



Public Service™

Public Service
Company of Colorado

16805 WCR 19 1/2, Platteville, Colorado 80651

May 16, 1986
Fort St. Vrain
Unit No. 1
P-86366

Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. H. N. Berkow, Director
Standardization and Special
Projects Directorate

Docket No. 50-267

SUBJECT: Fort St. Vrain Control
Room Design Review
Summary Report

REFERENCE: 1) NRC Letter (G-85363)
Hunter to Lee
Dated 8/27/85

2) PSC Letter (P-85384)
Warembourg to Butcher
Dated 10/29/85

Dear Mr. Berkow:

The purpose of this letter is to provide you with Public Service Company's sixth submittal in response to the requests of Reference 1 above.

The purpose of these submittals is to provide you with specific information relative to the proposed Control Room Design Changes. This information is submitted as Attachments 6b-17 through 6b-19 with supplements to Attachment 9 as referenced by "Public Service Company's Response to the Nuclear Regulatory Commission's 'request for additional information'" included with reference 2.

If you have any questions, please contact M. H. Holmes at (303) 480-6960.

Very truly yours,

D. W. Warembourg
D. W. Warembourg
Manager, Nuclear
Engineering Division

DWW:DJG/asa

Attachments

8605280067 860516
PDR ADOCK 05000267
P PDR

A003
1/1

ATTACHMENT 6b-17

SUMMARY OF THE
CONTROL ROOM IMPROVEMENT
DESIGN PROCESS
AS APPLICABLE TO
I-7507X HVAC PANEL

FOREWORD - NUREG-0737 Supplement 1, Section 5.1b requires that a Control Room Design Review (CRDR) be conducted to identify human engineering discrepancies. Section 5.1c requires that these discrepancies be assessed and design improvements selected to correct these discrepancies.

Public Service Company (PSC) has conducted the required review of the Fort St. Vrain Control Room. Approximately eight hundred forty eight (848) discrepancies or classes of discrepancies were cited. These discrepancies were assessed to determine their potential for causing an operating error and the potential effect of any error. (Certain discrepancies are known to have caused errors). An improvement program has been selected which meets the regulatory requirements and proposes to improve the operability and functionality of the Control Room.

The regulatory requirement for the CRDR and the follow-on improvement program was directed toward the improved handling of emergencies and not specifically toward improved production. Public Service Company's improvement program is directed toward both normal operation and the handling of emergencies.

BACKGROUND - Public Service Company has initiated an integrated improvement program based on functionality rather than particular classifications of problems. This approach is first, one of determining functional groupings, followed by demarcating, hierarchical labeling, correcting indicator scaling, complying with established conventions (color coding, switch positions, etc.).

The following steps constituted the planning portion of the integrated improvement program.

- An Elevation drawing of each panel was color coded or marked to show all applicable HEDs as relabeling, relocations, scaling, deletions, or equipment change-out. This scheme provided an overview of the problems documented on each control board or panel.
- All HEDs involving alarms were reviewed. System function and operator responses were considered in grouping or deleting alarms.
- Operator interviews were conducted to determine their interpretations or actions to each component or mimic display on the panel.
- Controls and indications were arranged functionally. Associated alarm locations were rechecked to verify that the more desirable locations were selected.

- A drawing was prepared to show the proposed arrangement.
- A Change Notice (CN) number was assigned to each effort identified above.

IMPROVEMENT PROCESS METHODOLOGY APPLICABLE TO I-7507X

The Improvement Process starts with the documentation and drawings produced during the improvement planning process described in the BACKGROUND presentation portion of this summary. An individual designer was assigned the responsibility of evaluating I-7507X. Since this individual had not participated in previous efforts, an educational process was initiated to acquire a thorough understanding of the system, subsystems and components represented on the assigned panel. System descriptions, Piping & Instrument diagrams, electrical drawings, operating procedures are studied to gain this thorough understanding of the system and component functions. An operational analysis was conducted for the system and components. (This in-depth analysis is in addition to that completed for the CRDR and planning purposes.) This Operational Analysis provided additional basis for determining any changes to functional groupings.

Operating and training personnel were interviewed to solicit operational philosophies. The Operational value and function of each control and indication was addressed. Informational requirements were again discussed. (This informational requirements effort is in addition to that conducted for Emergency Operating Procedures task analysis). These interviews are documented and samples are being submitted as an attachment to this design package.

All HEDs (see Attachment A) applicable to the I-7507X panel were reviewed and the tentative fix evaluated for its corrective value within the integrated approach. Any previously prepared investigative information was studied. All factors were evaluated in considering any changes to I-7507X.

SPECIFIC - I-7507X Redesign Synopsis - (Change Notice (CN)-1894 preparation package.)

Research - During this phase, a study was conducted on the HVAC system as related to the I-7507X panel. This panel primarily provides indication and control of the three room control complex HVAC systems. In addition, I-7507X includes provision for the manual control of the Turbine Building Supply & Ventilation Dampers and the Access Control Bay Exhaust Fan for use during a fire. A system study was done using the related System Description, System Abstract, System Operating Procedure, Technical Specifications, and System Drawings.

Other research included discussions with operators, and engineering support personnel. This interaction with other sectors continued throughout the Research and Design phases.

A review of the HEDs and a physical study of the panel confirmed problems in labeling, grouping and the physical location of controls and indications. The original panel layout is included as Attachment B.

Conceptual Design - After the existing design was reviewed, preliminary redesign proposals were made using elevation drawings modified to show proposed changes. Several iterations of these drawings were used to develop a new layout that answered all of the design problems encountered during the research phase. As the functional group was defined, its operational relationships were evaluated to make certain that the arrangement provided the best man-machine interface.

This design provided for placement of controls and displays within the functional group.

As the design became more viable and appeared to resolve most or all of the known problems, interviews were conducted to determine if all of the operational requirements were met. Sample copies of the Interview records are included as Attachment C. These interviews were conducted in the following manner:

- The final iteration of a proposed layout was presented to an operator.
- The operator was asked to comment on the layout in relation to various tasks that he would perform.
- Information and control needs were reviewed.

The interview phase brought forth several concerns; some of which proved to be valid. As a direct result, the finalized proposed layout includes: lamp test buttons for damper position indicating lights, and status "Run" legend lights above fan symbols on the mimic layout.

Investigations failed to establish a need for filter high temperature alarms other than those which exist.

Operations personnel concurred that although there is a need for an hour meter to show control room HVAC filter use, it should not be located in the control room but rather local to the filter or on panel I-7501X.

During a "table top" discussion on the I-15 panel, it was decided that indicators TI-7553, MI-7554, TI-7555, PDI-7556, and TI-7557 should be relocated to panel I-7507X for functional grouping.

Reevaluation of the HEDs indicates HED 0354 is no longer valid since it refers to the labeling of a fan symbol on the 480V switchgear room mimic. Since the 480V switchgear room mimic is being deleted, the

HED is no longer valid. HED 0461 refers to the labeling of an alarm for the Technical Support Center HVAC filter. This alarm will be relocated to the I-15 Alarm panel.

The finalized proposed layout is included as Attachment D and a summary of proposed changes is included as Attachment E.

The final step in this conceptual design phase was to determine the final text content for functional labels. Prior operator interviews and operational efforts provide the basis for these determinations. See Attachment F for Sample Functional label legends.

The following Design Directives apply to the redesign of I-7507X:

<u>NUMBER</u>	<u>ISSUE</u>	<u>DESCRIPTION</u>
DD-AAS-1	A	ABBREVIATION, SYMBOL, AND ACRONYM SELECTION
DD-APL-1	A	ANNUNCIATOR PANEL LEGENDS
DD-ASP-1	A	ANNUNCIATOR SELECTION AND PLACEMENT
** DD-CBL-1		CONTROL BOARD LAYOUT
DD-ILS-1	A	INDICATOR LIGHT SELECTION AND LOCATION
DD-LAB-1	B	PANEL AND COMPONENT LABELING
DD-SWI-1	A	SWITCH SELECTION
**		IN DRAFT FORM

ATTACHMENTS
TO
SUMMARY OF THE
CONTROL ROOM IMPROVEMENT
DESIGN PROCESS

- A List of all I-7507X HEDs & Copies of I-7507X HEDs
- B Original Control Panel Layout
- C Sample Copies of Operator Interview Records
- D Final Control Panel Layout
- E Summary of Changes to Panel
- F Label List

ATTACHMENT A
List of All I-7507X HEDs
*
Copies of I-7507X HEDs

HUMAN ENGINEERING DISCREPANCIES LISTED FOR HVAC PANEL I-7507X

HED NO.	PROBLEM CLASSIFICATION		LOCATION		CATEGORY	DISPOSITION		REMARKS
	GROUP	CODE (SEE FIGURE 1)	IDENTIFICATION	INSTRUMENT NUMBER		RESOLUTION	CHANGE NOTICE	
0235	Instrument	2n	I-7507X	HS-75202	1	Change-out	1894	Change indicating light lens colors per DD-ILS-1
0235	Instrument	2n	I-7507X	HS-75203	1	Change-out	1894	Change indicating light lens colors per DD-ILS-1
0351	Labeling	1b	I-7507X	TI-75191	1	Label	1894	Label per DD-LAS-1 to show actual function
0352	Labeling	1b	I-7507X	V-75450	1	Relabel	1894	Number changed to DV-75331 by CN-1295 Relabel indicating lights per DD-LAB-1 Delete DV-75331 mimic symbol
0352	Labeling	1b	I-7507X	V-75451	1	Relabel	1894	Number changed to DV-75332 by CN-1295 Relabel indicating light per DD-LAB-1 Delete DV-75332 mimic symbol
0352	Labeling	1b	I-7507X	V-75452	1	Relabel	1894	Number changed to DV-75333 per CN-1295 Relabel indicating light per DD-LAB-1 Delete DV-75333 mimic symbol
0352	Labeling	1b	I-7507X	V-75453	1	Relabel	1894	Number changed to DV-75334 by CN-1295 Relabel indicating light per DD-LAB-1 Delete DV-75334 mimic symbol
0352	Labeling	1b	I-7507X	V-75483	1	Relabel	1894	Number changed to DV-75364 per CN-1295 Relabel indicating light per DD-LAB-1 Delete DV-75364 mimic symbol
0352	Labeling	1b	I-7507X	V-75484	1	Relabel	1894	Number changed to DV-75365 per CN-1295 Relabel indicating light per DD-LAB-1 Delete DV-75365 mimic symbol
0353	Labeling	1b	I-7507X	HS-75202	1	Relabel	1894	Relabel per DD-LAB-1
0353	Labeling	1b	I-7507X	HS-75203	1	Relabel	1894	Relabel per DD-LAB-1
0354	Labeling	1b	I-7507X	C-7516	1	Reevaluated	1894	Delete mimic - HED no longer valid
0355	Labeling	1b	I-7507X	V-75404	1	Relabel	1894	Number changed to DV-75300 by CN-1295 Relabel per DD-LAB-1
0356	Labeling	1b	I-7507X	HS-7547	1	Relabel	1894	Relabel per DD-LAB-1
0356	Labeling	1b	I-7507X	HS-7549	1	Relabel	1894	Relabel per DD-LAB-1
0356	Labeling	1b	I-7507X	V-75402	1	Relabel	1894	Number changed to DV-75298 by CN-1295 Relabel per DD-LAB-1
0356	Labeling	1b	I-7507X	V-75403	1	Relabel	1894	Number changed to DV-75299 by CN-1295 Relabel per DD-LAB-1
0356	Labeling	1b	I-7507X	V-75442	1	Relabel	1894	Number changed to DV-75323 by CN-1295 Relabel per DD-LAB-1
0356	Labeling	1b	I-7507X	V-75443	1	Relabel	1894	Number changed to DV-75324 by CN-1295 Relabel per DD-LAB-1
0356	Labeling	1b	I-7507X	V-75446	1	Relabel	1894	Number changed to DV-75327 by CN-1295 Relabel per DD-LAB-1

HUMAN ENGINEERING DISCREPANCIES LISTED FOR HVAC PANEL I-7507X

HED NO.	PROBLEM CLASSIFICATION		LOCATION		CATEGORY	DISPOSITION		REMARKS
	GROUP	CODE (SEE FIGURE 1)	IDENTIFICATION	INSTRUMENT NUMBER		RESOLUTION	CHANGE NOTICE	
0356	Labeling	1b	I-7507X	V-75449	1	Relabel	1894	Number changed to DV-75330 by CN-1295 Relabel per DD-LAB-1
0357	Labeling	1b	I-7507X	HS-7548	1	Relabel	1894	Relabel per DD-LAB-1
0357	Labeling	1b	I-7507X	V-75407	1	Relabel	1894	Number changed to DV-75303 by CN-1295 Relabel per DD-LAB-1
0357	Labeling	1b	I-7507X	V-75444	1	Relabel	1894	Number changed to DV-75325 by CN-1295 Relabel per DD-LAB-1
0357	Labeling	1b	I-7507X	V-75445	1	Relabel	1894	Number changed to DV-75326 by CN-1295 Relabel per DD-LAB-1
0357	Labeling	1b	I-7507X	V-75447	1	Relabel	1894	Number changed to DV-75328 by CN-1295 Relabel per DD-LAB-1
0357	Labeling	1b	I-7507X	V-75448	1	Relabel	1894	Number changed to DV-75329 by CN-1295 Relabel per DD-LAB-1
0357	Labeling	1b	I-7507X	V-75482	1	Relabel	1894	Number changed to DV-75363 by CN-1295 Relabel per DD-LAB-1
0358	Labeling	1b	I-7507X	HS-75161	1	Relabel	1894	Relabel per DD-LAB-1
0358	Labeling	1b	I-7507X	HS-75184	1	Relabel	1894	Relabel per DD-LAB-1
0358	Labeling	1b	I-7507X	HS-75186	1	Relabel	1894	Relabel per DD-LAB-1
0358	Labeling	1b	I-7507X	HS-75187	1	Relabel	1894	Relabel per DD-LAB-1
0373	Labeling	1b	I-7507X	F-7502	1	Relabel	1894	Relabel per DD-LAB-1
0373	Labeling	1b	I-7507X	F-7503	1	Relabel	1894	Relabel per DD-LAB-1
0373	Labeling	1b	I-7507X	F-7504	1	Relabel	1894	Relabel per DD-LAB-1
0373	Labeling	1b	I-7507X	V-75400	1	Relabel	1894	Number changed to DV-75296 by CN-1295 Relabel per DD-LAB-1
0373	Labeling	1b	I-7507X	V-75401	1	Relabel	1894	Number changed to DV-75297 by CN-1295 Relabel per DD-LAB-1
0373	Labeling	1b	I-7507X	V-75405	1	Relabel	1894	Number changed to DV-75301 by CN-1295 Relabel per DD-LAB-1
0373	Labeling	1b	I-7507X	V-75406	1	Relabel	1894	Number changed to DV-75302 by CN-1295 Relabel per DD-LAB-1
0385	Instrument	2cx	I-7507X	General	3	Relocate	1894	Relocate on I-7507X per DD-CBL-1
0459	Alarms	8d	I-7507X	General	1	Relabel	1894	Relabel per DD-LAB-1 & DD-APL-1
0461	Alarms	8d	I-7507X	F-7901	1	Relocate	1924	Relocate to I-15 control board and relabel to reflect actual function
0478	Alarms	8d	I-7507X		2	Change-out	1894	Alarm P.B. Switches to be changed and functionally grouped per DD-CBL-1 and DD-SWI-1
0648	Instrument	2e	I-7507X	TI-75191	2	Rescale	1894	Rescale per DD-AIS-1
0691	Instrument	2h	I-7507X	Indica Lights	2	Addition	1894	Install lamp test button on I-7507X
0771	Labeling	1c	I-7507X	HS-75202	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function

HUMAN ENGINEERING DISCREPANCIES LISTED FOR HVAC PANEL I-7507X

HED NO.	PROBLEM CLASSIFICATION		LOCATION		CATEGORY	DISPOSITION		REMARKS
	GROUP	CODE (SEE FIGURE 1)	IDENTIFICATION	INSTRUMENT NUMBER		RESOLUTION	CHANGE NOTICE	
0771	Labeling	1c	I-7507X	HS-75203	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function
0814	Instrument	2n	I-7507X	HS-7549	1	Change-out	1894	Change indicating lights per DD-ILS-1
0814	Instrument	2n	I-7507X	HS-7547	1	Change-out	1894	Change indicating lights per DD-ILS-1
0814	Instrument	2n	I-7507X	HS-7548	1	Change-out	1894	Change indicating lights per DD-ILS-1
0814	Instrument	2n	I-7507X	HS-75161	1	Change-out	1894	Change indicating lights per DD-ILS-1
0814	Instrument	2n	I-7507X	HS-75184	1	Change-out	1894	Change indicating lights per DD-ILS-1
0814	Instrument	2n	I-7507X	HS-75187	1	Change-out	1894	Change indicating lights per DD-ILS-1
0815	Labeling	1c	I-7507X	HS-75184	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function
0815	Labeling	1c	I-7507X	HS-75186	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function
0840	Labeling	1c	I-7507X	HS-75202	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function
0840	Labeling	1c	I-7507X	HS-75203	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function
0841	Labeling	1c	I-7507X	General	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function
0841	Labeling	1c	I-7507X	Mimic	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function on mimic
0841	Labeling	1c	I-7507X	HS-75184	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function
0841	Labeling	1c	I-7507X	HS-75186	1	Relabel	1894	Relabel per DD-LAB-1 to show actual function



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0235

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <u>RON GARRETT</u>	DATE <u>7/11/83</u>
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A. HED TITLE INDICATING LIGHTS CONVENTION

