators on Panel 800
- Lowest row of indicators on Panels 820 and 840

Prior Response:

An eight-inch platform was installed in front of P-001 to provide the operator improved access and visibility to the displays and controller.
Residual parallax on this panel is considered minimal. Color banding and setpoint additions, as noted in item 10.3.1 (Finding E-5.62), will minimize the parallax on Panels P-800, P-820, and P-840. No further action required.

NRC Comment:

Parallax problems need a positive response. Color banding may not be visible on low-range indicators on P-820, P-840. Horizontal indicators on P-800 are acceptable.

Prior Response:

A review was performed of the indicators located on P-820 and P-840. Indicator design is such that the pointers are located at the right hand edge of the scales directly in line with the edge of the scale face. There is no raised distance between the pointer and scale face. With this design, there is essentially no apparent displacement as seen from two different heights. No action is required.

Current Response:

A review of color banding and indicator scale viewing angle adequacy was performed. See Finding D-1.27 for response.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.62	SS NO. 10.3.1

Finding:

Indicator scales have generally not been marked or color coded to indicate normal and abnormal ranges.

Prior Response:

Color banding and trip setpoint additions will be applied past fuel load when application guidelines and operational experience have been obtained. Resolutions will be noted in the Summary Report.

NRC Comment:

Temporary markings should be in place prior to licensing, with permanent markings to be based on operational experience.

Prior Response:

Temporary markings are being installed on selected instrumentation where their addition is of value to the operator. Temporary markings will be verified based on operational experience and made permanent by the first refueling outage.

Current Response:

158 indicators have been identified for scale color banding application. Color banding has been applied except for those indicators pending engineering evaluations as to color banding setpoints; primarily on pump ammeters and electrical bus meters. A color band application and setpoint control log book will be maintained in the Shift Manager's office and changes will be procedurally controlled through PPM 1.3.1, Standing Orders Procedure. All color banding and controls will be installed by or during the first refueling outage.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.63	SS NO. 11.3.3

Finding:

Alarm points and operating limits are not identified on recorder scales.

Prior Response:

See Item 10.3.1 (Finding 5.62) for response.

Color banding and trip setpoint additions will be applied past fuel load when application guidelines and operational experience have been obtained. Resolutions will be noted in the Summary Report.

NRC Comment:

See Finding 5.62 comment.

Current Response:

See Supply System response to E-5.62.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.66	SS NO. 24.6.29

Finding:

The scale of the HPCS pressure indicator does not conform to recommended standards.

Prior Response:

A review was completed of all indicator and recorder scales in the control room. Seventeen scales were found inadequate and required changeout, and four will be deleted prior to fuel load. Most of the remaining scales use major progression steps of three, with two submajor and twelve minor lines, or are nonlinear due to hardware design. Readability and extrapolation were found as adequate on these scales. No further action required. (See Findings D-5.38, D-5.39, E-5.55 and E-5.56.)

NRC Comment:

See Findings E-5.55 and E-5.56.

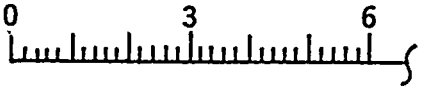
Prior Response:

The scale progressions of the HPCS pressure indicator is in multiples of 300 with 14 minors between majors, or 20 psig per minor. This display is adequately readable as not to require immediate revision. However, the HPCS pressure indicator scale will be brought into conformance with NUREG-0700 by the first refueling outage per response to NRC Audit Finding E-5.55, and D-5.38.

Current Response:

Operating experience and discussions with operators has indicated that indicator scales with major multiples of 3 are acceptable as long as they include two submajors. The use of 14 minors is considered acceptable in this application as long as excessive conjection was not noted. See Finding D-5.38 for further response.

EXAMPLE:



HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. E-5.70	SS NO. 24.4.10	Page 1 of 2

Finding:

The following parameter values identified in the task analysis would be difficult to discern using installed instrumentation, as the instrument scales cannot practically be read to the specified accuracy:

- 1150 gpm HPCS flow (PPM 2.4.4, Step C.8)
- 200 gpm standby service water flow (PPM 2.4.5, Step D.2)
- 145 psig RPV pressure (PPM 5.3.4, Step B.1)
- RPV pressure 76 psig above suppression chamber pressure (PPM 5.3.5, Step F.1)
- RPV pressure 96 psig above suppression chamber pressure (PPM 5.3.5, Step F.2)
- RPV pressure 238 psig above suppression chamber pressure (PPM 5.3.6, Step C.1)
- 8% reactor power (PPM 5.3.7, Note 1)

Prior Response:

GDS displays and computer peripherals are available to the operator with the required accuracy. Need for further action will be based on operational training & simulator experience. No further action required at this time.

NRC Comment:

Response does not address the HED. See Finding E-5.69.

Prior Response:

HPCS, PPM 2.4.4: a procedure revision provides actions for less than 7175 gpm or under/over 1250 gpm. These flow rates are engineered values for pump runout and minimum flow.

Procedural qualifiers such as "less than", "more than", or "not exceed" enables adequate operator response. Also, in the design operating mode (LOCA), it is not necessary for the operator to respond to indicated flows not now provided by the HPCS flow meter. No action is required.

SW, PPM 2.4.5: The procedure has been revised to specify 2000 gpm instead of 200 gpm; the meters at P-601 have 200 gpm subdivisions. No change is required for the meter on P-601. However, the service water flow meters at Board A reads in % instead of gpm. These will be corrected prior to fuel load.

Vol. 5 Procedures, RPV Pressure: In all cases, the referenced procedures specify an action at a pressure above or below the specified pressure and specified pressures are engineered values. RPV pressure is scaled to 20 psig subdivisions and suppression chamber pressure to 2 psig subdivisions. In procedures 5.3.5 and 5.3.6, the operator is required to determine the difference between RPV pressure and suppression chamber pressure before applying the engineered procedural value. RPV pressure may be taken from the computer digital display or graphic display system if accident conditions demand more exact readings than obtainable from the pressure indicator.

Changing indicator scales is not practical; modifying pressure values in procedures is nonproductive as a result of the arithmetical requirement. The required actions are considered within the capabilities of the operator using existing equipment and procedures. Also, procedure revision may be a deviation from emergency procedure guidelines. No action is required.

8% reactor power PPM 5.3.7: Minor divisions on meters at P-603 are 5 %; on back panels, minor divisions are 1% power. This procedure requirement is "maintain power above 8% but as low as practicable." Front Panel (P-603) instruments permit the immediate requirement to be satisfied with finite control provided using back panel indicators. Revising the 8% value may be a deviation from emergency procedure guidelines. No action is required.

Current Response:

RPV pressure readability was noted as a finding in the Emergency Procedure Task Analysis. Additional instrumentation will be provided to allow readability to the necessary accuracy. See Task Analysis Item TA-G-3 for further response.

Readability of HPCS flow, service water flow and percentage power parameters noted above were considered acceptable based on the Task Analysis review. The HPCS minimum flow parameter was not identified as required by the DCRDR Task Analysis; service water flow has been corrected to state 2000 gpm in all procedures; and the 8% power can be read accurately to half a minor on the APRM scale (7.5% power) or on the IRM system range 10 at 20% of scale (20% on the scale equals 8% power). The 7.5% APRM value is considered an acceptable tolerance per the Task Analysis.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. F-3.76	SS NO. 14.3.7

Finding:

The annunciator windows on the fire control panels (although not evaluated as part of this survey) are extremely difficult to read due to the small letter size and the low height of some of the windows.

Prior Response:

Resolution will be provided in the Summary Report.

NRC Comment:

This HED should be resolved prior to licensing.

Prior Response:

The lowest engraved alarm window is 46 inches above the floor. This is above the minimum display guideline height of 41 inches for vertical panels. It is also less than the 75° upper limit for the visual field of view. Based on a nominal viewing distance of 30 inches, the field of view is 38.3° for a 95th percentile male looking downward. A character height of 0.125" is used with a width-to-width ratio of about 1:8. This provides a viewing distance of 31 inches based on a 15-minute maximum visual angle. Windows use black letters on white lenses for good contrast. This panel is used for closeup viewing and is provided with a distinctive alarm tone and an illumination flashing system for detectability and directivity. No changes are required.