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>HS-75202</u>	<u>FIRE TURB. BLD</u>	<u>I-7507X</u>	
<u>HS-75203</u>	<u>ACCESS BAY</u>	<u>↓</u>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) THE ABOVE SWITCHES HAS ONE RED LIGHT AND ONE WHITE LIGHT, THESE INDICATING LIGHTS DO NOT FOLLOW THE ESTABLISHED CONVENTION.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION REPLACE INDICATING LIGHTS PER DD-ILS-1 *Roll* 21 APRIL 86
CN 1894

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0351

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

200

Form 344-22-4228

REVIEWER NAME <i>Elanas</i>	DATE <i>7-27-83</i>
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A. HED TITLE *Labeling and Tagging Convention*

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>TJ-75191</i>		<i>I-7507X</i>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) *Needs function tag*

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

RLD 1 MAY 85
Team Show Function
~~RE LABEL~~ PER DD-LAO-1 ON CN 1874 *RLD 1 MAY 85*

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0352

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE-1

200
 Form 344-22-4228

REVIEWER NAME <i>M. Llanas</i>	DATE <i>7-27-83</i>
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A. HED TITLE *Labeling and Tagging Convention*

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>CHANGED TO DV-75331 V-75450</i>	<i>480 volt switch gear Room</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75333 V-75452</i>	<i>to out doors</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75332 V-75451</i>	<i>to outdoors</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75324 V-75453</i>	<i>480 volt switch gear Room</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75364 V-75483</i>	<i>to TRB BLDG</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75365 V-75484</i>	<i>to out doors</i>	<i>I-7507X</i>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) *Lettering on instrument and function tags are too small should be 3/16*

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION ~~RELABEL PER DD LAB-1~~ ^{W/ THE DD LAB-1} ~~PER DD LAB-1~~ ^{RYA} 21 APR 86, 480V SWGR ROOM
MIMIC LINES ~~PER DD LAB-1~~ ^{PER DD LAB-1} DELETED, INDICATOR LIGHTS WILL BE
RELABELLED PER DD-LAB-1, CN 1899. ^{RYA} 21 APR 86

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0353

200
 Form 344-22-4220

REVIEWER NAME <u>Elanas</u>	DATE <u>7-27-83</u>
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A. HED TITLE Labeling and Tagging Convention

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
HS-75203	Access Bay	I-7507X	
HS-75202	FIRE Turb BID	I-7507X	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Lettering on symbol plate instrument and function is too small should be 5/32. Instrument and function lettering should have three over legend tags.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION RELABEL PER DD-LAB-1 [Signature] 21 APRIL 86, CN1894

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0354

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <i>Llanas</i>	DATE <i>7-27-83</i>
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A. HED TITLE *Labeling and Tagging convention*

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>C-7516</i>	<i>exhaust Fan</i>	<i>I-7507X</i>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) *Lettering is too small should be 7/32 on instrument and function tags*

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION ^{DATE} 4:30 P SWGR ROOM MISC LINES ^{DATE} ~~THESE~~ BEING DELETED, ON ^{DATE} ~~CHINA~~, THEREFORE THIS HED WILL NO LONGER BE RELEVANT. ^{DATE} 2/11/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0355

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE-1

200

Form 364-22-422B

REVIEWER NAME

Elaras

DATE

7-27-83

A. HED TITLE

Labeling and Paying Convention

B.

ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>CHANGED TO DV-75300 V-75404</i>		<i>I-7507X</i>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED)

Lettering on instrument tag is too small should be 32. Also function tag is needed.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION RELABEL PER DD-LAB-1, CN-1894 RJD 22 APR 88

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDA Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0356

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <i>P. Llanas</i>	DATE <i>7-27-83</i>
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A. HED TITLE *Labeling and Tagging Convention*

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>HS-7549</i>	<i>Filter Fan</i>	<i>I-7507X</i>	
<i>HS-7547</i>	<i>supply Fan</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75327 V-75446</i>	<i>Exhaust Fan Engineers</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75330 V-75449</i>	<i>toilet Exhaust Fan</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75324 V-75443</i>	<i>Control Room</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75323 V-75442</i>	<i>control Room</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75299 V-75403</i>	<i>Regulator Filter</i>	<i>I-7507X</i>	
<i>CHANGED TO DV-75298 V-75402</i>	<i>outside AIR</i>	<i>I-7507X</i>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) *Lettering on instrument and function tags are too small should be 3/16*

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION RELABEL PER DD-LAB-1, RLY 21 APRIL 86 CN 1894

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0357

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

200
Form 344-22-4228

REVIEWER NAME	Llanas	DATE	7-27-83
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A. HED TITLE Labeling and Tagging Convention

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
CHANGED TO DV-75303 V-75407.	to access cont Bay	I-7507X	
CHANGED TO DV-75363 V-75482.	to out doors	I-7507X	
CHANGED TO DV-75325 V-75444.	Control Room	I-7507X	
CHANGED TO DV-75326 V-75445.	Reactor Engineers office	I-7507X	
CHANGED TO DV-75328 V-75447.	Auxiliary Equipment	I-7507X	
CHANGED TO DV-75328 H5-75448.	Control Room Return Fan	I-7507X	
CHANGED TO DV-75329 V-75448.	auxiliary Equipment	I-7507X	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Setting on the instrument and function tags are too small should be 7/32

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

RELABEL PER DD-LAB-1. ~~RD~~ 21 APRIL 86 CN 1894

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0358

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE-1

200
Form 344-22-4228

REVIEWER NAME F. Llanas DATE 7-27-83

A. HED TITLE Labeling and Tagging Convention

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>HS-75184</u>	<u>Zones 1 and 2</u>	<u>I-7507X</u>	
<u>HS-75186</u>	<u>Zones 3</u>	<u>I-7507X</u>	
<u>HS-75187</u>	<u>480V SWGR Rm Exhaust Fan</u>	<u>I-7507X</u>	
<u>HS-75161</u>	<u>480V SWGR Boiler Fan</u>	<u>I-7507X</u>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Lettering on instrument and function tags are too small should be 5/16

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION RELABEL PER DD-LAB-1. *RJ* 22 APR 1986 CN1894

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0373

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <i>Elanas</i>	DATE <i>7-28-83</i>
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A. HED TITLE *Labeling and Tagging Conventions*

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>CHANGED TO DV-75301 V-75405</i>		<i>I-7507X</i>	
<i>F-7504</i>		<i>I-7507X</i>	
<i>F-7503</i>		<i>I-7507X</i>	
<i>CHANGED TO DV-75297 V-75401</i>		<i>I-7507X</i>	
<i>CHANGED TO DV-75296 V-75400</i>		<i>I-7507X</i>	
<i>I-7502</i>		<i>I-7507X</i>	
<i>CHANGED TO DV-75302 V-75406</i>		<i>I-7507X</i>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) *Lettering is too small should be $\frac{3}{16}$*

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION RELABEL PER DD-LAB-1. RLA 22 APRIL 86 CN 1894

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0385

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4338

REVIEWER NAME <i>Ellenas</i>	DATE <i>8-5-83</i>
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A. HED TITLE *Control Elevations*

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>see attached sheets</i>			

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) *All instruments listed on the attached 22 sheets of survey checklist number CRS-11 are either too high or too low on panels I-7507X, I-09, I-10, I-13, I-14 and I-15*

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

CA

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION HS-73400, 73401, 73404, & 73405 on I-15 are 15/16" too low. The controls are hand switches. The indicators are above 34°. The existing discrepancy is not significant. No further action required CN-1891 WCH 4/1/86

I-7507X CONTROLS & INDICATIONS, RELOCATED ON I-7507X PER DD-CBL-1, Rd 22 APR 86 CN 1894

I-10 instruments to remain at present locations - no further action required CN-1895 WCH 5/1/86 (cont - next page)

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 048

FORM 344-22-4227

CRS- 11

Sheet 1 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-09						NO	SEE SURVEY CHECKLIST ^{CRS-11}
	I-7507X						HED# 0385	
	I-7507X						NO	
	I-13						HED# 0385	
	I-13						NO	
	I-13						HED# 0385	
	I-14						NO	
	I-10						HED# 0385	
	I-10						NO	
	I-15						HED# 0385	
	I-49 + I-498					YES		



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 049

FORM 344-22-4227

CRS - 11

Sheet 2 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS	
				YES	NO	YES	NO		
				AS-10	HED#	AS-9	HED#		
I-09	BUS SELECTOR SWITCH	24"				NO	HED# 0385	NO INSTR. NUMBER	
I-09	BUS SELECTOR SWITCH	24"				NO		↓	
I-09	BUS SELECTOR SWITCH	24"				NO			
I-09	HS-7378-11 THRU. HS-7378-20	32 3/4"				NO			
I-09	(WELD) RECLOSURE	29 3/4"				NO			NO INSTR. NUMBER
I-09	(PRPA) RECLOSURE	29 3/4"				NO			
I-09	(LOOKOUT) RECLOSURE	29 3/4"				NO			
I-09	(PRAWEE) RECLOSURE	29 3/4"				NO			
I-09	(SMOKY HILL) RECLOSURE	29 3/4"				NO		↓	
I-7507X	HS-75202	71 1/2"			NO		HED# 0385		



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 050

FORM 344-22-4227

CRS - 11

Sheet 3 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-7507X	HS-75203	71 1/2"		NO HED# 0385			
	I-7507X	HS-75161	33 3/4"				NO HED# 0385	
	I-7507X	TEST PUSH-BUTTON	29 7/8"				NO	NO INSTR. NUMBER
	I-7507X	HS-75184	30 3/16"				NO	
	I-7507X	HS-75186	30 3/16"				NO	
	I-7507X	SILENCE PUSH-BUTTON	30"				NO	NO INSTR. NUMBER
	I-13	HR-4601	17 1/8"				NO	
	I-13	HR-4602	17 1/8"				NO	
	I-13	HS-11260	27 15/16"				NO	
	I-13	HS-11264	27 15/16"				NO	



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0459

Form 344-22-4228

REVIEWER NAME Anderson / Stone / Holmes DATE 9/23/83

A. HED TITLE Alarm Tile Legend.

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
XC-48153P I-7507X	Fire Control Alarm Panel	C.R	
SEE HED-0478			

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED)

Alarm markings are temporary - Dupond tape

(See HED 0478)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

Change to Permanent Legend Plates

I. DISPOSITION *Label in accordance with DD-CAB-1, §*
DD-APL-1 *[Signature]* *2/13/86*

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

Confusion factor in executing required action - Requires Outside Operator to investigate and manually actuate deluge system in event of Fire.

Operator interview with Stan Kolaki 9/23/83 confirmed lack of understanding as to alarm meaning

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

change legend to:

" T.S.C. Intake Filter
High Temp.

I. DISPOSITION _____

Label to reflect actual function

RELOCATE TO ~~I-15~~ ^{FOR ALARM PANEL ON I-15} ~~FUNCTIONAL GROUPING~~ ^{2/13/86} ~~9 MAY 86~~

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0478

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

See HED 0316

Form 344-22-422B

REVIEWER NAME: D. [redacted] / R. Moler / G. Moore DATE: 10-10-83

A. HED TITLE: Annunciate Controls Layout, Identification and markings. Ref HEDs 459, 461, & 316

B. ITEMS INVOLVED: § 0740

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
Alarm P.B.	Set, Act, test & Reset P.B. Alarm Control Buttons	I-01	
		I-02	A-70
		I-03	D-77
		I-05	A-23, A42
		I-06	D-88
		I-09	
		I-13	
		XC-45133P I-7507X	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED)

- (1) Alarm Buttons do not conform to DD-SWI-1
- (2) Function identification is inconsistent.
- (3) Button location and layout is inconsistent.
- (4) Buttons for 2nd Alarm panel on I-7507X are not functionally grouped.
- (5) Test sequences vary between Panels. (7) I-03, Red Comp Panel Legend Tag is Red.
- (6) Alarm controls are not separated (demarkated) from similar equip. controls.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

all procedures involving Alarms

(8) I-06B is not equipped with set-test & reset buttons (operator must walk to west end of I-06A)

NOTE See attached sketches

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED

- (1) (2) (4) Confusion in silencing and acknowledging alarms
- (5) Failure to execute proper tests
- (3) Careless acknowledging alarms unintentionally
- (4) (6) Actuating equipment control by mistake.
- (7) Confusion in interpreting function-tag color coding

F. LIST THE CONSEQUENCES OF OPERATOR ERROR

Actuating or tripping critical equipment inadvertently
 i.e. water and/or steam turbine PPS trip
 inputs on I-05.

G. CLASSIFICATION

H. CORRECTIVE ACTION OPTIONS

- (1) Change all alarm buttons to extra long Black.
- (2) Establish & Apply a consistent function identification scheme.
- (3) Locate Alarm Control P.B. Consistently. (4) Group test & Silence pushbuttons with alarm window group on I-7507X.
- (5) Establish & Apply consistent test sequences.
- (6) After consistently locating & grouping alarm control P.B.'s, demarcate these groups. (7) Apply legend tag color code. (8) Provide as a minimum an Ack, and Silence P.B on the east end of I-06.

I. DISPOSITION

I-01, I-02, I-03, I-05, I-06 and I-13 annunciator control switch operators changed to conform to DD-SWI-1 per CN-1879. I-01, I-02, I-03, I-05 and I-06 annunciator control switches functionally labeled, functionally grouped and demarcated by CN-1879. SKA 10/19/85

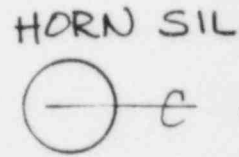
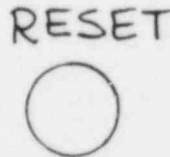
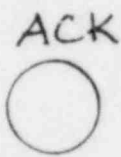
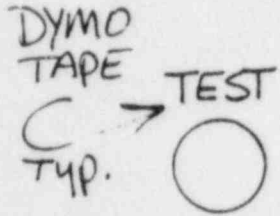
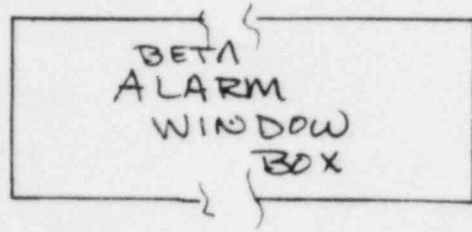
XG45153P & I-06 annunciator control switch operators will be changed to conform to DD-SWI-1, functionally grouped and labeled in CN 1924B. I-7507X SWITCHES TO BE CHANGED, FUNCTIONALLY GROUPED PER DD-COL-18 DD-SWI-1 ON CN1894 R/S 2/13/88

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

PANEL I-7507X

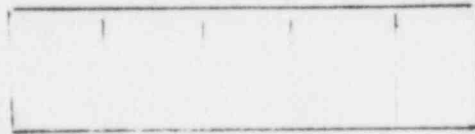
Attachment to
HED # 0478
Page 5 of 6



Buttons do not conform to DD-SWI-1

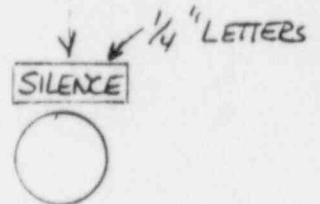
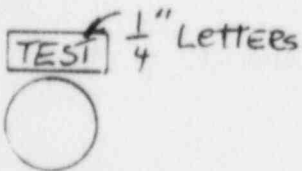
centered between alarms
However Buttons have no effect on lower alarm

Alarm Box w/ INDIVIDUAL ALARM CUBICLES



Alarm Assy w/ Individual Cub. test & Silence Buttons are remote from the Alarm Assy.

≈ 2'5"





PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0648

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22-422B

REVIEWER NAME <u>JOE KELEMEN</u>	DATE <u>2/27/84</u>
-------------------------------------	------------------------

A. HED TITLE INSTRUMENT SCALING

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>TI-75191</u>	<u>INDICATING METER DISPLAY</u>	<u>I-7507 X</u>	
<u>FI-2205</u>	↓	<u>I-49</u>	
<u>FI-2206</u>		↓	
<u>LI-3192-2</u>		<u>I-49</u>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) INDICATOR SCALES DO NOT HAVE NUMERALS ON BOTH ENDS. (REF. CRS-46)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *RESCALE PER DD-AIS-1 ON CN-1894, RJA 22 APRIL 86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22-4228

REVIEWER NAME Glenn - Assessment Team DATE 3/27/84

A. HED TITLE Instrument Credibility - Indicating lights
MAINTENANCE METHODS - LAMP REPLACEMENT

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>Indicating lights</u>	<u>-</u>	<u>all boards</u>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED)

- ① No lamp test method exists -
- ② Lamp replacement for Westinghouse minimalites is a problem - glass breakage - bases sticking in holder -
- ③ Lamp replacement for turbine panel difficult and bulbs are interchangable

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

- ④ FIX XPER & RESET BUTTON LIGHTS DIFFICULT TO CHANGE

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

Alternate Long familiar methods verified for I-01 / I-02 (testable status light installed for functions where bulb malfunction is not otherwise determined) Bulb replacement aid to be addressed by CN-1900. Table and Breaker control circuit configuration provides a method by which faulty bulbs are routinely detected and replaced. Discrete condition indicators are being replaced on all boards with legend indicators which have a test feature. ^{INSTALL} Lamp TEST BUTTON ON I-7507X panel ON CN-1894 R&B 30 April 86

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0771

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22-4228

REVIEWER NAME <u>Assessment Committee</u>	DATE <u>4/2/84</u>
--	-----------------------

A. HED TITLE Labeling - Functional

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>HS-75202</u>		<u>I7507X</u>	
<u>HS-75203</u>		<u>I7507X</u>	

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Functional Labeling is deficient

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION ^{TO SHOW RECORD FUNCTION} RELABEL PER DD-LAB-1 ON CN 1094 (PL) 22APR186

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0814

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22-4228

REVIEWER NAME: <u>Assessment Team</u>			DATE: <u>4/4/84</u>
A. HED TITLE: <u>Instrument - indicating light convention</u>			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
HS 7549		IBP I-7507K	N/A
HS 7547		↓	N/A
HS 7548			N/A
HS 75161			N/A
HS 75184			N/A
HS 75187			N/A
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) <u>lights do not follow convention</u>			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION CHANGE INDICATING LIGHTS PER DD-ILS-1 *[Signature]* 5 MAY 86
CN1894

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0815

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22-4228

REVIEWER NAME Assessment Team DATE 4/4/84

A. HED TITLE Labeling - Functional

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
HS-75184		<u>IC9 I-7507X</u>	<u>N/A</u>
HS-75186		<u>IC9 I-7507X</u>	<u>N/A</u>

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Functional Labeling
insufficient

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

RELABEL PER DD-LAB-1 TO SHOW ACTUAL FUNCTION *Relabel 5 MAY 00*
DD-LAB-1

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0840

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344 22-4228

REVIEWER NAME Glenn DATE 5/25/84

A. HED TITLE Labeling Instrument - Acronym

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
① HS-75203	Frie Turb Bld	I-7507X	none
② HS-75202	Access Bay	T-7507X	none
	Ref HS-75203	E1203	P252
	HS-75202	E1203	P1323, 1357

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) ① HS-75203 is mislabeled - Switch function is: Bypass PS-7593X switch in C-7525 Control circuit. Also Bld is not an acceptable abbreviation for Building. ② HS-75202 label is non descript. Switch Bypasses TS-75172-2X & Provides manual control of pumps (See E1203 P1323)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS

Label correctly

I. DISPOSITION

RELABEL TO PER DD-LAB-1 ON CN 1094 RLA 22 APRIL 86
SHOW ACTION FUNCTION

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0841

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22-4228

REVIEWER NAME: D. Glenn Instrument DATE: 5-25-84

A. HED TITLE: Panel Labeling

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.	
①	Ventilation Control Cab.	I-7507X (C.R)	None	
②	^{P1302} HS-75184	Zone 1 & 2 Fire Protection	I-7507X	None
②	^{P1385} HS-75186	Zone 3 Fire Protection	I-7507X	None
③	Mimic	Reactor Engineering Off	I-7507X	None
Reference PI-75-9				

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED)

① Panel I-7507X is labeled as "Fire Protection Control Cabinet" This is incorrect. Control on panel affect ventilation (exhaust - supply air) and isn't necessarily ^{limited to} fire protection functions.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

② HS-75184/6 labeled as "Fire Protection" when in fact these switches control 3 room Complex HVAC Functions

③ Mimic Marked as Reactor Engineering office which is no longer applicable

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED

F. LIST THE CONSEQUENCES OF OPERATOR ERROR

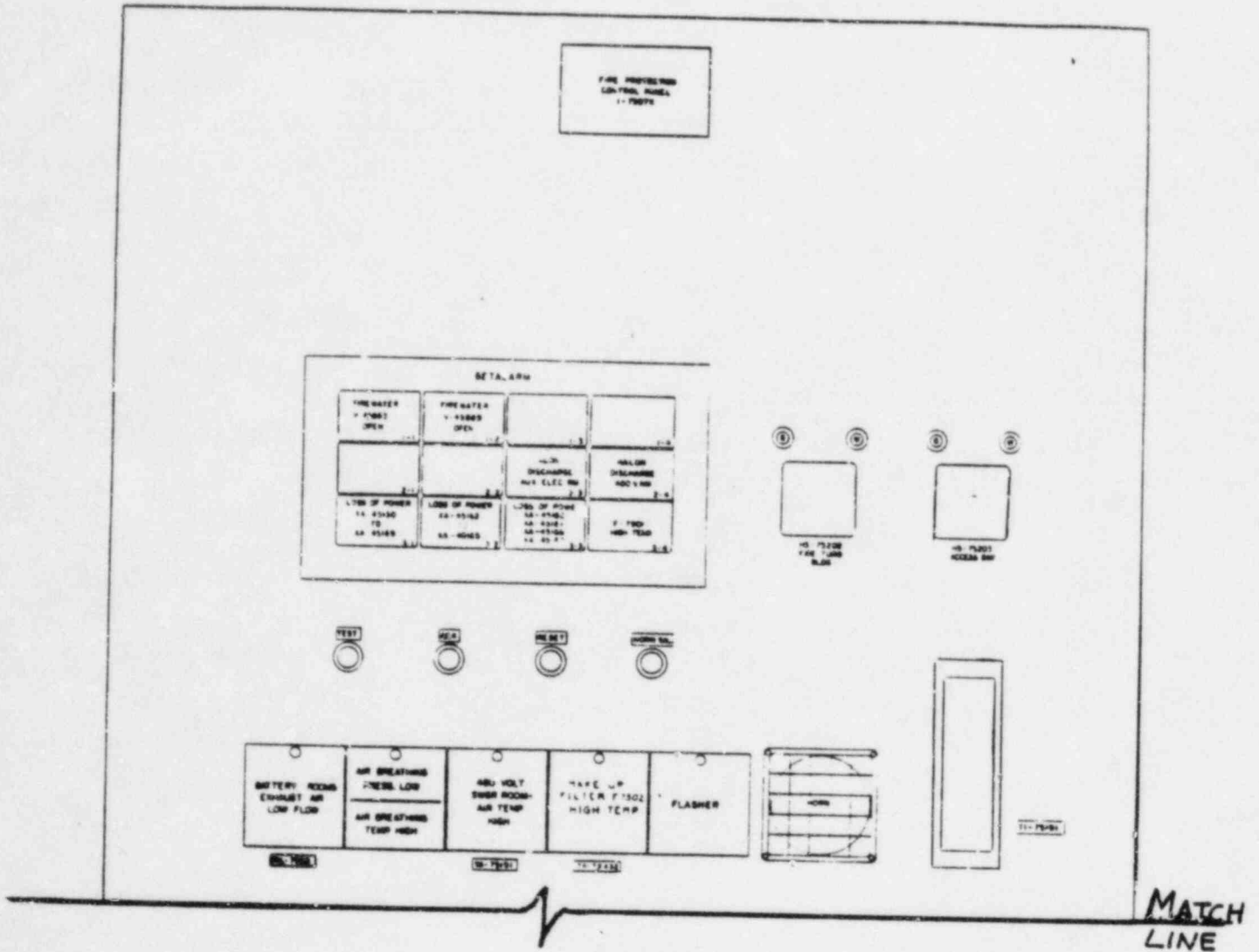
G. CLASSIFICATION

- H. CORRECTIVE ACTION OPTIONS ^{"3 Rm Cont Complex HVAC System"}
- ① Label as "3 Rm Complex Ventilation System" or other appropriate...
 - ② Label appropriate to function
 - ③ Label as record room or other applicable title

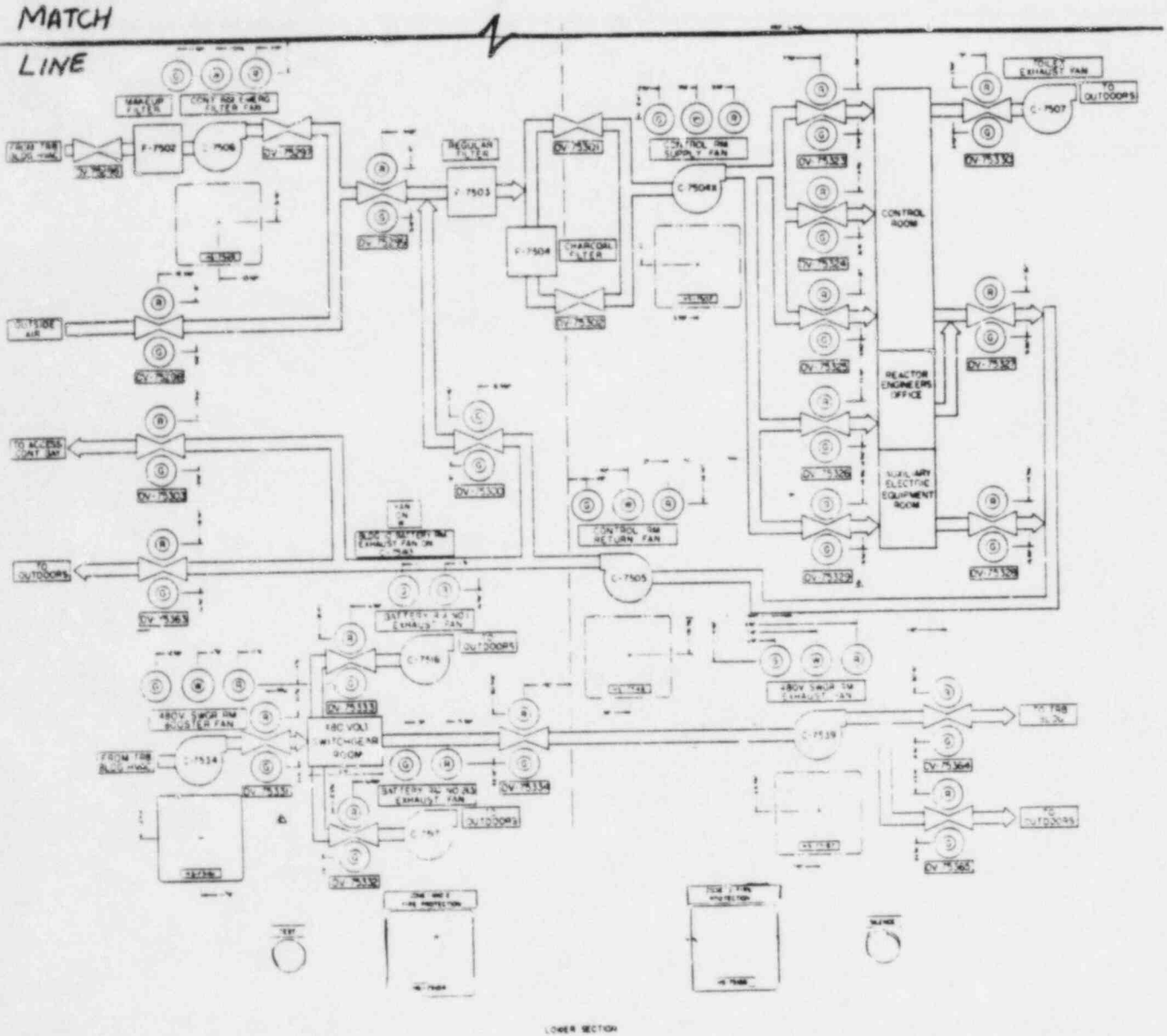
I. DISPOSITION ^{TO SHOW ACTUAL FUNCTIONS} RELABEL PER DD LAB-1 ON CN1894 R/H 22 APRIL 86
RELABEL MIMIC TO TO ACTUAL FUNCTION PER DD LAB-1 22 APRIL 86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

ATTACHMENT B (Page 1 of 2)
 Section of Elevation
 Drawing Showing Existing
 Configuration of I-7507X



Section of Elevation
Drawing Showing Existing
Configuration of I-7507X

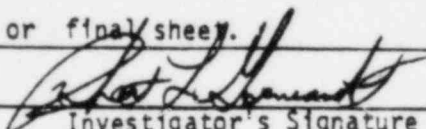


ATTACHMENT C
SAMPLE COPIES
OF
OPERATOR INTERVIEWS



INVESTIGATIVE INFORMATIONAL RECORD

Sht 1 of 24

Investigator's Name		BOB CORNEAULT			DATE	9 APRIL 86
Problem Description: GENERAL COMMENTS ON NEW I-7507X PANEL INCLUDING ANNUNCIATOR AND MIMIC LINES FOR 3-ROOM COMPLEX						
480 V. SWITCHGEAR ROOM						
ITEMS INVOLVED						
ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.		
	I-7507X					
Questions: 1. SINCE THE 480 V. SWGR RM HVAC IS A RELATIVELY SIMPLE SYSTEM, & DUE TO LACK OF SPACE ON PANEL, DOES REMOVING THIS SYSTEM'S MIMIC LINE PRESENT ANY PROBLEMS?						
2. ARE THE ^{remaining} MIMIC LINES FOR THE 3-ROOM COMPLEX ADEQUATE?						
3. IT IS PROPOSED TO DELETE 1 ANNUNCIATOR AS SHOWN AND MAKE LEGENDS MORE DESCRIPTIVE, ACCEPTABLE? ^{IS THIS?}						
Responses (Include Respondent's Name)						
1. "NO PROBLEM DELETING 480 V RM MIMIC LINES" (BOB KEVAN & KEN EINIG)						
"WE ONLY NEED STATUS LIGHTS FOR DAMPERS & EXHAUST FANS AS YOU HAVE SHOWN" (KEN EINIG)						
2. * EXCEPT, WE WOULD LIKE TO SEE STATUS LIGHTS OVER FAN SYMBOLS."						
(BOB KEVAN & KEN EINIG) (INTERVIEWER - "DO YOU NEED ONE FOR TOILET FAN?") "NO." (KEN)						
"WE USE THEM (THE STATUS LIGHTS) DURING SURVEILLANCE TESTS" AND						
"THE OTHER LIGHTS (MIMIC LIGHTS AT THE SWITCHES) AREN'T ADEQUATE, WE NEED TO SEE THEM FROM ACROSS THE ROOM" (KEN EINIG)						
3. YES, THE OLD LEGENDS WEREN'T ANY GOOD (BOB & KEN)						
Provide Conclusion on separate or final sheet.						
 Investigator's Signature					9 APRIL 86 Date	



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 083

INVESTIGATIVE INFORMATIONAL RECORD

Sht 2 of 4

Investigator's Name: BOB GORNEWITZ DATE _____

Problem Description: I-7507X PROPOSED LAYOUT

ITEMS INVOLVED				
ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.
	<u>I-7507X</u>			

Questions: 4. OVERALL, ANY COMMENTS OR CRITICISMS ON I-7507X LAYOUT?

Responses (Include Respondent's Name) _____
4. OTHER THAN THE STATUS LIGHTS IT LOOKS FINE, NO PROBLEM (BOB KEVAN & KEV FINIG)

Provide Conclusion on separate or final sheet.
 Investigator's Signature: [Signature] Date: 7 APRIL 86



INVESTIGATIVE INFORMATIONAL RECORD

Investigator's Name: BUS CORNEAULT DATE 14 APRIL 86

Problem Description: PROPOSED LAYOUT - I-7507 PANEL

ITEMS INVOLVED				
ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.
	I-7507K			

- Questions:
1. DOES REMOVING 480V SWGR BY MIMIC LINE PRESENT A PROBLEM?
 2. ARE NEW CONTROL ROOM MIMIC LINES ADEQUATE?
 3. IS THE NEW ANNUNCIATOR LAYOUT (COMBINE 2 INTO 1) ACCEPTABLE?
 4. GENERAL COMMENTS ON NEW PANEL LAYOUT?

- Responses (Include Respondent's Name)
1. "I LIKE THE MIMICS." (D.E. JOHNSON)
 2. "YES, YOU'RE NOT GETTING RID OF TRIP LIGHTS ON FANS?" ("NO" INTERVIEWER) "GOOD." (D.E. JOHNSON)
 3. (NODS HEAD YES) (D.E. JOHNSON)
 4. "O.K., I'D LIKE TO KEEP MIMICS, TO BAD ORIGINAL LAYOUT WASN'T ANY GOOD, IT'S A FAIRLY NEW PANEL, HASN'T BEEN IN THAT LONG" (D.E. JOHNSON)

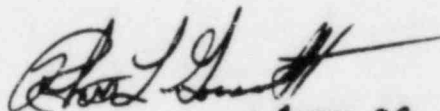
Provide Conclusion on separate or final sheet.

[Signature]
Investigator's Signature

14 APRIL 86
Date

CONCLUSION: _____

LAYOUT WILL BE KEPT AS PROPOSED EXCEPT LEGEND
LIGHTS WILL BE ADDED ABOVE SYMBOLS FOR ; RETURN, SUPPLY,
& MAKE UP FILTER FANS.


9 APRIL 86



INVESTIGATIVE INFORMATIONAL RECORD

Sht 1 of 4

Investigator's Name

R.L. CORNEAULT

DATE

29 APRIL 86

Problem Description:

PROPOSED LAYOUT FOR I-7507X

ITEMS INVOLVED

ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.
	<u>I-7507X</u>			

Questions: 1. IS THIS NEW LAYOUT FOR I-7507X ACCEPTABLE?

2. BECAUSE OF SPACE LIMITATIONS I PROPOSE REMOVING 480V RM MIMICS, IS THAT A PROBLEM?

3. WILL MOVING THE 5 INDICATORS FROM I-15 AS SHOWN HELP YOU?

Responses (Include Respondent's Name) 1. "OTHER THAN A FEW CHANGES THE MIMICS ARE BASICALLY THE SAME, GOOD" (TONY VIGIL)

Looks Good (Tom Dice) "BECAUSE OF THE MODULATING DAMPERS I WOULD LIKE TO SEE A LAMP TEST BUTTON" (Tom Dice) "EXISTING BATT. RM LABELS ARE WRONG" (Tom Dice)

2. "NO" (TONY VIGIL) "IT LOOKS FINE" (Tom Dice)

3. "GOOD IDEA, SURE IT HELPS, YOU DON'T HAVE TO WALK AROUND BACK ANYMORE" (TONY VIGIL) "YES, IT LOOKS GOOD" (Tom Dice & DARREL JOHNSON)

Provide Conclusion on separate or final sheet.