Current Response:

Operational experience has determined that many of the existing engravings do not provide adequate descriptions for operator response. The plant is in the process of defining new engraving legends for all the fire control panel annunciator windows. The engraving characteristics will be brought into conformance with the WNP-2 engraving standard during this modification. Changes will be completed by or during the first refueling outage.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. F-4.36	SS NO. 13.3.19

Finding:

Keylock controls are used for the reactor mode switch and the SCRAM discharge volume high level bypass switch on Panel 603. Prompt activation of these controls may be required during plant operation, suggesting that keylocks may not be the most convenient protective measure in these applications.

Prior Response:

Resolution will be noted in the Final Report.

NRC Comment:

Resolution and implementation schedules should be prepared and accepted prior to licensing.

Prior Response:

The mode switch is required by Plant Technical Specifications to be locked in the shutdown position and the key removed. At all other times, the key will be in place for operator use. No change is required.

The SCRAM Discharge Volume Bypass Switch has sufficient interlock circuits to void the need for a keylock switch in this application. This switch will be replaced during the first refueling outage. Meantime, the key will be left in the switch to provide quick accessibility.

Current Response:

Engineering has further evaluated the operational requirements of RPS-RMS-S4, the SCRAM Discharge Volume Bypass Switch, and has concluded that the switch should not be replaced with a non-keylock type switch based on the following:

1. Prompt actuation of RPS-RMS-S4 is not required. The switch is only operated after a SCRAM to allow reset and drainage of the discharge volume. A review of the Recovery Procedure (PPM 3.3.1) and discussions with operators confirm that prompt actuation of RPS-RMS-S4 is not required. Also, emergency procedure Task Analysis did not indicate the need for prompt actuation.

2. The operation of RPS-RMS-S4 will bypass the high discharge volume trip contacts. Compliance to IEEE 279, Paragraph 4.14, requires administrative control for access to means of bypassing. As stated in the FSAR, Chapter 7, Section 7.2.2.2, the WNP-2 method of compliance to the IEEE 279 requirement is the use of keylock switches with administrative control of the keys.

3. The cost of replacing RPS-RMS-S4 with a non-keylock switch is significant due to qualification costs and the unique barrier/box assembly utilized for electrical separation requirements. The switch has a unique design for electrical separation. No qualified non-keylock switch with this unique design is readily available without extensive qualification costs.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. F-5.72	SS NO. 6.3.1

Finding:

No standards are in effect governing the color coding of controls and demarcation lines.

Prior Response:

A separate demarcation guideline has been completed. A switch color coding guideline will be prepared and reviewed against the control room prior to the Summary Report.

NRC Comment:

Switch color coding guideline should be available and in use prior to licensing.

Prior Response:

A review of the control room indicates that application of switch color coding has been minimal. Red is used to highlight emergency trip controls, and white has been used to provide contrast to J-style control handles where needed. Except for the remote shutdown room, white has been used for two switches on Panel P-602. The present use of color coding is minimal, and expansion of the above is not foreseen. A color standard is not presently needed.

Current Response:

Operating experience to date indicates that the prior response noted above is still valid. No further use of control color coding has been identified.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. F-5.73	SS NO. 6.3.3

Finding:

Unique indicating light color codes are utilized on several vendor supplied modular panel inserts (Digital Electro Hydraulic (DEH), rod worth minimizer, reheater controller, and vibration monitors). These color conventions are sometimes at variance with those defined by the standard.

Prior Response:

Color code review and upgrading of vendor status light modules were deferred until past fuel load. Resolution will be noted in the Summary Report.

NRC Comment:

Review and resolution should be completed prior to licensing.

Prior Response:
A review was performed of the vendor supplied modular panels.

RWM uses amber in two locations to alert the operator to an error selection or out-of-sequence condition. Red is used to identify failure of the RWM unit and a rod block condition which results from three selection errors and prevents any further rod pulls. The above coding by severity appear appropriate.

is also used to identify that the unit is either in manual or automatic mode. Auto mode should be white and manual mode amber.

RSC uses amber and red to define the LED display mode. The legend "Amber Display Control" is used with amber colored switch to control the amber display LED lights for rod selection group status. The legend "Red Display Control" is used with the red colored switch to control the red display LED lights for rod position status. The color coding versus LED light color display is well coordinated. The amber agrees with the color standard. The use of red here is appropriate as it relates to a primary monitoring point of information required during SCRAMs (all rods are full in).

Vibration monitors on P-840/P-820 use amber LEDs for alert and red LEDs for Hi-Hi trips. These appear appropriate. Green LEDs are used for -18 volt and -20 volt power supply monitoring status. These should be white.

Reheater controller colors are a mixture of green, blue, red, and amber colors. Six pushbutton backlight switches are mode selector controls and should be white. The two groups of four red/green indication lamps are valve position lights. Their color code is consistent with the open/close color coding scheme for WNP-2. The six mode selector controls will be changed to white.

Correction of the red RWM lamp for auto and manual, green vibration unit lamps and the reheater controller lights to white will be completed by the first refueling outage as specialized lamp covers need to be procured.

Current Response:

Changes noted to the RWM and reheater controller lights will be completed as stated, by or during the first refueling outage.

Changes to the vibration monitors, green to white, for normal power supply available status monitoring will not be completed as noted in the prior response. Green, per the WNP-2 Indicating Lamp Color Standard, is used to indicate a normal condition and the circuit will normally be in a "lit" state as a normal indication of power supply availability. The vibration monitors are speciality units, their use of green is not inconsistent with nor in conflict with other lamps located in the area, and they meet the WNP-2 Indicating Lamp Color Standard criteria. No change is required.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. F-5.75	SS NO. 11.3.1

Finding:

The printouts of multipoint recorders are difficult to read. The printed numerals are small, overlapping, and indistinct.

Prior Response:

Multipoint recorders are not used for parameters requiring process control. Computer monitoring and/or annunciator alarms are available for points of concern. Upgrade or changeout of multipoint recorders is not considered cost effective based on the limited operating experience to date. These will be re-assessed prior to the Summary Report.

NRC Comment:

HED should be re-assessed prior to licensing.

Prior Response:

Multipoint recorders are basically used for observation of trends or specific points which are showing peculiar characteristics. No changes are planned unless operating history dictates a change is necessary. In these cases, the specific application and operator needs will be evaluated. Re-assessment at this time does not indicate that upgrading of the multipoint recorders is necessary.

Current Response:

Based on operational experience to date, operator interviews, and the results of the Emergency Procedure Task Analysis, multipoint recorders are not required by Emergency Procedures and are considered adequate for their intended functions. Recorders are also reviewed by operations "one time per shift" for proper functioning and display readability.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. F-6.114	SS NO. 24.6.20

Finding:

The DEH valve controls are labeled "raise" and "lower" instead of the preferred "open" and "close".

Prior Response:

This will be resolved prior to the Summary Report.