R.L. Cornault
Investigator's Signature

29 APRIL 86
Date



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 084

INVESTIGATIVE INFORMATIONAL RECORD

Sht 2 of 4

Investigator's Name R.L. GORNEAULT DATE 29 APRIL 86

Problem Description: PROPOSED LAYOUT FOR I-7507X

ITEMS INVOLVED

ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.
	<u>I-7507X</u>			

Questions: A BACK TO SOME PARTICULARS REGARDING THE FIRST QUESTION, DOES RELOCATING THE FIRE ALARMS & THE BETA ALARM PANEL TO XC-45153P HELP YOU?
5. HOW ABOUT THE NEW HANDSWITCH LAYOUT, ANY PROBLEMS?

Responses (Include Respondent's Name) 4. "I LIKE THAT IDEA (DARREL JOHNSON)"
"LOOKS GOOD" (TONY VIGIL)

5. "NO" (ALL) "THE STATUS RUN LIGHTS WILL HELP, TOO" (TONY VIGIL)

Provide Conclusion on separate or final sheet.

R.L. Gorneault
Investigator's Signature

29 APRIL 86
Date

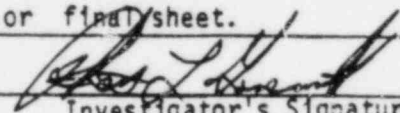


PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 084

INVESTIGATIVE INFORMATIONAL RECORD

Sht 3 of 4

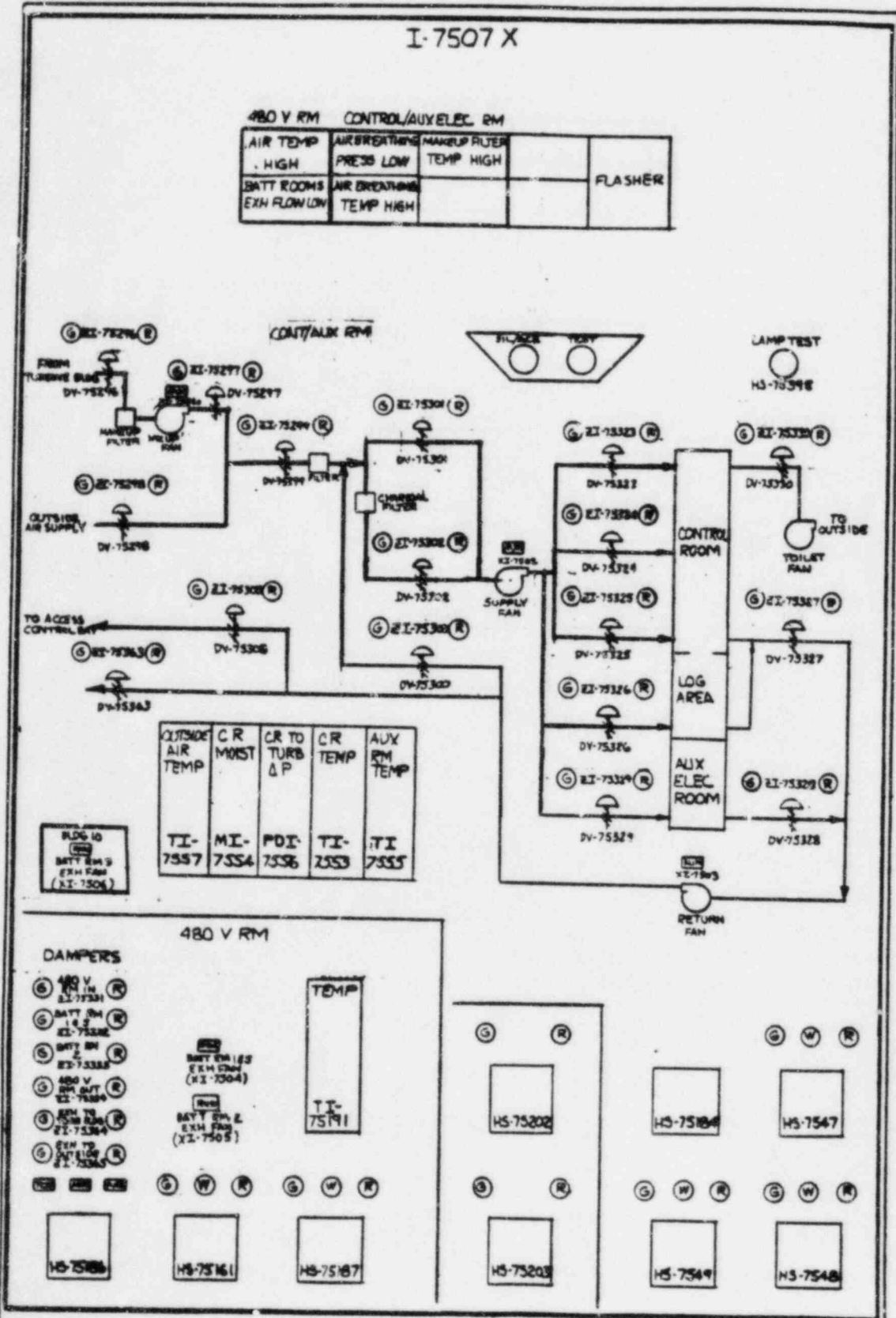
Investigator's Name <u>R.L. CORNEAULT</u>		DATE <u>29 APRIL 86</u>		
Problem Description: <u>I-7507X PROPOSED LAYOUT</u>				
ITEMS INVOLVED				
ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.
	<u>I-7507X</u>			
<p>Questions: <u>6. THERE HAS BEEN SOME DISCUSSION REGARDING HOUR METERS FOR CONTROL ROOM FILTER USE. SINCE IT IS FOR MAINTENANCE PURPOSES, I PROPOSE MAKING IT LOCAL. DO YOU SEE ANY NEED FOR IT IN THE CONTROL ROOM?</u></p> <p><u>7. HAVE YOU EVER HAD ANY NEED OR USE FOR CONTROL RM. CHARCOAL FILTER HIGH TEMPERATURE</u></p>				
<p>Responses (Include Respondent's Name) <u>6. "NO, NO NEED FOR IT IN CONTROL ROOM" (TOM DICE) "LOCAL IS GOOD" (DARREL JOHNSON)</u></p> <p><u>7. "No", "NO REASON FOR IT." (ALL)</u></p>				
Provide Conclusion on separate or final sheet.				
 Investigator's Signature			<u>29 APRIL 86</u> Date	

CONCLUSIONS:

1. LAYOUT IS ACCEPTABLE AS PROPOSED
2. A LAMP TEST BUTTON WILL BE ADDED FOR DAMPER POSITION INDICATORS
3. FILTER HOUR METERS SHOULD BE LOCAL, NOT IN CONTROL ROOM
4. THERE IS NO NEED FOR HIGH TEMP ALARMS ON CONTROL ROOM CHARCOAL FILTERS

Robert L. Hornum 29 APRIL 86

ATTACHMENT D (Page 1 of 1)
 Section of Elevation
 Drawing Showing Proposed
 Configuration of I-7507X



ATTACHMENT E

SUMMARY OF PROPOSED CHANGES TO I-7507X CONTROL BOARD

1. Relocates: to other boards.
 - Relocate Betalarm Annunciator Panel and associated pushbuttons to XC-45153P, Fire Alarm Panel.
 - Relocate F-7901 High Temperature Alarm to I-15 Alarm panel.
2. Additions:
 - Indicators TI-7557, MI-7554, PDI-7556, TI-7553, and TI-7555 are relocated from I-15 to I-7507X.
 - Position indicator lights added to mimics for DV-75301 and DV-75302 to show use of charcoal filter.
 - Position indicator lights added to mimics for DV-75296 and DV-75297 to show use of make-up filter.
 - Lamp test button for indicating lights.
 - Summary lights for 480V Room Damper Modes.
3. Functionally group all controls, related indicators, and alarms.
4. Rescale indicators.
5. Revise Control/Aux Electric Rooms Mimics:
 - Damper symbols to replace valve symbols.
 - Position indicators for Dampers to follow conventions.
 - Due to additional space needed for Control/Aux Rooms Mimic, 480 V Switchgear Room Mimic will be deleted. Damper position indicators will be relocated on I-7507X to show Damper line-up.
6. Label:
 - Panel, instruments, controls, and mimic layout.
7. Demarcate

ATTACHMENT F

SAMPLES OF LABEL LIST
(Control Panel I-7507X)

LABELING LEGEND LIST

CONTROL BOARD #	INSTRUMENT #	STYLE	FUNCTIONAL LABEL	STYLE	HED # (if applicable)
I-7507X			I-7507X	1 BLK	0041
			FROM TURBINE BUILDING	6a BLK	
			OUTSIDE AIR SUPPLY	6a BLK	
			TO ACCESS CONTROL BAY	6a BLK	
			TO OUTSIDE	6 BLK	
			TO OUTSIDE	6a BLK	
	DV-75296	// BLK			0373
	ZI-75296	// BLK			
			MK UP FAN	8a BLK	
	DV-75299	// BLK			0356
	ZI-75299	// BLK			
			FILTER	8a BLK	0373
			CHARCOAL FLTR	8a BLK	0373
	DV-75301	// BLK			0373
	ZI-75301	// BLK			
	DV-75302	// BLK			0373
	ZI-75302	// BLK			
			SUPPLY FAN	8a BLK	
	DV-75323	// BLK			0356

LABELING LEGEND LIST

CONTROL BOARD #	INSTRUMENT #	STYLE	FUNCTIONAL LABEL	STYLE	HED # (if applicable)
I-7507X			TOILET FAN	8 BLK	
			RETURN FAN	8 BLK	
	DV-75303	11 BLK			0357
	ZI-75303	11 BLK			
			480 V Room	BLK	
			480 V RM IN ZI-75331	SPECIAL BLK	0352
			BATT RM 1 & 5 ZI-75332	SPECIAL BLK	0352
			BATT RM 2 ZI-75333	SPECIAL BLK	0352
			480V RM OUT ZI-75334	SPECIAL BLK	0352
			EXH TO TURB BLDG ZI-75364	SPECIAL BLK	0352
			EXH TO OUTSIDE ZI-75365	SPECIAL BLK	0358
	HS-75186	ON SWITCH PLATE	DAMPER MODE	5 BLK	0350, 0841, 0815
	HS-75161	ON SWITCH PLATE	BOOST FAN		0358
	HS-75395	ON SWITCH PLATE	LAMP TEST	SPECIAL BLK	
			BLDG 10	6 BLK	
	TI-7557	SPECIAL	OUTSIDE TEMP	9 BLK	0214
	MI-7559	SPECIAL	CONT RM MOISTURE	9 BLK	
	PDI-7556	SPECIAL	CONT RM TO TURB DP	9 BLK	0214
			CONT/AUX RM	3 BLK	

LABELING LEGEND LIST

CONTROL BOARD #	INSTRUMENT #	STYLE	FUNCTIONAL LABEL	STYLE	HED # (if applicable)
I-7507X	ZI-75323	// BLK			
	DV-75324	// BLK			0356
	ZI-75324	// BLK			
	DV-75325	// BLK			0356
	ZI-75325	// BLK			
	DV-75326	// BLK			0357
	ZI-75326	// BLK			
	DV-75327	// BLK			0356
	ZI-75327	// BLK			
	DV-75328	// BLK			0357
	ZI-75328	// BLK			
	DV-75329	// BLK			0357
	ZI-75329	// BLK			
	DV-75330	// BLK			0356
	ZI-75330	// BLK			
	DV-75300	// BLK			0355
	ZI-75300	// BLK			
	ZI-75363	// BLK			
	DV-75363	// BLK			0357

LABELING LEGEND LIST

CONTROL BOARD #	INSTRUMENT #	STYLE	FUNCTIONAL LABEL	STYLE	HED # (if applicable)
I-7507X	HS-75187	ON SWITCH PLATE	EXH FAN	SPECIAL BLK	0358
	HS-75202	ON SWITCH PLATE	STACK	5 BLK	0353,0771,0840
	HS-75203	ON SWITCH PLATE	ACCESS BAY EXH FAN	5 BLK	0353,0771,0840
	HS-75184	ON SWITCH PLATE	DAMPER MODE	5 BLK	0358,0841
	HS-7547	ON SWITCH PLATE	SUPPLY FAN	5 BLK	0356
	HS-7548	ON SWITCH PLATE	RETURN FAN	5 BLK	0357
	HS-7549	ON SWITCH PLATE	MK UP FAN	5 BLK	0356
			BATT Rm 185 EXH FAN (XI-7504)	SPECIAL BLK	
			RUN	90K LEGEND LIGHT	
			BATT Rm 2 EXH FAN (XI-7504)	SPECIAL BLK	
			RUN	90K LEGEND LIGHT	
			BATT Rm 3 EXH FAN (XI-7506)	SPECIAL BLK	
			RUN	90K LEGEND LIGHT	
	DV-75297	11 BLK			0373
	ZI-75297	11 BLK			
	DV-75298	11 BLK			0356
	ZI-75298	11 BLK			
			MAKEUP FILTER	8a BLK	0373
			DAMPERS	4 BLK	

SUPPLEMENT
to
ATTACHMENT 9

ATTACHMENT 9
HEDs Having
Final Dispositions Different From The
Proposed Disposition Shown In Attachment B
Of The Summary Report

HED	PROBLEM CLASSIFICATION	ORIGINAL DISPOSITION	FINAL DISPOSITION	REMARKS
0354	Labeling	Relabel	Reevaluated	Delete 480V switchgear room mimic
0461	Alarms	Relabel	Relocate	Relocate alarm to I-15 control board for functional grouping and relabel to reflect function
0691	Instrument	None	Addition	Install lamp test button on I-7507X

ATTACHMENT 6b-18

SUMMARY OF THE
CONTROL ROOM IMPROVEMENT
DESIGN PROCESS
AS APPLICABLE TO
I-10 CONTROL BOARD

FOREWORD - NUREG-0737 Supplement 1, Section 5.1b requires that a Control Room Design Review (CRDR) be conducted to identify human engineering discrepancies. Section 5.1c requires that these discrepancies be assessed and design improvements selected to correct these discrepancies.

Public Service Company (PSC) has conducted the required review of the Fort St. Vrain Control Room. Approximately eight hundred forty eight (848) discrepancies or classes of discrepancies were cited. These discrepancies were assessed to determine their potential for causing an operating error and the potential effect of any error. (Certain discrepancies are known to have caused errors). An improvement program has been selected which meets the regulatory requirements and proposes to improve the operability and functionality of the Control Room.

The regulatory requirement for the CRDR and the follow-on improvement program was directed toward the improved handling of emergencies and not specifically toward improved production. Public Service Company's improvement program is directed toward both normal operation and the handling of emergencies.

BACKGROUND - Public Service Company has initiated an integrated improvement program based on functionality rather than particular classifications of problems. This approach is first, one of determining functional groupings, followed by demarcating, hierarchical labeling, correcting indicator scaling, complying with established conventions (color coding, switch positions, etc.).

The following steps constituted the planning portion of the integrated improvement program.

- Elevation Drawings of each control panel were color coded to show applicable HEDs as either, relabeling, relocations, scaling, deletions, or equipment change-out. This scheme provides an overview of the problems documented on each control board.
- All HEDs involving alarm locations, and multipoint alarms were reviewed. System function and operator response were considered in grouping, deleting and adding alarms. Paste-ups of all alarm panels were completed to show proposed rearrangements.
- Functional grouping of controls and indications was approached by first preparing point interaction sketches for various systems or by direct reference to system P&Is. This effort was, in effect, an extensive operational analysis which considered the dynamic considerations of control groups and

arrangements. This activity reviewed the purpose and use of each and every component on the main control boards. Interviews with operators and training personnel were conducted to determine operator interpretations and actions.

- Controls and indications were then arranged in functionally related groups. Associated alarm locations were rechecked to verify that the more desirable locations were selected. The function relationship of adjacent indicator and control groupings were reviewed.
- Revised drawings were prepared to show the proposed arrangements. Certain of these drawings were color coded to aid in differentiating between groupings. These drawings were then utilized to determine the scope of each change package (change notice).
- Change Notice (CN) numbers were assigned to each effort identified above.

IMPROVEMENT PROCESS METHODOLOGY

The Improvement Process starts with the documentation and drawings produced during the improvement planning process described in the BACKGROUND presentation portion of this summary. An individual designer is assigned the responsibility of evaluating a particular board. Since this individual may not have participated in previous efforts, an educational process is initiated to acquire a thorough understanding of each system, subsystem and component represented on the assigned control board. System descriptions, Piping & Instrument diagrams, electrical drawings, and operating procedures are studied to gain this thorough understanding of each system. (This in-depth analysis is in addition to that completed for the CRDR and planning purposes.) This Operational Analysis provides additional basis for determining any changes to functional groupings.

Operating and training personnel are interviewed to solicit operational philosophies. The Operational value and function of each control and indication is addressed. Informational requirements are again discussed. (This informational requirements effort is in addition to that conducted for Emergency Operating Procedures task analysis). Samples of these Investigative Informational Records are submitted as Attachment B to this design package.

All HEDs applicable to a particular control board are reviewed and the tentative fix evaluated for its corrective value within the integrated approach. HEDs written against instruments and controls recorded by the Emergency Operating Procedure task analysis "Information and Control Requirements" effort, are reviewed with

particular attention to any potential safety considerations. Any previously prepared investigative information is studied. All factors are evaluated in considering any changes to the control board.

SPECIFIC - I-10 (I-9310) Redesign Synopsis - (Change Notice (CN)-1895 preparation package.)

The system review process for I-10 was like other segments of the control room redesign effort, approached in phases. The outstanding difference for this panel is that it mainly contains the electronics for the Plant Protection System (PPS) and is located on the back side of the main control boards. The function of this equipment is one of monitoring plant parameters and providing protective action when certain setpoints are exceeded. Personnel interface with this panel may be classified as follows:

- Operational use (normal and emergency)
- Surveillance (operating recording of data)
- Maintenance (repair and testing)

Of these three, only operational use during emergency operations requires timely operator recognition to assure resetting certain tripped bistables during core cooling restoration procedures.

Most of the HEDs initiated against this board were for control sizes, control physical configurations, meter scaling, labeling text, and label character sizes. Due to space limitations, it is not possible in most cases and not reasonable in others, to increase the size of labels and controls associated with the PPS system. The controls and indications utilized by the operators during emergency operations were identified and improvement options evaluated.

Miniature meters installed in the NIM bins of I-9310 are in fact primarily for surveillance and maintenance use. Critical parameter values displayed on the NIM bin miniature indicators are also displayed on the main control boards for operator use. (No additional changes are planned in response to those HEDs citing meter scale problems on I-9310.)

Research - During this phase, the systems represented by I-9310 were studied using the applicable System Descriptions, System Operating Procedures, Emergency Procedures, System Drawings, and the Control Room Design Review Task Analysis to determine the controls needed for emergency operation.

Other research included discussions with operators, trainers, and engineering support personnel. A review of all related HEDs was performed and each design problem was reviewed in order to find a solution within the space confines of the board (see Attachment A).

It was determined that the only controls utilized by the operator during an emergency situation are eight bistable resets required for restoration of adequate core cooling. These resets are located on bins 402, 602, 1002, and 1202 position P1/2, and bins 404, 604, 1004, and 1204 position P5/6. Numerous other labeling improvements are feasible within the room constraints of this board. These improvements support routine operation and monitoring activities.

Conceptual Design - Detail drawings were made of the modules required during emergency operations. The original design did not provide for a reset button conforming to recommended sizes nor adequate labeling to enable timely operator identification. The proposed improvement will demarcate around the control, color patch and provide a "reset" label. Additionally, the module will be provided with adequate functional labeling. These "location aids" are shown on Attachment C, Details B & C.

The XCR relay drivers are not required for operator use during an emergency situation, but are used as a diagnostic tool to determine the cause of a trip. The present instrument labeling under the module is confusing since the lights on the module for the XCRs are in a vertical array and the label is in a two-line configuration reading left to right. Operator aids are presently posted near the modules and provide a location key, function and reset information. An attempt was made to label each XCR with the instrument number and function. Due to space constraints, letter sizes would be compromised to the degree of not being legible from the operating position for all operators. The optimum solution was found to be that of labeling each set of indicating lights with instrument numbers (see Attachment C, Detail A), enlarging the operator aid, and possibly moving these operator aids to a more convenient location.

The present labeling on the nuclear instrumentation uses Roman numerals on the front of the I-03 section of the main control board and Arabic numerals on I-10.

All nuclear instrumentation channels are to be labeled with Roman numerals for consistency, in accordance with industry convention. By increasing the size of the label under these bins to the maximum physical size allowed, the letter size may be increased to a size close to compliance with DD-LAB-1.

Other changes to the board are detailed in the individual HED dispositions on Attachment A and the summary of changes on Attachment D.

Reevaluation of HED-0589 and 0590 resulted in the determination that no additional action was required.

- HED-0589 cites the number of graduation marks on an indicating meter between numerals. These meters are used for calibration purposes. Duplicate indication is available

to the operator on the main control panel, I-03.

- HED-0590 was initiated in response to a standard checklist item. It is not applicable to the log scale meters cites.

The final step in this conceptual design phase was to determine the final text content for functional labels (see Attachment E for an example of the Label List.)

The following Design Directives apply to the relabeling and demarcation of the I-10 control board:

<u>NUMBER</u>	<u>ISSUE</u>	<u>DESCRIPTION</u>
DD-AAS-1	A	ABBREVIATION, SYMBOL, AND ACRONYM SELECTION
** DD-AIS-1		SELECTION OF ANALOG INDICATORS
** DD-CBL-1		CONTROL BOARD LAYOUT
DD-ILS-1	A	INDICATOR LIGHT SELECTION AND LOCATION
DD-LAB-1	B	PANEL AND COMPONENT LABELING
DD-SWI-1	A	SWITCH SELECTION

** IN DRAFT FORM

ATTACHMENTS
TO
SUMMARY OF THE
CONTROL ROOM IMPROVEMENT
DESIGN PROCESS

- A List of all I-10 HEDs & Copies of I-10 HEDs
- B Sample Copies of Investigative Informational Records
- C Examples of Proposed "Location Aids" and "Labeling"
- D Summary of Changes to Board
- E Label List

ATTACHMENT A
List of All 1-10 HEDs
&
Copies of 1-10 HEDs

HUMAN ENGINEERING DISCREPANCIES LISTED FOR CONTROL BOARD 1-10

HED NO.	PROBLEM CLASSIFICATION		LOCATION		INSTRUMENT NUMBER	CATEGORY	DISPOSITION		REMARKS
	GROUP	CODE (SEE FIGURE 1)	IDENTIFICATION				RESOLUTION	CHANGE NOTICE	
0014	Labeling	1b	CR		I-9310	1	Label	1895	Label per DD-LAB-1
0241	Relabeling	1d	I-10		XS-93515	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1
0241	Relabeling	1d	I-10		XS-93516	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1
0241	Relabeling	1d	I-10		XS-93517	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1
0241	Relabeling	1d	I-10		XS-93518	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1
0241	Relabeling	1d	I-10		XS-93519	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1
0241	Relabeling	1d	I-10		XS-93520	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1
0318	Labeling	1b	I-10		TR-1192	1	Relabel	1895	Permanently Label Point Assignment, per DD-LAB-1
0319	Labeling	1b	I-10		Bay 1002	1	None		Not operator used controls
0319	Labeling	1b	I-10		Bay 1102	1	None		Not operator used controls
0319	Labeling	1b	I-10		Bay 1202	1	None		Not operator used controls
0319	Labeling	1b	I-10		Bay 402	1	None		Not operator used controls
0319	Labeling	1b	I-10		Bay 502	1	None		Not operator used controls
0319	Labeling	1b	I-10		Bay 602	1	None		Not operator used controls
0319	Labeling	1b	I-10		Bay 702	1	Relabel	1895	Relabel P7/8 only, per DD-LAB-1. Others are not operator used controls.
0319	Labeling	1b	I-10		Bay 902	1	Relabel	1895	Relabel P7/8 only, per DD-LAB-1. Others are not operator used controls.
0320	Labeling	1b	I-10		Bay 1003	1	Relabel	1895	Relabel P1/2/3 only, per DD-LAB-1. Others are not operator used controls.
0320	Labeling	1b	I-10		Bay 1103	1	Relabel	1895	Relabel P1/2/3 only, per DD-LAB-1. Others are not operator used controls.
0320	Labeling	1b	I-10		Bay 1203	1	Relabel	1895	Relabel P1/2/3 only, per DD-LAB-1. Others are not operator used controls.
0320	Labeling	1b	I-10		Bay 403	1	Relabel	1895	Relabel P1/2/3 only, per DD-LAB-1. Others are not operator used controls.
0320	Labeling	1b	I-10		Bay 503	1	Relabel	1895	Relabel P1/2/3 only, per DD-LAB-1. Others are not operator used controls.
0320	Labeling	1b	I-10		Bay 603	1	Relabel	1895	Relabel P1/2/3 only, per DD-LAB-1. Others are not operator used controls.
0320	Labeling	1b	I-10		Bay 703	1	Relabel	1895	Relabel P1/2/3 only, per DD-LAB-1. Others are not operator used controls.
0320	Labeling	1b	I-10		Bay 903	1	Relabel	1895	Relabel P1/2/3 only, per DD-LAB-1. Others are not operator used controls.
0321	Labeling	1b	I-10		Bay 1104	1	None		Not operator used controls

HUMAN ENGINEERING DISCREPANCIES LISTED FOR CONTROL BOARD 1-10

HED NO.	PROBLEM CLASSIFICATION		LOCATION		INSTRUMENT NUMBER	CATEGORY	DISPOSITION		REMARKS
	GROUP	CODE (SEE FIGURE 1)	IDENTIFICATION	RESOLUTION			CHANGE NOTICE		
0321	Labeling	1b	1-10	Bay 1204	1	Relabel	1895	Relabel P5/6 only, per DD-LAB-1. Others are not operator used controls.	
0321	Labeling	1b	1-10	Bay 404	1	Relabel	1895	Relabel P5/6 only, per DD-LAB-1. Others are not operator used controls.	
0321	Labeling	1b	1-10	Bay 504	1	None		Not operator used controls	
0321	Labeling	1b	1-10	Bay 604	1	Relabel	1895	Relabel P5/6 only, per DD-LAB-1. Others are not operator used controls.	
0321	Labeling	1b	1-10	Bay 704	1	None		Not operator used controls	
0321	Labeling	1b	1-10	Bay 904	1	None		Not operator used controls	
0322	Labeling	1b	1-10	Bay 1005	1	None		Not operator used controls	
0322	Labeling	1b	1-10	Bay 1105	1	None		Not operator used controls	
0322	Labeling	1b	1-10	Bay 405	1	None		Not operator used controls	
0322	Labeling	1b	1-10	Bay 505	1	None		Not operator used controls	
0322	Labeling	1b	1-10	Bay 605	1	None		Not operator used controls	
0322	Labeling	1b	1-10	Bay 705	1	None		Not operator used controls	
0322	Labeling	1b	1-10	Bay 905	1	None		Not operator used controls	
0323	Labeling	1b	1-10	Bay 1006	1	Relabel	1895	Relabel bins per DD-LAB-1	
0323	Labeling	1b	1-10	Bay 1106	1	Relabel	1895	Relabel bins per DD-LAB-1	
0323	Labeling	1b	1-10	Bay 1206	1	Relabel	1895	Relabel bins per DD-LAB-1	
0323	Labeling	1b	1-10	Bay 406	1	Relabel	1895	Relabel bins per DD-LAB-1	
0323	Labeling	1b	1-10	Bay 506	1	Relabel	1895	Relabel bins per DD-LAB-1	
0323	Labeling	1b	1-10	Bay 606	1	Relabel	1895	Relabel bins per DD-LAB-1	
0324	Labeling	1b	1-10	Bay 1006	1	Relabel	1895	Relabel bins per DD-LAB-1	
0324	Labeling	1b	1-10	Bay 1106	1	Relabel	1895	Relabel bins per DD-LAB-1	
0324	Labeling	1b	1-10	Bay 1206	1	Relabel	1895	Relabel bins per DD-LAB-1	
0324	Labeling	1b	1-10	Bay 406	1	Relabel	1895	Relabel bins per DD-LAB-1	
0324	Labeling	1b	1-10	Bay 506	1	Relabel	1895	Relabel bins per DD-LAB-1	
0324	Labeling	1b	1-10	Bay 606	1	Relabel	1895	Relabel bins per DD-LAB-1	
0325	Labeling	1b	1-10	HS-93243	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1	
0325	Labeling	1b	1-10	HS-93245	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1	
0325	Labeling	1b	1-10	HS-93246	1	Label	1895	Function included in HS-93242 - delete number from documents	
0325	Labeling	1b	1-10	HS-93248	1	Label	1895	Function included in HS-93245 - delete number from documents	
0325	Labeling	1b	1-10	NIM-1133-3	1	Label	1895	Label per DD-LAB-1	
0325	Labeling	1b	1-10	NIM-1135-3	1	Label	1895	Label per DD-LAB-1	
0325	Labeling	1b	1-10	NIM-1136	1	Label	1895	Label per DD-LAB-1	
0325	Labeling	1b	1-10	NIM-1138	1	Label	1895	Label per DD-LAB-1	
0326	Labeling	1b	1-10	HS-93244	1	Label	1895	Label per DD-SWI-1 & DD-LAB-1	
0326	Labeling	1b	1-10	HS-93247	1	Label	1895	Function included in HS-93244 - Delete number from documents	

HUMAN ENGINEERING DISCREPANCIES LISTED FOR CONTROL BOARD 1-10

HED NO.	PROBLEM CLASSIFICATION		LOCATION	INSTRUMENT NUMBER	CATEGORY	DISPOSITION		
	GROUP	CODE (SEE FIGURE 1)	IDENTIFICATION			RESOLUTION	CHANGE NOTICE	REMARKS
0326	Labeling	1b	1-10	NIM-1134-3	1	Label	1895	Label per DD-LAB-1
0326	Labeling	1b	1-10	NIM-1137	1	Label	1895	Label per DD-LAB-1
0327	Labeling	1b	1-10	Bay 104	1	Relabel	1895	Relabel bin per DD-LAB-1
0327	Labeling	1b	1-10	Bay 204	1	Relabel	1895	Relabel bin per DD-LAB-1
0327	Labeling	1b	1-10	Bay 304	1	Relabel	1895	Relabel bin per DD-LAB-1
0359	Instrument	2a	1-10	Misc. Instr.	4	Label	1895	Provide location aid and label operator used control only
0360	Instrument	2a	1-10	NIM Bin Sw.	4	None		Not operator used controls
0361	Labeling	1c	1-10	NIM Bin Sw.	1	None		Not operator used controls
0362	Labeling	1c	1-10	NIM Bin Sw.	1	Label	1895	Label operator used controls and provide location aid
0363	Labeling	1c	1-10	NIM Bin Sw.	1	None		Not operator used controls
0364	Labeling	1c	1-10	Illum. PB	1	None		Not operator used controls
0365-1	Labeling	1c	1-10	Bay 1002	1	Label	1895	Functionally label per DD-LAB-1
				P9/10				
0365-1	Labeling	1c	1-10	Bay 1202	1	Label	1895	Functionally label per DD-LAB-1
				P9/10				
0384	Instrument	2cx	1-10	Misc. Instr.	3	None		Space limitations preclude relocation within height limits-Operator utilized devices to be labeled, demarcated and location aid provided
0385	Instrument	2cx	1-10	Misc. Instr.	3	None		Space limitations preclude relocation within height limits-Operator utilized devices to be labeled, demarcated and location aid provided
0403	Instrument	2a	1-10	Misc. Instr.	2	None		Not operator used controls
0488	Labeling	1b	1-10	Misc. Instr.	1	Relabel	1895	Relabel per DD-LAB-1 & DD-AAS-1
0518	Labeling	1b	1-10	SM-21165/66	1	Label	1895	Label per DD-LAB-1
0518	Labeling	1b	1-10	SM-21171/72	1	Label	1895	Label per DD-LAB-1
0521	Labeling	1c	1-10	404 P5/6 S3	1	Label	1895	Label and provide location aid
0521	Instrument	2f	1-10	402 P1 S3	1	Label	1895	Label and provide location aid
0521	Instrument	2f	1-10	602 P1 S3	1	Label	1895	Label and provide location aid
0521	Instrument	2f	1-10	1002 P1 S3	1	Label	1895	Label and provide location aid
0521	Instrument	2f	1-10	1202 P1 S3	1	Label	1895	Label and provide location aid
0542	Instrument	2e	1-10	Bay 103	3	Rescale	1895	Remove existing marks from meters
0542	Instrument	2e	1-10	Bay 203	3	Rescale	1895	Remove existing marks from meters
0542	Instrument	2e	1-10	Bay 303	3	Rescale	1895	Remove existing marks from meters
0542	Instrument	2e	1-10	Bay 102	3	Rescale	1895	Remove existing marks from meters
0542	Instrument	2e	1-10	Bay 302	3	Rescale	1895	Remove existing marks from meters
0545	Labeling	1b	1-10	FSL-2210-3	1	Relabel	1895	Relabel per DD-LAB-1
0562	Instrument	2e	1-10	Misc. Meters	2	None		Not operator used indicators

HUMAN ENGINEERING DISCREPANCIES LISTED FOR CONTROL BOARD I-10

HED NO.	PROBLEM CLASSIFICATION		LOCATION		INSTRUMENT NUMBER	CATEGORY	DISPOSITION		REMARKS
	GROUP	CODE (SEE FIGURE 1)	IDENTIFICATION				RESOLUTION	CHANGE NOTICE	
0563	Instrument	2e	I-10		Misc. Meters	2	None		Not operator used indicators
0568	Instrument	2e	I-10		Misc. Meters	2	None		Not operator used indicators
0572	Instrument	2e	I-10		Misc. Meters	2	None		Not operator used indicators
0573	Instrument	2e	I-10		Misc. Meters	2	None		Not operator used indicators
0578	Instrument	2e	I-10		Misc. Meters	2	None		Not operator used indicators
0581	Instrument	2e	I-10		Misc. Meters	2	None		Not operator used indicators
0583	Instrument	2e	I-10		TSH-93472	2	None		Not operator used item
0583	Instrument	2e	I-10		TSH-93474	2	None		Not operator used item
0588	Instrument	2e	I-10		Misc. Meters	2	None		Not operator used item
0589	Instrument	2e	I-10		Bay 105	2	Evaluated		Not operator used indicator
0589	Instrument	2e	I-10		Bay 205	2	Evaluated	1895	Not operator used indicator
0589	Instrument	2e	I-10		Bay 305	2	Evaluated	1895	Not operator used indicator
0590	Instrument	2e	I-10		Bay 102	2	None	1895	HED initiated in response to standard checklist item-Not applicable to log scale
0590	Instrument	2e	I-10		Bay 103	2	Rescale	1895	HED initiated in response to standard checklist item-Not applicable to log scale
0590	Instrument	2e	I-10		Bay 204	2	Rescale	1895	HED initiated in response to standard checklist item-Not applicable to log scale
0590	Instrument	2e	I-10		Bay 302	2	Rescale	1895	HED initiated in response to standard checklist item-Not applicable to log scale
0590	Instrument	2e	I-10		Bay 303	2	Rescale	1895	HED initiated in response to standard checklist item-Not applicable to log scale
0592	Instrument	2e	I-10		Misc. Meters	2	None		Not operator used item
0597	Labeling	1b	I-10		Misc.	1	Relabel		Change Arabic numerals on Nuclear Instr. to Roman numerals
0627	Instrument	2f	I-10		HS-93301	1	Change-out	1895	Change button & ring color per DD-SWI-1
0627	Instrument	2f	I-10		HS-93302	1	Change-out	1895	Change button & ring color per DD-SWI-1
0627	Instrument	2f	I-10		HS-93303	1	Change-out	1895	Change button & ring color per DD-SWI-1
0627	Instrument	2f	I-10		HS-93304	1	Change-out	1895	Change button & ring color per DD-SWI-1
0627	Instrument	2f	I-10		KS-700	1	Change-out	1895	Change operating sequence per DD-SWI-1 and assign instrument number
0627	Instrument	2f	I-10		KS-900	1	Change-out	1895	Change operating sequence per DD-SWI-1 and assign instrument number
0658	Instrument	2e	I-10		TR-1192	2	Evaluated		Not required by operator
0782	Labeling	1c	I-10		XCR Lights	1	Relabel	1895	Label for identification of bistable and reference to operator aid

HUMAN ENGINEERING DISCREPANCIES LISTED FOR CONTROL BOARD 1-10

HED NO.	PROBLEM CLASSIFICATION		LOCATION		INSTRUMENT NUMBER	CATEGORY	DISPOSITION		REMARKS
	GROUP	CODE (SEE FIGURE 1)	IDENTI- FICATION	RESOLUTION			CHANGE NOTICE		
0783	Labeling	1b	1-10	MIS-1115 thru MIS-1122	1	Change-out	1882	Changed adjustment potentiometer and knob on CN-1882	
0784	Instrument	2n	1-10	Misc.	1	Change-out	1895	Change test indication light lens	
0785	Labeling	1c	1-10	1002 P9/10	1	Label	1895	Functionally label per DD-LAB-1	
0785	Labeling	1c	1-10	1202 P9/10	1	Label	1895	Functionally label per DD-LAB-1	
0792	Labeling	1c	1-10	XS-93515 thru XS-93520	1	Label	1895	Functionally label per DD-LAB-1	



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 014

200
 Form 344 22 4228

REVIEWER NAME JOE KELEMEN DATE 6/1/83

A. HED TITLE MAIN CONTROL BOARD - TAGGING + LABELING SURVEY

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
I-01.	MAIN CONTROL BOARD (PANELS) ↓	CONTROL ROOM	
I-02.			
I-03.			
I-04.			
I-05.			
I-06.			
I-09.			
I-10.			
I-13.			
I-14.			
I-15.			