NRC Comment:

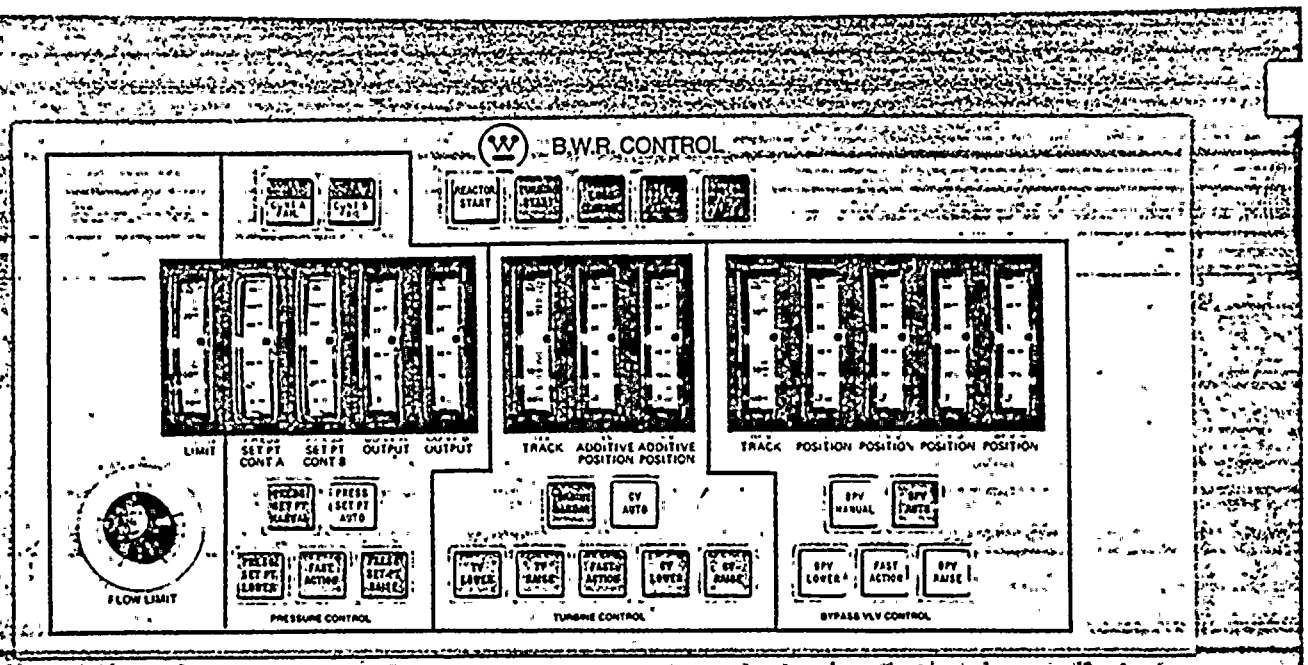
Resolve prior to licensing.

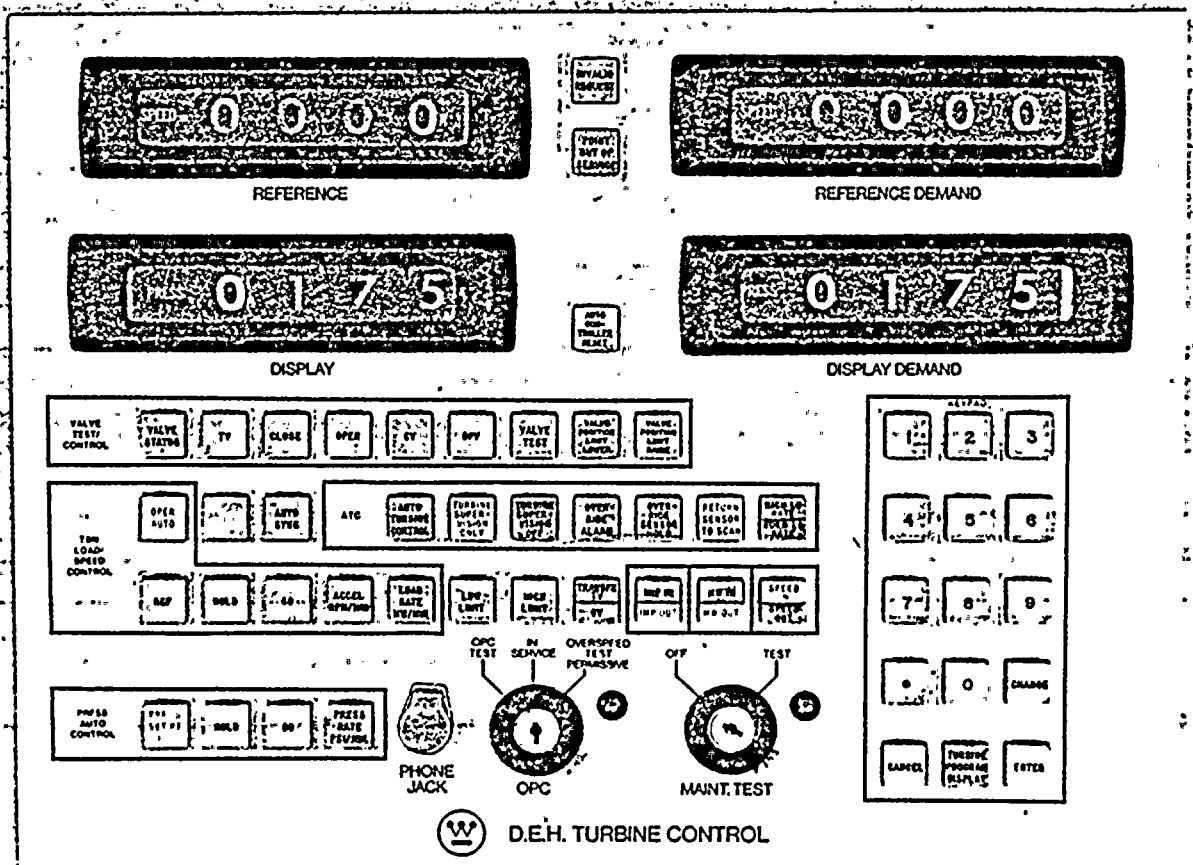
Prior Response:

Turbine speed and generator load are controlled by either the throttle valves or governor, depending on the specific status of the plant. Raise and lower refer to speed and load conditions which are appropriate. The use of TV and GV refer to the specific valves which perform the function. Operators will be specifically trained on the DEH controls prior to startup. No change is necessary.

Current Response:

The DEH panel was demarcated by control function and group labels applied; e.g., Pressure Control, Turbine Control, Bypass Value Control. The controls noted above are part of the turbine control group on the BWR control panel. Operating experience to date indicates that with the added demarcation, group labeling and DEH training provided prior to startup, any apparant operator misunderstanding has been clarified.


B.W.R. CONTROL
REACTOR START
LIMIT
SET PT CONT A
SET PT CONT B
OUTPUT
OUTPUT
TRACK
ADDITIVE POSITION
ADDITIVE POSITION
TRACK
POSITION
POSITION
POSITION
POSITION
FLOW LIMIT
PRESSURE CONTROL
TURBINE CONTROL
BYPASS VLV CONTROL


REFERENCE
REFERENCE DEMAND
DISPLAY
DISPLAY DEMAND
OPC TEST
IN SERVICE
OVERSPEED TEST PERMISSIVE
OFF
TEST
PHONE JACK
OPC
MAINT. TEST
D.E.H. TURBINE CONTROL

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. F-8.50	SS NO. 5.3.16.k

Finding:

The spray pond "A" temperature indication is placed to the right of the "B" indication on Panel 820.

Prior Response:

Spray pond temperatures and levels will be resequenced. Schedule for correction will be noted in the Summary Report.

NRC Comment:

Implementation schedule should be proposed and accepted prior to licensing.

Prior Response:

Panel P-820 spray pond temperature and level indicators will be resequenced to locate spray pond "A" indicators to the left of spray pond "B" indicators by the first refueling outage.

Current Response:

The above corrective action is presently scheduled for the first refueling outage.

HUMAN ENGINEERING DEFICIENCY FINDING	
NRC NO. F-8.51	SS NO. 5.3.17

Finding:

The relative positions of the "open" and "closed" valve position indicating lights on Panel 832 (and some on Panel 813) are the reverse of those on all other panels.

Prior Response:

Indicating position lights on P-813 will be corrected prior to fuel load.

P-832 is a nonsafety panel (feedwater heater vent and drains). Correction of the indicating lamps has been deferred until the first refueling outage.

NRC Comment:

P-832 should be corrected prior to licensing.

Prior Response:

The indicating lamps are color coded and labeled "close" or "open". The fact that the panel is a nonsafety panel, not frequently used, not required to mitigate an abnormal event, is properly color coded and has engraved open/close legends on the lenses and is a distinctive switch not used elsewhere in the control room, should minimize the effect of the reverse light sequence. No changes are required.