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) VARIOUS MAIN CONTROL BOARDS ARE NOT IDENTIFIED (LABELED OR TAGGED) IN CONTROL ROOM.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION I-01 Labeled per DD-LAB-1

I-02 Labeled per DD-LAB-1 I

I-03 & I-04 Label per DD-LAB-1 CN 1887 WCH 10-30-85

I-05 to be labeled per DD-LAB-1 by CN-1890 JH 1/16/86

I-06 A to be labeled per DD-LAB-1 by CN-1891 JH 1/16/86

I-06 B to be labeled per DD-LAB-1 by CN-1892 WCH 2/24/86

I-15 to be labeled per DD-LAB-1 by CN-1893 WCH 4/11/86

I-10 to be labeled per DD-LAB-1 by CN-1895 WCH 5/11/86

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0241

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <u>RON GARRETT</u>	DATE <u>7/12/83</u>
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A. HED TITLE HANDSWITCH LABELING

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>XS-93515P</u>	<u>CIPD. FEEDWATER TESTSWITCH</u>	<u>I-10</u>	<u>B-90</u>
<u>XS-93516P</u>			<u>B-90</u>
<u>XS-93517P</u>			<u>B-90</u>
<u>XS-93518P</u>			<u>B-90</u>
<u>XS-93519P</u>			<u>B-90</u>
<u>XS-93520P</u>	<u>✓</u>	<u>✓</u>	<u>B-90</u>

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) ALL OF THE ABOVE SWITCHES DO NOT HAVE A POSITION TAG SHOWING POSITION OF SWITCH.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Label per DD-SWI-1 & DD-LAB-1 CN-1895 w/H s/1/26*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Permanently label point assignments per
DD-LAB-1 CN-1895 WCH 5/1/81*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0319

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <u>F Llanas</u>	DATE <u>7-21-83</u>
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A. HED TITLE Labeling and Tagging Convention

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
400 2	P1-P11	I-10	E-35
500 2	P11-P12	I-10	E-36
600 2	P1-P11	I-10	E-37
700 2	P6-P7	I-10	C-24
900 2	P6-P7	I-10	E-38
1000 2	P1-P11	I-10	C-09
1100 2	P11-P12	I-10	C-08
1200 2	P1-P11	I-10	C-06

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Lettering is too small ($\frac{1}{2}$) should be $\frac{5}{32}$

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION None - not operator used controls WCH 5/1/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0320

200
 Form 344-22-4228

REVIEWER NAME <u>F Llanas</u>	DATE <u>7-21-83</u>
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A. HED TITLE Labeling and Tagging convention

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
400 3 PI thru P12		I-10	E-34
500 3 PI thru P12		I-10	E-33
600 3 PI thru P12		I-10	G-02
700 3 PI thru P12		I-10	E-23
900 3 PI thru P12		I-10	E-60
1000 3 PI thru P12		I-10	E-30
1200 3 PI thru P12		I-10	E-29
1200 3 PI thru P12		I-10	E-28

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Lettering is too small ($\frac{1}{8}$) should be $\frac{3}{16}$

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Relabel P1/2/3 on all bins per DD-LAB-1. No change on others - not operator used controls. CN-1895 WGH 5/1/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION Relabel P516 on bins 1204, 404, & 604.
No change on others, not operator used controls.
CN-1895 WCH 5/1/81

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0322

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <u>F Llanas</u>	DATE <u>7-21-83</u>
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A. HED TITLE Labeling and Tagging Convention

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
400 S P6,7,8		I-10	C-18
500 S P4,6,7,8		I-10	C-19
600 S P6,7,8		I-10	C-20
700 S P5,7,9,11		I-10	C-21
900 S P5,7,9,11		I-10	E-43
1000 S P4,6,7,8		I-10	E-44
1100 S P9,11		I-10	G-06

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) ON ALL THE INSTRUMENTS LISTED ABOVE LABELING & TAGGING LETTER SIZE DOES NOT CONFORM TO DESIGN DIRECTIVE LAB-1, LETTERING UNDER-SIZED, SHOULD BE 5/16"

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *No ~~Further~~ action - not operator used
controls WCH 5/1/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0323

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

20
Form 44-22-4228

REVISOR NAME <u>F Llanas</u>	DATE <u>7-21-83</u>
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A. HED TITLE Labeling and Tagging convention

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
400 6	P1 thru P12	I-10	C-17
500 6	P1 thru P12	I-10	C-16
600 6	P1 thru P12	I-10	G-09
1000 6	P1 thru P12	I-10	C-11
1100 6	P1 thru P12	I-10	G-07
1200 6	P1 thru P12	I-10	H-69

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) <

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR Lettering is too small ($\frac{1}{8}$) - should be $\frac{3}{16}$

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *See HED-324 for specific problems & disposition WCH 5/1/81. Re-evaluated - relabel entire bins per DD-LAB-1 within existing restraints. CN-1895 WCH 5/16/81.*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0324

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <u>FL/anas</u>	DATE <u>7-21-83</u>
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A. HED TITLE Labeling and Tagging Convention

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
400 6 P2,3,9		I-10	C-17
500 6 P2,3,9		I-10	C-16
600 6 P2,3,9		I-10	G-09
1000 6 P2,3,9		I-10	C-11
1100 6 P2,3,9		I-10	G-07
1200 6 P2,3,9		I-10	A-69

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Function and instrument label is temporary (paper) and different from drawing ELD-169-2115, 169-2145, 169-2175, 169-2295, 169-2325 and 169-2365 CN-1110

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Relabel entire bins per DD-LAB-1 CN 1895*
WCH 5/1/86 Functionally label per DD-LAB-1 CN 1895
WCH 5/14/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0325

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <u>F Llanas</u>			DATE <u>7-22-83</u>
A. HED TITLE <u>Labeling and Tagging Convention</u>			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>HS-93243 (sw)</u>		<u>I-10 304 P1</u>	<u>B-97</u>
<u>HS-93246 (sw)</u>		<u>I-10 304 P7</u>	<u>B-97</u>
<u>nim-1133-3</u>		<u>I-10 304 P6</u>	<u>B-97</u>
<u>nim 1136</u>		<u>I-10 304 P12</u>	<u>B-97</u>
<u>HS-93245 (sw)</u>		<u>I-10 204 P1</u>	<u>B-98</u>
<u>HS-93248 (sw)</u>		<u>I-10 204 P7</u>	<u>B-98</u>
<u>nim-1135-3</u>		<u>I-10 204 P6</u>	<u>B-98</u>
<u>nim-1138</u>		<u>I-10 204 P12</u>	<u>B-98</u>
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) <u>No function tag is shown on instrument number</u>			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Functionally label switches per DD-SWI-1 & DD-LAB-1. Functionally label indicators per DD-LAB-1 CN 1895 WCH 5/19/86 Delete HS-93246 and HS-93248 from documentation. Function included in HS-93243 & HS-93245 CN 1895 WCH 5/19/86*

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0326

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200

Form 344-22-4228

REVIEWER NAME <u>E Llanas</u>	DATE <u>7-22-83</u>
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A. HED TITLE Labeling and Tagging Convention

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>HS-93244</u>		<u>I-10 104 P1</u>	<u>A-08</u>
<u>HS-93247 (sw)</u>		<u>I-10 104 P7</u>	<u>A-08</u>
<u>NIM-1134-3</u>		<u>I-10 104 P6</u>	<u>A-08</u>
<u>nim 1137</u>		<u>I-10 104 P7A</u>	<u>A-08</u>

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) No function tag is shown or instrument number.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

Functionally label switches per DD-SWI-1 & DD-LAB-1. Functionally label indicators per DD-LAB-1. CN-1895 WCH 5/11/86 Delete HS-93247 from documentation. Function included in HS-93244 CN-1895 WCH 5/19/86

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0327

200
 Form 344-22-4228

REVIEWER NAME F Llanas DATE 7-22-83

A. HED TITLE Labeling and Tagging Convention

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
100 4 P2, P3, P4 P5, P8, P9, P10 P11		I-010	A-08
200 4 P2, P3 P4, P5, P8, P9 P10, P11		I-010	B-98
300 4 P2, P3, P4, P5 P8, P9, P10, P11		I-010	B-97

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) Lettering is too small ($\frac{1}{8}$) should be $\frac{3}{32}$

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *relabel bins per DD-LAB-1 CN9895 W&H 5/1/86*

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0359

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

Pg 1 of 5
DATE
7/27/83

REVIEWER NAME RON GARRETT

A. HED TITLE SWITCH CONVENTION

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<u>SEE SEPARATE SHEETS</u>			
		<u>MAIN ENDR</u>	<u>3</u>

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) PUSH-BUTTON AND ROTARY SWITCHES NOT MEETING THE LOCATION SPACING OF ERDA-76-45-2 (SWITCHES ON E-14 IRE ILLUM PUSH-BUTTON)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Enhance labeling or demarcation on operator used controls only CN-1895 WCH 5/1/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

Attachment to
HED 0359

	PANEL	BAY	BIN	MODULE	INSTR. #		PANEL	BAY	BIN	MODULE	INSTR. #
E-11	I-14	200		P9/10	RIS-73437-1	B-95	I-10	200	5	P8	XSL-2273
E-11	I-14	100		P11/12	RIS-73437-2	B-95	I-10	200	5	P9	XSL-2235
B-96	I-10	100	1	P3/4		B-95	I-10	200	5	P10	TSM-22137
	I-10	100	5	P2	XSL-93363	B-92	I-10	200	6	P1	TSM-1177
	I-10	100	5	P3	PSL-1109-2		I-10	200	6	P2	TSL-1177
	I-10	100	5	P4	PSL-1109-1		I-10	200	6	P3	TSM-1173
	I-10	100	5	P5	PT-1109		I-10	200	6	P4	TM-1153-2
	I-10	100	5	P6/7	MTU-1		I-10	200	6	P5	TM-1153-1
	I-10	100	5	P8	XSL-2271	B-92	I-10	200	6	P6	TM-1153-3
	I-10	100	5	P9	XSL-2233	G-05	I-10	300	1	P3/4	TSM-93474
B-96	I-10	100	5	P10	TSM-22136	B-94	I-10	300	5	P1	TSM-1238
B-93	I-10	100	6	P1	TSM-1176		I-10	300	5	P2	XSL-93362
	I-10	100	6	P2	TSL-1176		I-10	300	5	P3	PSM-1108-2
	I-10	100	6	P3	TSM-1172		I-10	300	5	P4	PSL-1108-1
	I-10	100	6	P4	TSM-1172		I-10	300	5	P5	PSM-1108-1
	I-10	100	6	P5	TM-1152-2		I-10	300	5	P5	PT-1108
	I-10	100	6	P6	TM-1152-1		I-10	300	5	P6/7	MTU-1
B-93	I-10	100	6	P6	TM-1152-3		I-10	300	5	P8	XSL-2269
H-01	I-10	200	1	P1	TSM-93473		I-10	300	5	P9	XSL-2221
H-01	I-10	200	1	P2	XMS-11262-14	B-94	I-10	300	5	P10	XSL-2221
	I-10	200	1	P7/8	XMS-11262-13	B-91	I-10	300	6	P1	TSM-22135
C-02	I-10	200	2	P1	XMS-11262-12		I-10	300	6	P2	TSM-1175
	I-10	200	2	P2	XMS-11262-8		I-10	300	6	P3	TSL-1175
	I-10	200	2	P3	XMS-11262-4		I-10	300	6	P4	TSM-1171
	I-10	200	2	P4	XMS-11262-11		I-10	300	6	P5	TM-1151-2
	I-10	200	2	P5	XMS-11262-7	B-91	I-10	300	6	P6	TM-1151-1
	I-10	200	2	P6	XMS-11262-3	E-34	I-10	400	3	P1/3	TM-1151-3
	I-10	200	2	P7	XMS-11262-10	C-18	I-10	400	4	P5/6	TSM-93472
	I-10	200	2	P8	XMS-11262-6		I-10	400	5	P1	MIS-1122
	I-10	200	2	P9	XMS-11262-2		I-10	400	5	P2	CS-182
	I-10	200	2	P10	XMS-11262-9		I-10	400	5	P1	SM-21170-2
	I-10	200	2	P11	XMS-11262-5		I-10	400	5	P2	SM-21170-1
C-02	I-10	200	2	P12	XMS-11262-1		I-10	400	5	P3	ST-21170
B-95	I-10	200	5	P1	XMS-11262-15		I-10	400	5	P4/5	MTU-1
	I-10	200	5	P2	XSL-93364		I-10	400	5	P6	TSL-22104
	I-10	200	5	P3	PSL-1110-1		I-10	400	5	P7	XSN-11222
	I-10	200	5	P4	PSM-1110-1		I-10	400	5	P8	FM-2212
	I-10	200	5	P5	PSL-1110(SPARA)		I-10	400	5	P9	YT-93470-B
	I-10	200	5	P6/7	PT-1110		I-10	400	5	P10	SM-21164-2
B-95	I-10	200	5	P6/7	MTU-1		I-10	400	5	P11	SM-21164-1
						C-18	I-10	400	5	P12	ST-21164

	PANEL	BAY	BIN	MODULE	INSTR. #	PANEL	BAY	BIN	MODULE	INSTR. #	
C-17	I-10	400		P1	XD15-21728 XSN-11186 PDS-21550-1	I-10	500	6	P12	SSN-21166 SSN-21166-1	C-16
	I-10	400		P2	PDS-21550-2	I-10	600	3	P1/3	MIS-1120	G-02
	I-10	400	6	P3	PDS-21548-1 PDS-21548-2	I-10	600	4	P5/6	CS-1A2	E-2A
	I-10	400	6	P4	FSL-2212-3	I-10	600	5	P1	SM-21168-2	C-2
	I-10	400	6	P5	SSL-21170-1 SSL-21170-2	I-10	600	5	P2	SM-21168-1	
	I-10	400	6	P6	SSN-21170 SSN-21170-1	I-10	600	5	P3	ST-21168	
	I-10	400	6	P7	XD15-21322 XSN-11180	I-10	600	5	P4/5	MTU-1	
	I-10	400	6	P8	XSN-93470-B	I-10	600	5	P6	TSL-22102	
	I-10	400	6	P9	XD15-21176 XD15-21182	I-10	600	5	P7	XSN-11220	
	I-10	400	6	P10	FSL-2212-1 FSL-2212-2	I-10	600	5	P8	FM-2210	
	I-10	400	6	P11	SSL-21164-1 SSL-21164-2	I-10	600	5	P9	XT-93470-A	
	I-10	400	6	P12	SSN-21164 SSN-21164-1	I-10	600	5	P10	SM-21162-2	
C-17	I-10	400	6	P12	XSN-93456-C	I-10	600	5	P11	SM-21162-1	
E-21	I-10	500	4	P9	XT-93456-C	I-10	600	5	P12	ST-21162	C-2
E-21	I-10	500	4	P10	XSN-93454-C	I-10	600	6	P2		G-0
E-21	I-10	500	4	P12	XT-93454-C	I-10	600	6	P3	XD15-21180 XD15-21156	
C-19	I-10	500	5	P1	SM-21172-2	I-10	600	6	P4	FSL-2210-3	
	I-10	500	5	P2	SM-21172-1	I-10	600	6	P5	SSL-21168-1 SSL-21168-2	
	I-10	500	5	P3	ST-21172	I-10	600	6	P6	SSN-21168 SSN-21168-1	
	I-10	500	5	P4/5	MTU-1	I-10	600	6	P7	XD15-21320 XSN-11178	
	I-10	500	5	P6	TSL-22106	I-10	600	6	P8	XSN-93470-A	
	I-10	500	5	P7	XSN-11224	I-10	600	6	P9	XD15-21174 XD15-21150	
	I-10	500	5	P8	FM-2214	I-10	600	6	P10	FSL-2210-1 FSL-2210-2	
	I-10	500	5	P9	XT-93470-C	I-10	600	6	P11	SSL-21162-1 SSL-21162-2	
	I-10	500	5	P10	SM-21166-2	I-10	600	6	P12	SSN-21162 SSN-21162-1	
	I-10	500	5	P11	SM-21166-1	I-10	700	2	P7/8	CS-22B	C-24
C-19	I-10	500	5	P12	ST-21166	I-10	700	3	P1/3	MIS-1115	E-2
C-16	I-10	500	6	P1	XD15-21330 XSN-11188	I-10	700	4	P1/2	MTU-1	C-3
	I-10	500	6	P2	PDS-21554-1 PDS-21554-2	I-10	700	4	P3	XSN-93449 XSN-93452	
	I-10	500	6	P3	PDS-21552-1 PDS-21552-2	I-10	700	4	P4	XDSN-93133	
	I-10	500	6	P4	FSL-2214-3	I-10	700	4	P5	XDSN-93130	
	I-10	500	6	P5	SSL-21172-1 SSL-21172-2	I-10	700	4	P10	TDSL-22103	
	I-10	500	6	P6	SSN-21172 SSN-21172-1	I-10	700	4	P11	XSN-2298	
	I-10	500	6	P7	XD15-21324 XSN-11184	I-10	700	4	P12	XSL-3124	E-3
	I-10	500	6	P8	XSN-93470-C	I-10	700	5	P5	XSN-93456-B-C	
	I-10	500	6	P9	XD15-21178 XD15-21184	I-10	700	5	P6	XT-93456-B	
	I-10	500	6	P10	FSL-2214-1 FSL-2214-2	I-10	700	5	P7	XSN-93454-B	
C-16	I-10	500	6	P11	SSL-21166-1 SSL-21166-2	I-10	700	5	P8	XT-93454-B-C	

	PANEL	BAY	BIN	MODULE	INSTR. #	PANEL	BAY	BIN	MODULE	INSTR. #	
C-21	I-10	700		P9	XSH-93457-B	E-44	I-10	1000	5	P11	SM-21163-1
C-21	I-10	700		P10	XT-93457-B	E-44	I-10	1000	5	P12	ST-21163
C-21	I-10	700	5	P11	XSH-93455-B	C-11	I-10	1000	6	P1	XOIS-21327 XSH-11185
C-21	I-10	700	5	P12	XT-93455-B	I-10	1000	6	P2	POS-21551-1 POS-2155-2	
E-32	I-10	800	4	P4/5	MTU-1	I-10	1000	6	P3	POS-21549-1 POS-21549-2	
	I-10	800	4	P6	XDSH-93134	I-10	1000	6	P4	FSL-2211-3	
	I-10	800	4	P7	XDSH-93131	I-10	1000	6	P5	SSL-21169-1 SSL-21169-2	
	I-10	800	4	P10	TOSL-22105	I-10	1000	6	P6	SSM-21169 SSM-21169-1	
	I-10	800	4	P11	XSH-2299	I-10	1000	6	P7	XOIS-21321 XSH-11179	
E-32	I-10	800	4	P12	XSL-3125	I-10	1000	6	P8	XSH-93471-B	
E-39	I-10	900	2	P7/8	CS-22A	I-10	1000	6	P9	XOIS-21175 XOIS-21181	
E-60	I-10	900	3	P1/3	MIS-1119	I-10	1000	6	P10	FSL-2211-1 FSL-2211-2	
E-24	I-10	900	4	P1/2	MTU-1	I-10	1000	6	P11	SSL-21163-1 SSL-21163-2	
	I-10	900	4	P3	XSH-93448 XSH-93451	C-11	I-10	1000	6	P12	SSM-21163 SSM-21163-1
	I-10	900	4	P4	XDSH-93132	E-29	I-10	1100	3	P1/3	MIS-1117
	I-10	900	4	P5	XDSH-93129	E-26	I-10	1100	4	P9	XSH-93457-C
	I-10	900	4	P10	TOSL-22101	I-10	1100	4	P10	XT-93457-C	
	I-10	900	4	P11	XSH-2297	I-10	1100	4	P11	XSH-93455-C	
E-24	I-10	900	4	P12	XSL-3123	E-26	I-10	1100	4	P12	XT-93455-C
E-43	I-10	900	5	P5	XSH-93456-A	G-06	I-10	1100	5	P1	SM-21171-2
E-43	I-10	900	5	P6	XT-93456-A	I-10	1100	5	P2	SM-21171-1	
E-43	I-10	900	5	P7	XSH-93454-A	I-10	1100	5	P3	ST-21171	
E-43	I-10	900	5	P8	XT-93454-A	I-10	1100	5	P4/5	MTU-1	
E-43	I-10	900	5	P9	XSH-93457-A	I-10	1100	5	P6	TSL-22105	
E-43	I-10	900	5	P10	XT-93457-A	I-10	1100	5	P7	XSH-11223	
E-43	I-10	900	5	P11	XSH-93455-A	I-10	1100	5	P8	FM-2213	
E-43	I-10	900	5	P12	XT-93455-A	I-10	1100	5	P9	XT-93471-C	
E-30	I-10	1000	3	P1/3	MIS-1116	I-10	1100	5	P10	SM-21165-2	
E-44	I-10	1000	4	P5/6	CS-181	I-10	1100	5	P11	SM-21165-1	
	I-10	1000	5	P1	SM-21169-2	I-10	1100	5	P12	ST-21165	
	I-10	1000	5	P2	SM-21169-1	G-07	I-10	1100	6	P1	XOIS-21329 XSH-11187
	I-10	1000	5	P3	ST-21169	I-10	1100	6	P2	XOIS-21183 XOIS-21159	
	I-10	1000	5	P4/5	MTU-1	I-10	1100	6	P3	FSL-2213-3	
	I-10	1000	5	P6	TSL-22103	I-10	1100	6	P4	SSL-21171-1 SSL-21171-2	
	I-10	1000	5	P7	XSH-11221	I-10	1100	6	P5	SSM-21171 SSM-21171-1	
	I-10	1000	5	P8	FM-2211	I-10	1100	6	P6	XOIS-21323 XSH-11181	
	I-10	1000	5	P9	XT-93471-B	I-10	1100	6	P7	XSH-93471-C	
E-44	I-10	1000	5	P10	SM-21163-2	I-10	1100	6	P8		

PANEL	INSTR.	QTY	DUPLICATE	INSTR. #	
G-07	I-10	1100	6	P9	XDIS-21177 XDIS-21153 FSL-2213-1 FSL-2213-2 SSL-21165-1 SSL-21165-2 SSH-21165 SSH-21165-1
	I-10	1100	6	P10	
	I-10	1100	6	P11	
✓	I-10	1100	6	P12	
E-28	I-10	1200	3	P13	MIS-1118
E-27	I-10	1200	4	P5/6	CS-1A1
A-69	I-10	1200	5	P1	SM-21167-2
	I-10	1200	5	P2	SM-21167-1
	I-10	1200	5	P3	ST-21167
	I-10	1200	5	P4/5	MTU-1
	I-10	1200	5	P6	TSL-22101
	I-10	1200	5	P7	XSH-11219
	I-10	1200	5	P8	FM-2209
	I-10	1200	5	P9	XT-93471-A
	I-10	1200	5	P10	SM-21161-2
	I-10	1200	5	P11	SM-21161-1
	I-10	1200	5	P12	ST-21161
	I-10	1200	6	P1	XDIS-21225 XSH-11183 POS-21547-1 POS-21547-2 POS-21545-1 POS-21545-2
	I-10	1200	6	P2	
	I-10	1200	6	P3	
	I-10	1200	6	P4	FSL-2209-3 SSL-21167-1 SSL-21167-2 SSH-21167 SSH-21167-1 XDIS-21319 XSH-11177
	I-10	1200	6	P5	
	I-10	1200	6	P6	
	I-10	1200	6	P7	
	I-10	1200	6	P8	XSH-93471-A
	I-10	1200	6	P9	XDIS-21173 XDIS-21174 FSL-2209-1 FSL-2209-2 SSL-21161-2 SSL-21161-1 SSH-21161 SSH-21161-1
	I-10	1200	6	P10	
✓	I-10	1200	6	P11	
A-69	I-10	1200	6	P12	



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0360

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <i>RON GARRETT</i>	DATE <i>1/26/83</i>
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A. HED TITLE *SWITCH CONVENTION*

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>SEE SEPARATE SHEETS</i>			

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) *PUSH-BUTTON, ILLUM PUSH-BUTTON, TOGGLE, ROTARY AND LEGEND SWITCHS NOT MEETING THE CONFIGURATION OF ERDA-76-45-2*

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION No action - not operator used controls WCH 5/1/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

Attachment to
 HED 8366

INEL	BAY		INSTR. #	PANEL	BAY	BIN	MODULE	INSTR. #
I-14	100		RIS-6212	I-14	400	4	E-8 P11/12	RIS-93250-5
I-14	100	3	RIS-6314-2	I-14	400	5	E-M P11/12	RIS-93250-12
I-14	100	3	P7/9 ↓	I-14	400	5	P5/6	RIS-93251-9
I-14	100	3	P10/12 A-17	I-14	400	5	P7/8	RIS-93251-7
I-14	100	5	P9/10 E-11	I-14	400	5	↓ P11/12	RIS-93250-4
I-14	100	5	P11/12 E-11	I-10	100	1	E-M P3/4	
I-14	200	3	P1/3 A-16	I-10	100	1	↓ P7/8	TT-93473
I-14	200	3	P4/6 ↓	I-10	100	5	B-9 P2	XSL-93363
I-14	200	3	P7/9 ↓	I-10	100	5	P3	PSL-1109-2
I-14	200	3	P10/12 A-16	I-10	100	5	P4	PSL-1109-1
I-14	200	4	P3/4 E-17	I-10	100	5	P5	PT-1109
I-14	200	4	P7/8 ↓	I-10	100	5	P6/7	MTU-1
I-14	200	4	P9/10 ↓	I-10	100	5	P8	XSL-2271
I-14	200	4	P11/12 E-17	I-10	100	5	P9	XSL-2233
I-14	200	5	P9/10 E-12	I-10	100	5	P10	TSM-22136
I-14	200	5	P11/12 E-12	I-10	100	5	↓ P11/12	TT-22136
I-14	300	3	P1/3 A-15	I-10	100	6	B-93 P1	TSH-1176
I-14	300	3	P4/6 ↓	I-10	100	6	P2	TSL-1176
I-14	300	3	P7/9 ↓	I-10	100	6	P3	TSM-1172
I-14	300	3	P10/12 ↓	I-10	100	6	P4	TM-1152-2
I-14	300	4	P3/4 E-16	I-10	100	6	P5	TM-1152-1
I-14	300	4	P5/6 ↓	I-10	100	6	P6	TM-1152-3
I-14	300	4	P7/8 ↓	I-10	100	6	P7/8	TSH-93473
I-14	300	4	P9/10 ↓	I-10	100	6	↓ P9/10	TT-1172
I-14	300	4	P11/12 E-16	I-10	100	6		TT-1176
I-14	300	5	P1/2 E-13	I-10	200	1	A-01 P1	XMS-11262-14
I-14	300	5	P3/4 ↓	I-10	200	1	P2	XMS-11262-13
I-14	300	5	P7/8 ↓	I-10	200	1	P7/8	
I-14	300	5	P9/10 ↓	I-10	200	1	P9/10	TT-93474
I-14	300	5	P11/12 ↓	I-10	200	1	↓ P12	XMS-11262-1
I-14	300	5	P11/12 ↓	I-10	200	2	C-02 P1	XMS-11262-16
I-14	400	3	P1/3 A-14	I-10	200	2	P2	XMS-11262-8
I-14	400	3	P4/6 ↓	I-10	200	2	P3	XMS-11262-4
I-14	400	3	P7/9 ↓	I-10	200	2	P4	XMS-11262-11
I-14	400	3	P10/12 ↓	I-10	200	2	P5	XMS-11262-7
I-14	400	4	P3/4 E-15	I-10	200	2	P6	XMS-11262-3
I-14	400	4	P5/6 ↓	I-10	200	2	P7	XMS-11262-10
I-14	400	4	P7/8 ↓	I-10	200	2	P8	XMS-11262-6
I-14	400	4	P9/10 ↓	I-10	200	2	↓ P9	XMS-11262-2

PANEL	BAY	BIN	MODULE	INSTR. #	PANEL	BAY	BIN	MODULE	INSTR. #	
C-02	I-10		P10	XMS-11262-9	B-91	I-10	300	P6	TSM-93472	
C-02	I-10	200	P11	XMS-11262-5	B-91	I-10	300	P7/8	TT-1171	
C-02	I-10	200	2	P12	XMS-11262-1	B-91	I-10	300	P9/10	TT-1175
B-95	I-10	200	5	P1	XMS-11262-15	E-35	I-10	400	P1/2	CC-282
	I-10	200	5	P2	XSL-93364		I-10	400	P3/4	TT-22104
	I-10	200	5	P3	PSL-1110-1		I-10	400	P5/6	ISL-93208-
	I-10	200	5	P4	PSH-1110-1		I-10	400	P7/8	ISL-93208-
	I-10	200	5	P5	PT-1110	E-36	I-10	400	P11/12	RIS-93252-
	I-10	200	5	P6/7	MTU-1	E-34	I-10	400	P1/3	MIS-1122
	I-10	200	5	P8	XSL-2273		I-10	400	P4/5	
	I-10	200	5	P9	XSL-2235		I-10	400	P6/7	
	I-10	200	5	P10	TSM-22137		I-10	400	P12	
	I-10	200	5	P11/12	TT-22137	E-20	I-10	400	P5/6	CS-182
	I-10	200	6	P1	TSM-1177		I-10	400	P7/8	CT-184
B-92	I-10	200	6	P2	TSL-1177		I-10	400	P9/10	CT-282
	I-10	200	6	P3	TSM-1173		I-10	400	P11/12	CT-1843
	I-10	200	6	P4	TSL-1173		I-10	400	P1	SM-21170-
	I-10	200	6	P5	TM-1153-2	C-18	I-10	400	P2	SM-21170-
	I-10	200	6	P6	TM-1153-1		I-10	400	P3	SM-21170-
	I-10	200	6	P7/8	TM-1153-3		I-10	400	P4/5	MTU-1
	I-10	200	6	P9/10	TSM-93474		I-10	400	P6	TSL-22104
	I-10	200	6	P3/4	TT-1173		I-10	400	P7	XSM-11222
G-05	I-10	300	1	P7/8	TT-1177		I-10	400	P8	FM-2212
G-05	I-10	300	1	P1	ISM-1238		I-10	400	P9	XT-93470-E
B-94	I-10	300	5	P2	XSL-93362		I-10	400	P10	SM-21164-2
	I-10	300	5	P3	PSH-1108-2		I-10	400	P11	SM-21164-
	I-10	300	5	P4	PSL-1108-1		I-10	400	P12	ST-21164
	I-10	300	5	P5	PSH-1108-1		I-10	400	P1	XOIS-21328
	I-10	300	5	P6/7	PSL-1108-2	C-17	I-10	400	P2	XSM-11186
	I-10	300	5	P8	PT-1108		I-10	400	P3	POS-21550-1
	I-10	300	5	P9	MTU-1		I-10	400	P4	POS-21550-2
	I-10	300	5	P10	XSL-2269		I-10	400	P5	POS-21548-1
	I-10	300	5	P11/12	XSL-2231		I-10	400	P6	POS-21548-2
	I-10	300	5	P1	TSM-22135		I-10	400	P7	FSL-2212-
	I-10	300	6	P2	TT-22135		I-10	400	P8	SSL-21170-1
B-91	I-10	300	6	P3	TSM-1175		I-10	400	P9	SSL-21170-2
	I-10	300	6	P4	TSL-1175		I-10	400	P10	SSM-21170
	I-10	300	6	P5	TSM-1171		I-10	400	P11	SSM-21170-1
	I-10	300	6	P6	TSL-1171		I-10	400		XOIS-21322
	I-10	300	6	P7	TM-1151-2		I-10	400		XSM-1180
	I-10	300	6	P8	TM-1151-1		I-10	400		XSM-93470-
	I-10	300	6	P9	TM-1151-3		I-10	400		XOIS-21176
	I-10	300	6				I-10	400		XOIS-21182
	I-10	300	6				I-10	400		FSL-2212-1
	I-10	300	6				I-10	400		FSL-2212-2
	I-10	300	6				I-10	400		SSL-21164-1
	I-10	300	6				I-10	400		SSL-21164-2