Current Response:

A review of operating history to date and discussions with plant operators has not noted any human errors or confusion resulting from the existing layout. Due to their distinctiveness, operators confusion should not occur nor should a mind set be establishable with other lamp color sequence arrangements. Correction of the above would provide only minimal improvement for the added engineering effort and cost required.

HUMAN ENGINEERING DEFICIENCY FINDING

NRC NO. F-8.52	SS NO.	Page 1 of 3

Finding:

Undifferentiated or only partially differentiated strings or matrices of components were noted in the following locations:

Panel 601:	HPCS indicators. SRV controls. Isolation valve controls.
Panel 603:	Standby Liquid Control (SLC) system indicating lights.
Panel 800:	Indicators on vertical section.
Panel 811/ 827:	Indicators and controllers.
Panel 813:	Containment vacuum breaker controls.
Panel 814:	Drywell temperature indicators.
Panel 820:	Turbine auxiliaries indicators. Steam Jet Air Ejector (SJAE) indicators. Turbine drain valve controls. Reheater controls. Evaporator controls.
Panel 832:	Control Switches.
Panel 840:	Reactor Feedwater Pump Turbine (RFPT) indicators.

Prior Response:

Panel 601:	Application of new labels, color padding, and demarcation as presently defined, and rearrangement of the SRVs as noted in Item 5.3.16.a, above, will minimize the undifferentiated effect. No further action required.
Panel 603:	The placement of the new labels will be against their respective indicating lights, leaving a visual gap below them to provide adequate differentiation. No further action required.
Panel 800:	The new labels and demarcation lines minimize this effect. The only areas of concern are at the diesel generator displays, which are pending several design changes. Resolution in this area will be noted in the Summary Report.

Panel 811/ 827: A design review noted that four of the controllers on each panel has been made nonfunctional but not removed from the panels. These will be removed prior to fuel load. New group labeling for the indicators will be installed prior to fuel load to provide visual differentiation. No further action required.

Panel 813: See Item 5.3.16.h, (Finding 8.1) above, for response.

Panel 814: New group labeling will be installed prior to fuel load. The displays were rearranged by drywell elevation and area (top-to-bottom, left-to-right) to allow application of group labels. No further action required.

Panel 820: New group labeling and demarcation lines will be installed prior to fuel load. No further action required.

Panel 832: New labels, demarcation, and improved mimicking will be installed prior to fuel load. No further action required.

Panel 840: The string of eight RFPT displays will be separated (three turbine displays and five oil system displays) during the first refueling outage. No further action required.

NRC Comment:

All design corrections should be installed, reviewed, and reported prior to licensing.

Prior Response

General Physics Corporation has reviewed these areas to ensure adequate differentiation now exists. Panel enhancements have resolved all items noted above.

Panel 601: The HPCS bus voltage meter and voltage selector switches were colored padded to improve visibility. No further differentiation required.

SRV control switches do not lend themselves to differentiation. Legend plates were provided having the PSIG relief setpoints and identifying the ADS valves. Red color bands will be installed on the ADS control legend plates to improve visibility. No further differentiation required.

The MSIV isolation valves have been demarcated and labeled with minor lines to differentiate them from the overall isolation valve grouping. No further differentiation required.

Panel 603: The top two lamps were replaced with square engraved lenses. The new labels were placed adjacent to their respective indicating lamps, leaving a visual gap below the plate to provide adequate differentiation. no further differentiation required.

Panel 800: Demarcation was applied around functional groupings of indicators: Startup Power, Backup Power, 480V Distribution, 4.16 KV Power, 6.9 KV Power, DG-1, DG-1, Bus SM-7 Power, Bus SM-8 Power, and Generator Yard switching. With the additional response noted in D-8.43, no further differential change is required.

Panel 811/ 827: See responses to NRC Audit Findings D-8.41 and D-8.40.

Panel 813: The containment vacuum breaker controls were demarcated into two groupings: Reactor Building to Wetwell breakers and Wetwell to Drywell breakers. The latter group was also subdivided by Rear and Front breakers by a subdemarcation line. No further differentiation is required.

Panel 814: See response to NRC Audit Finding D-8.42

Panel 820: See response to NRC Audit Finding D-8.44 for the indicators. The controls were functionally grouped by use of demarcation lines: Turbine Drain Valves, Evaporator Controls, Moisture Separator Reheater Controls, Steam Jet Air Ejectors, and Turbine Sprays. The Reheater and Steam Jet Air Ejector controls were further divided into A and B units with subdemarcation lines. No further differentiation is required.

Panel 832: Demarcation will be applied around the matrix of trap station bypass controls. The rest of the panel is mimicked and further differentiation is not required. See also NRC Audit Finding D-6.92.

Panel 840: See response to NRC Audit Finding D-8.38.

With the completion of NRC Audit Finding Items D-8.40, D-8.41, D-8.43, and D-8.38 prior to fuel load, no further differentiation will be required.

Current Response:

As a follow-up to the General Physics Corporation Human Factors review noted above, a subsequent review was performed based on operating experience to date along with operator discussions, the task analysis walk through, and discussions with simulator training engineers. This review has confirmed the adequacy of the changes noted above to resolve this finding.

ATTACHMENT C

EMERGENCY PROCEDURE FUNCTIONAL TASK ANALYSIS

INDIVIDUAL FINDINGS AND RECOMMENDATIONS

NRC NO.	SS NO. TA-G-1

FINDINGS: General procedural findings are:

Emergency Procedure Functional Task Analysis, operator walkthrough and input from WNP-2 Simulator Training Engineers identified the following procedural deficiencies:

1. Cautions and operator steps are similar in format making it difficult to follow step sequences or discern cautions from action steps.

2. Information notes or conditional statements often reference being applicable to "the following steps" without clearly identifying the following steps.

3. Procedures do not separate immediate operator actions from subsequent operator actions.

4. Inconsistencies appear in methods of procedural step notation and sequential numbering sometimes fail to separate conditional statements from action steps.

5. Page flipping is often required to use figures and conditional statements.

6. Inconsistencies are apparent in identifying curve out-of-limit zones and/or boundaries.

7. The boxing convention applied to instruct the operator when to exit a procedure versus not boxing an instruction where procedures are to be performed concurrently is confusing. Many of the statements do not explicitly state "exit this procedure" or "perform concurrently with", and the convention is not consistently applied.

8. Placement of cautions, graphs, conditions and other information aids often separates operator action steps sufficiently to prevent a smooth flow path from being visible, thus reducing operators clarity and procedural understanding, and causing some disorientation and delay.

9. Clarity of flow path through procedures is not always apparent; e.g., if a conditional procedural step is not applicable, subsequent direction is not always well defined.

10. Information or condition statements often state the purpose, condition and action in one lengthly sentence or paragraph making it difficult to read and comprehend.

NRC NO.	SS NO. TA-G-1

RECOMMENDATIONS

1. The WNP-2 Plant Specific Writers Guide for Emergency Procedures will be revised to provide improved procedure preparation guidiance and improved formatting techniques for resolving those findings noted above.

2. Emergency Procedures will be revised to reflect the provisions of the Writers Guide. Upon revision, procedures will be reviewed and approved by the Plant Operations Committee.

Recommendations 1 and 2 will be implemented within six months following the completion of the first refueling outage.

NRC NO.	SS NO. TA-G-2

FINDING: General procedural finding is:

Emergency procedures sometimes conflict with other plant procedures; e.g., emergency procedures reference a drywell high pressure trip of 1.65 psig while annunciator and emergency plan, amoung other procedures, indicate the drywell high pressure trip is 1.68 psig.

RECOMMENDATIONS

Plant procedures in the volumes listed below will be reviewed and revised as necessary to remove any conflict with emergency procedures within six months following completion of the first refueling outage.

Volume 2 - System Operating Procedures

Volume 3 - General Operating Procedures

Volume 4 - Abnormal Conditions and Annunciator Procedures

Volume 13 - Emergency Plan Implementing Procedures

NRC NO.	SS NO. TA-G-3

FINDING: General procedural finding is:

RPV pressure monitoring instrumentation has a readability of ± 10 psig while procedures often require reading RPV pressure to ± 1 psig.

RECOMMENDATIONS

1. RPV pressure parameters noted in the procedures will be reviewed and, where possible, rounded to an acceptable value.

2. Modified instrumentation will be installed in the control room which will provide the accuracy required by emergency procedures.

Recommendation 1 will be completed by the first refueling outage and incorporated into the revised procedures noted in Finding TA-G-1.

Recommendation 2 will be installed during the first refueling outage.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-G-5

FINDING: General procedural finding is:

An entry condition for the level, pressure and power control procedures is "any condition which requires MSIV isolation". One of these conditions, Main Steam Line Radiation High, is annunciated in the control room but operating procedures and radiation monitor displays do not identify the trip setting to permit verification of isolation or manual initiation of isolation.

RECOMMENDATIONS

1. A radiation monitor information book has been compiled for the control room. The book contains trip settings and operator response for all radiation monitors in the control room.

2. The associated radiation monitors will be color banded to identify the trip setpoints; MS-RIS-610A,B,C,D.

Recommendation 2 will be completed by the first refueling outage.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-G-4

FINDING: General procedural finding is:

Procedures require an operator to locally throttle the CRD pump discharge valve prior to starting a CRD pump from a "both pumps stopped" condition. The basis for this requirement has not been verified by engineering but the practice complicates and delays execution of the ATWS procedure.

RECOMMENDATION

Several recommendations will be evaluated; e.g., removal of the operating requirement, making the discharge valves remotely operable from the control room, improving the pressure tightness of the system such that valve control is not required, etc. The CRD System and procedures will be evaluated and modified as required to enable pump restart in a timely manner by the completion of the first refueling outage.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-G-7

FINDING: General procedural finding is:

Emergency procedures require suppression chamber spray actuation before the suppression chamber pressure reaches 16.5 psig. The WNP-2 FSAR indicates that suppression chamber spray will be initiated prior to 30 psig. Control room suppression chamber pressure high annunciators are set at 30 psig per the WNP-2 FSAR.

RECOMMENDATIONS

1. Annunciator setpoints and procedures will be changed to 16.5 psig for annunciators P601-A11, 4-2 and P601-A12, 8-2.

2. The appropriate FSAR sections will be updated to reflect emergency procedures provisions for suppression chamber spray.

Recommendation 1 will be completed during the first refueling outage.

Recommendation 2 will be incorporated into the next general revision of the WNP-2 FSAR.

NRC NO.	SS NO. TA-G-6

FINDING: General procedural finding is:

Control room design does not provide the operator information regarding the status of the 135 psig shutdown cooling interlock for valves RHR-V-8 and RHR-V-9.

RECOMMENDATION

Status lights will be installed above each valve's control switch. Lamps with square engraved lenses will be installed and will conform to the WNP-2 color engraving and abbreviation standards.

These status lights will be installed prior to or during the first refueling outage.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-G-9

FINDING: General procedural finding is:

Wetwell level and suppression chamber pressure recorders intermix parameters causing some confusion and mistakes when reading selected parameters. Narrow range level and suppression chamber pressure are on one set of recorders and wide range level on another set.

RECOMMENDATION

Recorder parameters will be modified such that both the narrow and wide range level will be on one set of recorders and the suppression chamber pressure will be by itself, on the other set of recorders.

Affected Instruments: CMS-LR-3
CMS-LR-4
CMS-LR/PR-3A
CMS-LR/PR-4

This recommendation will be completed during the first refueling outage.

NRC NO.	SS NO. TA-G-8

FINDING: General procedural finding is:

Twelve temperature indicating lights (6 per division), monitoring various wetwell and drywell temperatures, are mounted on the ECCS control panel. The lens of each light is engraved with the temperature value at which it illuminates. Two of these temperature setpoints (160°F and 360°F) do not correspond to procedural or design requirements.

RECOMMENDATIONS

1. The 160°F lens and setpoint will be changed to 135°F to correspond to the average drywell temperature Emergency Procedure entry condition.

2. The 360°F lens and setpoint will be changed to 340°F to correspond to the limiting drywell temperature as defined by Emergency Procedures.

Recommendations 1 and 2 will be completed prior to or during the first refueling outage.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-G-11

FINDING: General procedural finding is:

Emergency procedures reference plant procedure PPM 12.10.7, Post Accident Sampling and Analysis, for determination of reactor coolant activity prior to discharge from reactor systems. Execution of PPM 12.10.7 could require up to four hours to determine sample results which may prevent timely emergency procedure implementation and, even with the sample results, sufficient information may not be available to decide if discharge is permissible.

RECOMMENDATION

A full quantitative analysis was not intended by the guideline for procedure implementation. Emergency procedures and interfacing procedures will be revised to remove the reference to PPM 12.10.7 and, as required, to provide direction prohibiting release of highly contaminated coolant from the reactor and primary containment systems.

This recommendation will be incorporated into the revised procedures noted in Finding TA-G-1.

NRC NO.	SS NO. TA-G-10

FINDING: General procedural finding is:

Reactor recirculation pump suction temperature sensors are used to monitor RPV cooldown rates. With neither pump running and the RPV isolated, direct reactor coolant temperature monitoring becomes unavailable.

RECOMMENDATION

Emergency procedure coolant temperature monitoring requirements for the isolated RPV in an emergency will be reviewed. If the review indicates improved temperature monitoring will mitigate consequences of the emergency, a method, such as coolant saturation temperature (based on RPV dome pressure) will be in place not later than six months following completion of the first refueling outage.

NRC NO.	SS NO. TA-G-13

FINDINGS: General procedural findings are:

A 4' x 6" Emergency Procedure Flow Chart is located in the control room as an operator aid. Findings noted are:

1. The flow chart and table do not conform to NUREG-0700 anthropometric standards. The table and chart are too deep making the rear of the chart hard to read or reach.

2. The number of colors and their application causes some operator confusion as to color intent. The use of the colors for identifying alternate flow paths and concurrent flow paths appear to be the prime colors of concern.

3. The flow chart does not use standard flow chart symbology for "and" or "or" steps, such that, singular or concurrent flow paths are indeterminate.

4. Alternate flow paths are intermixed with the normal flow paths rather than separated, which reduces main flow path visibility.

5. The arrangement of flow paths, curves and cautions places the flow paths to the rear where they are less readable.

RECOMMENDATIONS

1. The flow chart table and chart will be redesigned to "conform to anthroparmetrics standards".

2. The number and application of colors will be clarified in conjunction with recommendations 3 and 4 below.

3. Standard flow chart symbology or descriptive phases will be used to identify "and" and "or" steps.

4. Alternate flow paths will be separated from main flow paths.

5. The arrangement of flow paths, curves and cautions will be rearranged as needed to improve layout, access and readability.

The flow charts will be updated to reflect the procedural revisions incurred by the Task Analysis.

Recommendations 1 through 5 will be completed within six months following completion of the first refueling outage.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-G-12

FINDING: General procedural finding is:

Operators are required to monitor and maintain wetwell level between + 1-3/4 inches and - 2-1/4 inches of scale zero. Annunciator alarms are available to alert the operators but verification is difficult as the narrow range level monitor scales can only be extrapolated to the nearest half inch.

RECOMMENDATION

During normal operation, annunciator alarms provide adequate monitoring within the above parameters. During emergency procedure implementation use of the annunciation for this function is inadequate. Engineering will evaluate changing plant Technical Specifications and procedures to allow a ± 2 inch band to be specified and/or modifying the monitoring instrument to provide the required readability.

This recommendation or a suitable alternate will be completed during the first refueling outage.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-5.0.0

FINDINGS: Specific procedural findings for PPM 5.0.0 are:

1. Caution #1 states "Observe the boxed requirements for exiting one procedure and entering another". Emergency procedures do not lend themselves well to this technique. See General Finding TA-G-1, Item 7.

2. General Precautions #7 and #9 have been inserted in individual procedures. This is contrary to the emergency procedure guideline definition of General Precautions.

RECOMMENDATIONS

1. The "Box" method of indicating exit from a procedure will be discontinued; exit requirements will be specifically stated.

2. Use of Precautions #7 and #9 will be in conformance with the guidelines.

Recommendations 1 and 2 will be incorporated into the revised procedures noted in Finding TA-G-1.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-G-14

FINDING: General procedural finding is:

Emergency procedure guidelines recommend ECCS Keep-Full Pumps as a method of RPV injection in an emergency. WNP-2 emergency procedures do not include these pumps.

RECOMMENDATIONS

Keep-Full Pumps were not included since they run continuously and would automatically inject under RPV low level and pressure conditions. However, the Keep-Full Pumps will be incorporated into emergency procedures to provide guidance if manual operation should be required. Procedures will be revised in conjunction with Finding TA-G-1.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-5.1.1

FINDINGS: Specific procedural findings for PPM 5.1.1 are:

1. Step 4 includes a list of specific instruments for monitoring RPV water level. The identification of commonly and routinely used instruments in this procedure is different from other procedures and tends to interrupt instruction or action steps provided by the EPG for the emergency.

2. Inclusion of Step 10 to operate the main steam leakage control is not addressed by the emergency procedure guidelines.

RECOMMENDATIONS

1. The list of instruments for monitoring RPV water level will be removed from Step 4 and placed on the opposite facing page for operator reference. This will be in conformance with the proposed revised Writer's Guide and will maintain the intent of the general practice.

2. Instruction to operate the main steam leakage control system was inserted in compliance to SER 6.7, dated March, 1982. The system will remain within the procedure but will be modified to better define conditions requiring use.

Recommendations 1 and 2 will be incorporated into the revised procedures noted in Findings TA-G-1.

NRC NO.	SS NO. TA-5.0.1

FINDING: Specific procedural finding for PPM 5.0.1 is:

PPM 5.0.1 is not an emergency procedure as it provides no plant operating instruction. PPM 5.0.1 places the Emergency Procedure Flow Chart under the control of the Plant Operating Committee.

RECOMMENDATION

The function of PPM 5.0.1 will be incorporated into PPM 5.0.0 and PPM 5.0.1 deleted. This recommendation will be performed in conjunction with the procedure revisions noted in Finding TA-G-1.

NRC NO.	SS NO. TA-5.1.2

FINDINGS: Specific procedural findings for PPM 5.1.2 are:

1. Step 8.2.a identifies valve MD-V-71 incorrectly as MS-V-71.

2. Panel P602 control switch label is incorrectly engraved MD-V-69; it should read MS instead of MD.

3. At Panel P601, operators have perciled the required SRV operating sequence (from PPM 5.1.2) onto valve control switch labels as an operating aid.

RECOMMENDATIONS

1. Step 8.2.a will be revised to read MD-V-71.

2. Panel P602 label will be revised to read MS-V-69.

3. Panel P601 SRV control switch labels will be revised to have their opening sequence number permanently engraved.

Recommendation 1 will be incorporated into the revised procedures noted in Finding TA-G-1.

Recommendations 2 and 3 will be completed by the end of the first refueling outage.

NRC NO.	SS NO. TA-5.1.3

RECOMMENDATIONS

1. Step 5 will be revised to clarify the action(s) that the operators are to confirm or initiate on recirculation flow runback to minimum.

2/3. Use of the RCIC standpipe, noted in Findings #2 and #3 above, will be evaluated with attention to:

   a. locating a different injection point,

   b. modifying the existing standpipe for ease of feed hose insertion,

   c. providing an alternate injection point to avoid the orifice and end ell,

   d. clearly identifying the components in the plant and procedures.

4. Potential storage areas within the plant security fence will be evaluated. Areas will be reviewed based on the necessity of keeping boron out of the reactor coolant during normal operation. An area will be selected to accommodate the Borax and Boric Acid which will not compromise normal plant operations.

5. Substeps 8.7 and 8.8 will be removed from Step 8 and either placed as procedure attachments or in new procedures.

6. Substep 8.2.c typographical error will be revised to read 8.2.e.

7. BWR Owners Group confirmation is required relative to the intent of Step 8.3.c. Based on the confirmation, if necessary, the step will be revised to allow scram discharge volume vent and drain valves to be manually opened only if the RPS circuit is energized.

8. An alternate CRD system venting point for depressurizing the CRD scram valves will be selected or CRD-V-64 will either be relocated or a new vent valve installed.

9. Alternate boron injection methods will be explored and evaluated. The RWCU alternate boron injection method will be deleted when a more efficient method is developed.

Recommendations 1, 4, 5 and 6 will be incorporated into revised procedures noted in Finding TA-G-1.

Recommendations 2, 3 and 7 will be completed by or during the first refueling outage.

Recommendation 8 will be resolved by the second refueling outage.

NRC NO.	SS NO. TA-5.1.3

FINDINGS: Specific procedural findings for PPM 5.1.3 are:

1. Step 5 states "confirm or initiate recirculation flow runback to minimum". System design allows for either automatic trip of the recirculation pumps to low speed and/or automatic throttling of the flow control valve. It is unclear as to which or both of the automatic actions are to be confirmed or initiated.

2. Step 8.7 requires an orifice to be removed from the standpipe of the RCIC suction line for alternate boron injection using the RCIC system. The location of the orifice is not adequately described and the orifice is located in a congested and not easily accessible area.

3. The RCIC method of alternate boron injection requires that the standpipe (noted in Finding #2 above) upper end ell be cut and removed to insert the temporary boron feed hose. The end ell is not clearly identified in the plant and its removal may cause an untimely delay in implementing the alternate boron injection method.

4. Borax and Boric Acid for alternate boron injection is stored in the warehouse outside the plant security fence. Its location may delay response to the ATWS event if alternate boron injection is required.

5. Step 8 provides instructions for alternate methods of control rod insertion; substeps 8.7 and 8.8 provide instructions for alternate boron injection. Two diverse actions are intermixed in one procedural step.

6. Step 8.2 has two substeps labeled 8.2.c; one should be 8.2.e.

7. Step 8.3.c requires the scram discharge volume vent and drain valves be opened. Conditions under which these valves are opened and how they are opened needs to be clarified.

8. Step 8.1 requires the CRD scram valve air supply header be isolated and depressurized. Vent valve CRD-V-64 is in an isolated, congested and not readily accessible location.

9. The RWCU alternate boron injection method noted in Step 8.8 is complex and lengthy and the RWCU system is potentially dangerous to personnel when used for alternate boron injection.

NRC NO.	SS NO. TA-5.2.2

FINDINGS: Specific procedural findings for PPM 5.2.2 are:

1. Entry condition states that procedure is entered whenever any local drywell temperature is above 150°F. The EPG requires that Technical Specifications fix the limit; WNP-2 Technical Specifications allow specific local areas to exceed 150°F. Step 4 also repeats the entry condition.

2. Step 3 uses the term "containment pressure"; it is unclear whether this means drywell or suppression chamber pressure.

3. Step 5 inclusion of the RPV saturation temperature limit curve appears inappropriate since WNP-2 level instrumentation reference legs are located outside the drywell.

4. Step 6 Drywell spray initiation pressure limit curve x-axis increment between 15-20 psig is not of equal spacing as other x-axis increments. This also applies to PPM 5.2.3, Steps 7 and 10.

RECOMMENDATIONS

1. The entry condition statement will be modified to be compatible with WNP-2 Technical Specifications. Step 4 will be deleted as it is redundant to the entry condition.

2. Step 3 wording will be revised to indicate that "containment" in this application can be either drywell or suppression chamber.

3. The RPV saturation temperature limit curve will be deleted.

4. The drywell spray initiation pressure limit curve will be modified to correct the x-axis spacing deficiency.

Recommendations 1 through 4 will be incorporated into the revised procedures noted in Finding TA-G-1.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-5.2.1

FINDINGS: Specific procedural findings for PPM 5.2.1:

None

NRC NO.	SS NO. TA-5.2.3

6. Instruction to operate the main steam leakage control system was inserted in compliance to SER 6.7, dated March, 1982. The system will remain within the procedure but will be modified to better define conditions requiring use.

7. As a participant in the BWR Owners Group subcommittee for the Emergency Procedure Guidelines, WNP-2 is cognizant of the forth coming Revision 4 to the guidelines regarding containment venting and combustible gas control. Evaluation and resolution of the WNP-2 venting capability is dependent on the provisions to be addressed in Revision 4 of the guidelines. As noted in the FSAR, WNP-2 will implement the guidelines when issued.

Recommendations 1 through 6 will be incorporated into the revised procedures noted in Finding TA-G-1.

Recommendation 7 will be implemented not later than the second refueling outage following EPG Revision 4 approval by the NRC.

NRC NO.	SS NO. TA-5.2.3

FINDINGS: Specific procedural findings for PPM 5.2.3 are:

1. Step 5 references PPM 2.3; the correct reference is PPM 2.3.3.

2. PPM 5.2.3, unlike other emergency procedures, is inconsistent in using the suffix "TAF", Top of Active Fuel, following its RPV level elevation -161 inches, when stated in procedures; e.g., -161 inches (TAF).

3. The Pressure Suppression and Primary Containment Design Pressure curves identify the x-axis as "Primary Containment Water Level"; it should read Suppression Pool Water Level.

4. The Drywell Spray Initiation Pressure Limit curve identifies the x-axis as Suppression Chamber Pressure; it should read Drywell Pressure.

5. The Primary Containment Pressure Limit curve identifies the x-axis as Suppression Chamber Water Level; it should read Suppression Pool Water Level.

6. Step 4 directs initiation of the main steam leakage control system which is not addressed by the Emergency Procedure Guidelines.

7. Step 11 directs use of the two inch containment purge exhaust valves for venting if containment pressure exceeds the limit (approximately 90 psig). The two inch vents are considered inadequate for dealing with a heat source causing containment pressurization to 90 psig.

RECOMMENDATIONS

1. Step 5 will be revised to reference the correct interfacing procedure; PPM 2.3.3.

2. PPM 5.2.3 will be revised to include the suffix "TAF" following use of "-161 inches" RPV level elevation.

3. The Pressure Suppression Pressure curve and the Primary Containment Design Pressure curve x-axis will be relabeled Suppression Pool Water Level.

4. The Drywell Spray Initiation Pressure limit curve x-axis will be relabeled Drywell Pressure.

5. The Primary Containment Pressure Limit curve x-axis will be relabeled Suppression Pool Water Level.

NRC NO.	SS NO. TA-5.2.4

7. Level instrument references will be revised to read CMS-LR/PR-3 and CMS-LR/PR-4.

Recommendations 1 through 7 will be incorporated into the revised procedures noted in Finding TA-G-1.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-5.2.4

FINDINGS: Specific procedural findings for PPM 5.2.4 are:

1. Step 3.2 does not provide direction for terminating the raising of the suppression pool water level.

2. The Heat Capacity Temprature Limit (HCTL) curve y-axis labeling is identified as "Suppression Pool Temperature"; it should read "Heat Capacity Temperature Limit".

3. Step 8.3 uses the term primary containment water level, it is unclear whether this means drywell or suppression pool water level.

4. Emergency procedure guidelines require that procedure Steps 7 and 8 be performed concurrently rather than in sequence.

5. The Drywell Spray Initiation Pressure Limit curve x-axis labeling is identified as "Suppression Chamber Pressure"; it should read "Drywell Pressure".

6. PPM 5.2.4 repeatedly specifies suppression pool water level instrument numbers throughout the procedure, intermixing both narrow and wide range instruments. This is space consuming, distracting and presents confusion.

7. PPM 5.2.4 references level instruments CMS-LR-3 and CMS-LR-4 incorrectly; they should read CMS-LR/PR-3 and CMS-LR/PR-4.

RECOMMENDATIONS

1. Step 3.e will be revised to provide direction to close the suppression pool fill valve when level is restored to normal.

2. The HCTL curve y-axis will be relabeled "Heat Capacity Temperature Limit".

3. The term primary containment will be revised to read "Drywell".

4. PPM 5.2.4 will be revised to conform to the guidelines and will provide for concurrent control of containment parameters.

5. The Drywell Spray Initiation Pressure Limit curve x-axis will be relabeled "Drywell Pressure".

6. Level instrument numbers in PPM 5.2.4 will be removed from procedural steps, placed in tabular form and either relocated on facing pages or prior to Step 1.

NRC NO.	SS NO. TA-5.2.5

3.

a. Temperature limits will be provided for the steam tunnel and sample racks SR-13/14.

b. Temperature limits that exceed control room instrumentation monitoring capability will be reassessed; where high range leak detection monitoring is not available, either the procedure will be revised to accomodate the condition or the instrument range expanded.

c. Temperature limits and annunciator alarm setpoints will be reassessed and adjusted (within Technical Specification limits) to obtain compatability.

4. Generally, installed plant instrumentation is not designed for monitoring the higher radiation levels impacting equipment operation; instrumentation is primarily for personnel protection. However, PPM 5.3.1 will be revised for maximum use of installed instrumentation while:

- o accomplishing the intent of the guideline as is reasonably achievable, and
- o utilizing the limiting criteria of the WNP-2 Equipment Qualification Program.

5. PPM 5.2.5 will be revised to specify actions based upon maximum safe operating levels that are within the plant's capability to measure; either visually or with existing level instrumentation. Additionally, the BWROG Subcommittee for emergency procedures will be advised of the difference between maximum safe operating levels and Mark II containment level measuring capabilities.

6. The BWROG Subcommittee on emergency procedures will be contacted and invited to clarify the apparent event-based statement. The resolution and schedule for correction, if any, will be based upon BWROG response.

7. The procedure will be revised to minimize and clarify water level terminology.

Recommendations 1, 3a, 4, 5 and 7 will be incorporated into the revised procedures noted in TA-G-1.

Recommendations 2, 3b and 3c will be completed prior to completion of the first refueling outage.

NRC NO.	SS NO. TA-5.2.5

FINDINGS: Specific procedural findings for PPM 5.2.5 are:

1. Procedure entry conditions include secondary containment differential pressure and HVAC cooler differential temperature. The procedure provides no instructions for responding to these conditions and does not provide HVAC cooler differential temperature entry criteria.

2. Annunciator procedures addressing secondary containment operating parameters do not reference this emergency procedure.

3. The maximum normal and maximum safe operating temperature table is difficent as follows:

   a. Parameters are not provided for the steam tunnel and sample racks SR-13/14.

   b. Temperature limits up to 245°F are specified while control room instruments read to 200°F maximum.

   c. Annunciator alarm trip points are different than entry conditions for temperatures listed.

4. The secondary containment radiation table does not specify a maximum safe radiation level as required by the guidelines.

5. The secondary containment water level table specifies maximum safe operating water levels that are not monitored by instruments and possibly cannot be visually observed.

6. Steps 1, 2 and 3 states "If a primary system is discharging into a primary area...." This phase is a event-based statement rather than a symptom as other emergency procedures are based upon.

7. The procedure uses the terms maximum normal operating water level, area water level, floor level and sump water level; terminology does not appear consistent.

RECOMMENDATIONS

1. Instructions will be provided for responding to abnormal secondary containment differential pressure and HVAC cooler differential temperature entry conditions. HVAC cooler differential temperature entry parameters will be evaluated with respect to the organization required for ready reference and incorporated if appropriate. Otherwise, any HVAC cooler differential temperature alarmed condition will signal procedure entry.

2. Applicable annunciator procedures will be revised to reference PPM 5.2.5.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-5.2.6

FINDINGS: Specific procedural findings for PPM 5.2.6 are:

1. Section 5.2.6.2 uses the Emergency Classification term "Area Alert". The proper terminology in accordance to the Emergency Plan is "Alert".

2. Entry conditions noted in this procedure for declaring emergency classifications of either "Alert" or "General Emergency" is not in accordance with Emergency Plan implementing procedure PPM 13.1.1.

3. Step 2 states "If a primary system is discharging into a primary area....". This is a event-based statement rather than symptom oriented.

RECOMMENDATIONS

1. The term "Area Alert" will be changed to "Alert".

2. Entry conditions will be rewritten to agree with Emergency Plan Implementing Procedure PPM 13.1.1.

3. The BWROG Subcommittee on emergency procedures will be contacted to clarify the apparent event-based statement. The resolution and schedule for correction, if any, will be based upon BWROG response.

Recommendations 1 and 2 will be incorporated into the revised procedures noted in TA-G-1.

NRC NO.	SS NO. TA-5.3.1

6. With respect to guideline intent, human factors and Plant Operations Committee approval, and in compliance with the revised Writers Guide noted in TA-G-1, PPM 5.3.1 will be reviewed and simplified.

Recommendations 1 through 6 will be incorporated into the revised procedures noted in TA-G-1.

NRC NO.	SS NO. TA-5.3.1

FINDINGS: Specific procedural findings for PPM 5.3.1 are:

1. The caution at Steps 8.3.d and 9.3 addressing stationing of an operator when using the temporary condensate-system-to-RHR-system pipe jumper is not included in the guidelines.

2. Step 9.3 directs operator action "when pressure decreases to 100 psig" but the guideline intent is that all of Step 9 be performed when RPV pressure is 60 psig or less.

3. Step 2.2 identifies two condensate booster pumps for temporary connection to the fire water system; only one pump is designed for this temporary connection.

4. Step 4.1 states "If RPV water level trend reverses or changes region....". The wording should state "If RPV water level trend reverses or RPV pressure changes region".

5. Step 3 direction table high pressure value (360 psig) is not located over the proper reference line to establish the intermediate high pressure boundary.

6. This procedure appears unnecessarily long and complex and is difficult for the operators to follow.

RECOMMENDATIONS

1. The caution at Steps 8.3.d and 9.3 is being reviewed for applicability; disposition will be as determined by the Plant Operating Committee.

2. Step 9.3 will be revised by moving the action requirement one step earlier to resolve the pressure discrepancy.

3. Step 2:2 will be revised to identify the correct pump; COND-P-2A.

4. Step 4.1 will be revised to comply with the guideline.

5. The table at Step 3 will be revised to properly identify the intermediate pressure boundry.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-5.3.3

FINDINGS: Specific procedural findings for PPM 5.3.3 are:

None

NRC NO.	SS NO. TA-5.3.2

FINDINGS: Specific procedural findings for PPM 5.3.2 are:

1. Step 1.2 does not include the RCIC System as one of the methods for RPV depressurization.

2. Step 1.2.a relay equipment numbers are listed incompletely; e.g., K1A rather than B22H-K1A.

3. Step 1.2.a requires the operator to bypass MSIV interlocks. No direction is noted to require the operator to place the MSIV controls in the closed position prior to this step to prevent their uncontrolled opening.

4. Step 1.2 does not contain the EPG wording "Use in order which will minimize radioactivity release to the environment...." as guidance in selecting listed systems for RPV depressurization.

RECOMMENDATIONS

1. RCIC System will be included in Step 1.2.

2. Relay numbers will be revised to read their total identification number;

   K1A to B22H-K1A
   K1B to B22H-K1B
   K1C to B22H-K1C
   K1D to B22H-K1D

3. A substep will be added directing the operator to place the MSIV controls to close position.

4. Selections of systems to minimize radioactivity release to the environment is dependent on event conditions and, thus, systems cannot be listed by a preferred order of use. Wording will be added to identify the concern but leaving system selection to the operator.

Recommendations 1 through 4 will be incorporated into the revised procedures noted in TA-G-1.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-5.3.5

FINDINGS: Specific procedural findings for PPM 5.3.5 are:

1. Step 5 and Step 6 provide actions required for the performance of Step 4. All these steps should be combined such that Steps 5 and 6 become substeps of Step 4 to clarify operator action and sequence.

2. Step 5 and Step 6 reference use of one RHR pump but do not qualify whether the pump is to be used in the LPCI Mode or Shutdown Cooling Mode.

RECOMMENDATIONS

1. Steps 5 and 6 will be reformatted as substeps to Step 4; e.g., Steps 4.1 and 4.2 respectively.

2. The mode of RHR will be clarified to inform the operator that the preferred mode is RHR Shutdown Cooling; otherwise use of LPCI Mode is permissible.

Recommendations 1 and 2 will be incorporated into the revised procedures noted in TA-G-1.

TASK ANALYSIS DEFICIENCY FINDING

NRC NO.	SS NO. TA-5.3.4

FINDINGS: Specific procedural findings for PPM 5.3.4 are:

None

NRC NO.	SS NO. TA-5.3.6

6. Steps 2 through 6 will be revised, in conjunction with the revised Writers Guide to clarify the procedure and to provide guidance when exit or entry conditions can not be met.

Recommendations 1 through 6 will be incorporated into the revised procedure noted in TA-G-1.

NRC NO.	SS NO. TA-5.3.6

FINDINGS: Specific procedural findings for PPM 5.3.6 are:

1. The Minimum Alternate RPV Flooding Pressure Table is used throughout this procedure and also PPM 5.3.7. The term "Minimum" is in conflict with directions provided in various steps; the table is actually "Maximum" values for Step 2.1 and PPM 5.3.7 Step 4.3 and "Minimum" values for Steps 2.2, 2.3 and 2.4.

2. Step 5.1 lists equipment numbers of recorders, indicators and their related transmitters. Many of these numbers are either incomplete or incorrect.

3. Step 6 references use of the Primary Containment Design Pressure curve but the curve is not available within the procedure.

4. Step 3.1 requires the operator to "Commence and increase injection into the RPV while verifying...." three stated conditions. It is not clear what the operator is to do if the conditions <u>are</u> or <u>are not</u> met and when the operator should terminate injection.

5. Use of the fire water system for providing water as an alternate RPV injection source should be considered in Step 3.1.

6. Implementation of Steps 2 through 6 is unclear; no guidance or directions are provided if step entry or exit conditions are not met or where to proceed upon completion of a step.

RECOMMENDATIONS

1. The term "Minimum" will be removed from the table title as adequate directions are provided in the individual steps to tell the operator to stay below or above the pressures listed in the table.

2. Equipment numbers in Step 5.1 will be corrected.

3. The Primary Containment Design Pressure curve will be included with the procedure.

4. Step 3.1 will be clarified to provide adequate direction to the operator.

5. The fire water system will be included into the listing of systems for alternate RPV injection sources.

NRC NO.	SS NO. TA-5.3.7

FINDINGS: Specific procedural findings for PPM 5.3.7 are:

1. Steps 4.c and 4.5.c reference valve RFW-V-10 incorrectly; it should read RFW-FCV-10.

2. Step 4 defines the RPV high water level trip as 54.0 inches while other procedures state 54.5 inches.

3. EPG's note that Caution #25 is applicable to Step 4 in this procedure but was not included.

4. Step 4.b provides a caution for RCIC operation while Step 4.5.b does not.

5. Implementation of Steps 4 through 7 is unclear; especially Step 4 which mixes two different operator response actions under one step. Substeps 4.1 and 4.2 are performed when RPV level can be maintained and substeps 4.3 through 4.6 when RPV level cannot be maintained. Also, only substep 4.6 presents the limitation "RPV level cannot be maintained" while substeps 4.3 and 4.4 do not specify a limitation.

RECOMMENDATIONS

1. The valve identification number will be revised to read RFW-FCV-10.

2. The RPV high water level trip will be revised to read 54.5 inches.

3. EPG Caution #25 will be inserted at Step 4 in the procedure.

4. The RCIC Caution will be included in Step 4.5.b.

5. Steps 4 through 7 will be revised, to clarify conditions for performing the indicated action steps.

Recommendations 1 through 5 will be incorporated into the revised procedures noted in TA-G-1.