PANEL				INSTR. #	PANEL	BAY	BIN	MODULE	INSTR. #		
C-17	I-10			SSN-21164 SSN-21164-1	I-10	600	2	P7/8	ISL-93207-3	E-37	
E-36	I-10	500		TT-22106	I-10	600	2	P11/12	RIS-93250-11	E-37	
E-36	I-10	500	2	P11/12	RIS-93252-11	I-10	600	3	P1/3	MIS-1120	G-02
E-33	I-10	500	3	P113	MIS-1121	I-10	600	3	P4/5		
	I-10	500	3	P4/5		I-10	600	3	P6/7		
	I-10	500	3	P6/7		I-10	600	3	P12		
	I-10	500	3	P12		I-10	600	3	P5/6	CS-1A2	E-22
E-21	I-10	500	4	P1/3	D265-2263	I-10	600	4	P7/8	CT-1AR4	
	I-10	500	4	P9	XSH-93456-C	I-10	600	4	P9/10	CT-2A2	
	I-10	500	4	P10	XT-93456-C	I-10	600	4	P11/12	CT-1A23	
	I-10	500	4	P11	XSH-93454-C	I-10	600	5	P1	SM-21168-2	C-20
	I-10	500	4	P12	XT-93454-C	I-10	600	5	P2	SM-21168-1	
C-19	I-10	500	5	P1	SM-21172-2	I-10	600	5	P3	ST-21168	
	I-10	500	5	P2	SM-21172-1	I-10	600	5	P4/5	MTU-1	
	I-10	500	5	P3	ST-21172	I-10	600	5	P6	TSL-22102	
	I-10	500	5	P4/5	MTU-1	I-10	600	5	P7	XSH-11220	
	I-10	500	5	P6	TSL-22106	I-10	600	5	P8	FM-2210	
	I-10	500	5	P7	XSH-11224	I-10	600	5	P9	XT-93470-A	
	I-10	500	5	P8	FM-2214	I-10	600	5	P10	SM-21162-2	
	I-10	500	5	P9	XT-93470-C	I-10	600	5	P11	SM-21162-1	
	I-10	500	5	P10	SM-21166-2	I-10	600	5	P12	ST-21162	
	I-10	500	5	P11	SM-21166-1	I-10	600	6	P1	XDIS-21326 XSH-11184	G-09
	I-10	500	5	P12	ST-21166	I-10	600	6	P2		
C-16	I-10	500	6	P1	XDIS-21330 XSH-11188	I-10	600	6	P3	XDIS-21180 XDIS-21156	
	I-10	500	6	P2	POS-21554-1 POS-21554-2	I-10	600	6	P4	FSL-2210-3	
	I-10	500	6	P3	POS-21552-1 POS-21552-2	I-10	600	6	P5	SSL-21168-1 SSL-21168-2 SSN-21168	
	I-10	500	6	P4	FSL-2214-3	I-10	600	6	P6	SSN-21168-1 XDIS-21320 XSH-11178	
	I-10	500	6	P5	SSL-21172-1 SSL-21172-2	I-10	600	6	P7		
	I-10	500	6	P6	SSN-21172	I-10	600	6	P8	XSH-93470-A	
	I-10	500	6	P7	SSN-21172-1 XDIS-21324 XSH-11182	I-10	600	6	P9	XDIS-21174 XDIS-21150	
	I-10	500	6	P8	XSH-93470-C	I-10	600	6	P10	FSL-2210-1 FSL-2210-2	
	I-10	500	6	P9	XDIS-21178 XDIS-21184	I-10	600	6	P11	SSL-21162-1 SSL-21162-2 SSN-21162	
	I-10	500	6	P10	FSL-2214-1 FSL-2214-2	I-10	600	6	P12	SSN-21162-1	
	I-10	500	6	P11	SSL-21166-1 SSL-21166-2	I-10	700	2	P1/2	TLT-18	C-24
	I-10	500	6	P12	SSN-21166 SSN-21166-1	I-10	700	2	P5/6	CC-18	
E-37	I-10	600	2	P1/2	CC-2A2	I-10	700	2	P7/8	CS-228	
E-37	I-10	600	2	P3/4	TT-22102	I-10	700	2	P11/12	CC-20	
E-37	I-10	600	2	P5/6	ISL-93207-4	I-10	700	3	P1/3	MIS-1115	E-23

	PANEL	BAY	BIN	MODULE	INSTR. #		PANEL	BAY	BIN	MODULE	INSTR. #
E-23	I-10	700			MIS-1115		I-10	900	4	P11	XSN-2297 E-24
	I-10	700					I-10	900	4	P12	XSL-3123 E-24
	I-10	700	3	P12			E-43 I-10	900	5	P5	XSN-93456-A
E-31	I-10	700	4	P1/2	MTU-1		I-10	900	5	P6	XT-93456-A
	I-10	700	4	P3	XSN-93449		I-10	900	5	P7	XSN-93454-A
	I-10	700	4	P4	XSN-93452		I-10	900	5	P8	XT-93454-A
	I-10	700	4	P5	XDSH-93133		I-10	900	5	P9	XSN-93457-A
	I-10	700	4	P10	XDSL-22103		I-10	900	5	P10	XT-93457-A
	I-10	700	4	P11	XSN-2298		I-10	900	5	P11	XSN-93455-A
	I-10	700	4	P12	XSL-3124		I-10	900	5	P12	XT-93455-A
C-21	I-10	700	5	P5	XSN-93456-B		C-09 I-10	1000	2	P1/2	CC-281
	I-10	700	5	P6	XT-93456-B		I-10	1000	2	P3/4	TT-22103
	I-10	700	5	P7	XSN-93454-B		I-10	1000	2	P5/6	ISL-93208-2
	I-10	700	5	P8	XT-93454-B		I-10	1000	2	P7/8	ISL-93208-1
	I-10	700	5	P9	XSN-93457-B		I-10	1000	2	P11/12	RIS-93251-10
	I-10	700	5	P10	XT-93457-B		E-30 I-10	1000	3	P1/3	MIS-1116
	I-10	700	5	P11	XSN-93455-B		I-10	1000	3	P4/5	
	I-10	700	5	P12	XT-93455-B		I-10	1000	3	P6/7	
E-32	I-10	800	4	P2	XSN-93450		I-10	1000	3	P12	
	I-10	800	4	P4/5	XSN-93453		E-25 I-10	1000	4	P5/6	CS-181
	I-10	800	4	P6	MTU-1		I-10	1000	4	P7/8	CT-18R2
	I-10	800	4	P7	XDSH-93134		I-10	1000	4	P9/10	CT-281
	I-10	800	4	P10	XDSH-93131		I-10	1000	4	P11/12	CT-18L1
	I-10	800	4	P11	TDSL-22105		E-44 I-10	1000	5	P1	SM-21169-2
	I-10	800	4	P12	XSN-2299		I-10	1000	5	P2	SM-21169-1
E-38	I-10	900	2	P1/2	XSL-3125		I-10	1000	5	P3	ST-21169
	I-10	900	2	P5/6	TLT-1A		I-10	1000	5	P4/5	MTU-1
	I-10	900	2	P7/8	CC-1A		I-10	1000	5	P6	TSL-22103
	I-10	900	2	P11/12	CS-22A		I-10	1000	5	P7	XSN-11221
E-60	I-10	900	3	P1/3	CC-2A		I-10	1000	5	P8	FM-2211
	I-10	900	3	P4/5	MIS-1119		I-10	1000	5	P9	XT-93471-B
	I-10	900	3	P6/7			I-10	1000	5	P10	SM-21163-2
	I-10	900	3	P12			I-10	1000	5	P11	SM-21163-1
E-24	I-10	900	4	P1/2	MTU-1		I-10	1000	5	P12	ST-21163
	I-10	900	4	P3	XSN-93448		C-11 I-10	1000	6	P1	XOIS-21327
	I-10	900	4	P4	XSN-93451		I-10	1000	6	P2	XSN-11185
	I-10	900	4	P5	XDSH-93132		I-10	1000	6	P3	POS-21551-1
	I-10	900	4	P10	XDSH-93129		I-10	1000	6	P4	POS-21551-2
	I-10	900	4	P10	TDSL-22101		I-10	1000	6	P4	POS-21549-1
	I-10	900	4	P10			I-10	1000	6	P4	POS-21549-2
	I-10	900	4	P10			I-10	1000	6	P4	FSL-2211-3

PANEL	BAY	BIN	MODULE	INSTR.*	PANEL	BAY	BIN	MODULE	INSTR.*
C-11	I-10	1000	P5	SSL-21169-1	G-02	I-10	1100	6	P10
	I-10	1000	P6	SSL-21169-2		I-10	1100	6	P11
	I-10	1000	P7	SSN-21169		I-10	1100	6	P12
	I-10	1000	P8	SSN-21169-1		I-10	1200	2	P1/2
	I-10	1000	P9	XD15-21321		I-10	1200	2	P3/4
	I-10	1000	P10	XSN-11179		I-10	1200	2	P5/6
	I-10	1000	P11	XSN-93471-B		I-10	1200	2	P7/8
	I-10	1000	P12	XD15-21175		I-10	1200	2	P11/12
C-08	I-10	1100	P3/4	XD15-21181	E-28	I-10	1200	3	P1/3
	I-10	1100	P11/12	FSL-2211-1		I-10	1200	3	P4/5
C-08	I-10	1100	P1/3	FSL-2211-2		I-10	1200	3	P6/7
	I-10	1100	P4/5	SSL-21163-1		I-10	1200	3	P12
E-29	I-10	1100	P6/7	SSL-21163-2		I-10	1200	3	P12
	I-10	1100	P12	SSN-21163		I-10	1200	3	P12
	I-10	1100	P9	SSN-21163-1		I-10	1200	4	P5/6
	I-10	1100	P10	TT-22105		I-10	1200	4	P7/8
	I-10	1100	P11	RIS-93252-10		I-10	1200	4	P9/10
	I-10	1100	P12	MIS-1117		I-10	1200	4	P11/12
E-26	I-10	1100	P9			I-10	1200	4	P1
	I-10	1100	P10	XSN-93457-C		I-10	1200	4	P2
	I-10	1100	P11	XT-93457-C		I-10	1200	4	P3
	I-10	1100	P12	XSN-93455-C		I-10	1200	4	P4/5
G-06	I-10	1100	P1	XT-93455-C		I-10	1200	4	P6
	I-10	1100	P2	SM-21171-2		I-10	1200	4	P7
	I-10	1100	P3	SM-21171-1		I-10	1200	4	P8
	I-10	1100	P4/5	ST-21171		I-10	1200	4	P9
	I-10	1100	P6	MTU-1		I-10	1200	4	P10
	I-10	1100	P7	TSL-22105		I-10	1200	4	P11
	I-10	1100	P8	XSN-11223		I-10	1200	4	P12
	I-10	1100	P9	FM-2213		I-10	1200	4	P1
	I-10	1100	P10	XT-93471-C		I-10	1200	4	P2
	I-10	1100	P11	SM-21165-2		I-10	1200	4	P3
	I-10	1100	P12	SM-21165-1		I-10	1200	4	P4/5
	I-10	1100	P1	ST-21165		I-10	1200	4	P6
	I-10	1100	P2	XD15-21329		I-10	1200	4	P7
	I-10	1100	P3	XSN-11187		I-10	1200	4	P8
	I-10	1100	P4			I-10	1200	4	P9
	I-10	1100	P5	XD15-21183		I-10	1200	4	P10
	I-10	1100	P6	XD15-21159		I-10	1200	4	P11
	I-10	1100	P7	FSL-2213-3		I-10	1200	4	P12
	I-10	1100	P8	SSL-21171-1		I-10	1200	4	P1
	I-10	1100	P9	SSL-21171-2		I-10	1200	4	P2
	I-10	1100	P10	SSN-21171		I-10	1200	4	P3
	I-10	1100	P11	SSN-21171-1		I-10	1200	4	P4
	I-10	1100	P12	XD15-21323		I-10	1200	4	P5
	I-10	1100	P1	XSN-11181		I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3	XSN-93471-C		I-10	1200	4	P8
	I-10	1100	P4	XD15-21177		I-10	1200	4	P9
	I-10	1100	P5			I-10	1200	4	P10
	I-10	1100	P6			I-10	1200	4	P11
	I-10	1100	P7			I-10	1200	4	P12
	I-10	1100	P8			I-10	1200	4	P1
	I-10	1100	P9			I-10	1200	4	P2
	I-10	1100	P10			I-10	1200	4	P3
	I-10	1100	P11			I-10	1200	4	P4
	I-10	1100	P12			I-10	1200	4	P5
	I-10	1100	P1			I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3			I-10	1200	4	P8
	I-10	1100	P4			I-10	1200	4	P9
	I-10	1100	P5			I-10	1200	4	P10
	I-10	1100	P6			I-10	1200	4	P11
	I-10	1100	P7			I-10	1200	4	P12
	I-10	1100	P8			I-10	1200	4	P1
	I-10	1100	P9			I-10	1200	4	P2
	I-10	1100	P10			I-10	1200	4	P3
	I-10	1100	P11			I-10	1200	4	P4
	I-10	1100	P12			I-10	1200	4	P5
	I-10	1100	P1			I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3			I-10	1200	4	P8
	I-10	1100	P4			I-10	1200	4	P9
	I-10	1100	P5			I-10	1200	4	P10
	I-10	1100	P6			I-10	1200	4	P11
	I-10	1100	P7			I-10	1200	4	P12
	I-10	1100	P8			I-10	1200	4	P1
	I-10	1100	P9			I-10	1200	4	P2
	I-10	1100	P10			I-10	1200	4	P3
	I-10	1100	P11			I-10	1200	4	P4
	I-10	1100	P12			I-10	1200	4	P5
	I-10	1100	P1			I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3			I-10	1200	4	P8
	I-10	1100	P4			I-10	1200	4	P9
	I-10	1100	P5			I-10	1200	4	P10
	I-10	1100	P6			I-10	1200	4	P11
	I-10	1100	P7			I-10	1200	4	P12
	I-10	1100	P8			I-10	1200	4	P1
	I-10	1100	P9			I-10	1200	4	P2
	I-10	1100	P10			I-10	1200	4	P3
	I-10	1100	P11			I-10	1200	4	P4
	I-10	1100	P12			I-10	1200	4	P5
	I-10	1100	P1			I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3			I-10	1200	4	P8
	I-10	1100	P4			I-10	1200	4	P9
	I-10	1100	P5			I-10	1200	4	P10
	I-10	1100	P6			I-10	1200	4	P11
	I-10	1100	P7			I-10	1200	4	P12
	I-10	1100	P8			I-10	1200	4	P1
	I-10	1100	P9			I-10	1200	4	P2
	I-10	1100	P10			I-10	1200	4	P3
	I-10	1100	P11			I-10	1200	4	P4
	I-10	1100	P12			I-10	1200	4	P5
	I-10	1100	P1			I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3			I-10	1200	4	P8
	I-10	1100	P4			I-10	1200	4	P9
	I-10	1100	P5			I-10	1200	4	P10
	I-10	1100	P6			I-10	1200	4	P11
	I-10	1100	P7			I-10	1200	4	P12
	I-10	1100	P8			I-10	1200	4	P1
	I-10	1100	P9			I-10	1200	4	P2
	I-10	1100	P10			I-10	1200	4	P3
	I-10	1100	P11			I-10	1200	4	P4
	I-10	1100	P12			I-10	1200	4	P5
	I-10	1100	P1			I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3			I-10	1200	4	P8
	I-10	1100	P4			I-10	1200	4	P9
	I-10	1100	P5			I-10	1200	4	P10
	I-10	1100	P6			I-10	1200	4	P11
	I-10	1100	P7			I-10	1200	4	P12
	I-10	1100	P8			I-10	1200	4	P1
	I-10	1100	P9			I-10	1200	4	P2
	I-10	1100	P10			I-10	1200	4	P3
	I-10	1100	P11			I-10	1200	4	P4
	I-10	1100	P12			I-10	1200	4	P5
	I-10	1100	P1			I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3			I-10	1200	4	P8
	I-10	1100	P4			I-10	1200	4	P9
	I-10	1100	P5			I-10	1200	4	P10
	I-10	1100	P6			I-10	1200	4	P11
	I-10	1100	P7			I-10	1200	4	P12
	I-10	1100	P8			I-10	1200	4	P1
	I-10	1100	P9			I-10	1200	4	P2
	I-10	1100	P10			I-10	1200	4	P3
	I-10	1100	P11			I-10	1200	4	P4
	I-10	1100	P12			I-10	1200	4	P5
	I-10	1100	P1			I-10	1200	4	P6
	I-10	1100	P2			I-10	1200	4	P7
	I-10	1100	P3			I-10			



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0361

200
 Form 344-22-4228

REVIEWER NAME <i>RON GARRETT</i>			DATE <i>7/27/83</i>
A. HED TITLE <i>SWITCH CONVENTION</i> <i>Labeling, Functional</i>			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>SEE SEPARATE SHEET</i>			
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) <i>TOGGLE SWITCHES SHOW ONLY ONE POSITION</i> <i>OR DOES NOT SHOW MIDDLE POSITION (I-10 B/C 3 TOGGLE SWITCHES SHOW NO FUNCTION</i> <i>OR MIDDLE POSITION)</i>			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *No action - not operator used controls WCH 5/1/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

PANEL	BAY	BIN	MODULE	INSTR. #	
I-10	100	F	P3/4		G-01
I-10	300	1	P3/4		G-05
I-10	400	2	P1/2	CC-2B2	E-35
I-10	400	4	P5/6	CS-1B2	E-20
I-10	400	4	P7/8	CT-1BR4	↓
I-10	400	4	P9/10	CT-2B2	
I-10	400	4	P11/12	CT-1BL3	↓
I-10	600	2	P1/2	CC-2A2	E-37
I-10	600	4	P5/6	CS-1A2	E-22
I-10	600	4	P7/8	CT-1AR4	↓
I-10	600	4	P9/10	CT-2A2	
I-10	600	4	P11/12	CT-1AL3	↓
I-10	700	2	P1/2	TLT-1B	C-24
I-10	700	2	P5/6	CC-1B	↓
I-10	700	2	P7/8	CS-22B	
I-10	700	2	P11/12	CC-2B	↓
I-10	800	3		HS-1123	D-42
I-10	900	2	P1/2	TLT-1A	E-38
I-10	900	2	P5/6	CC-1A	↓
I-10	900	2	P7/8	CS-22A	
I-10	900	2	P11/12	CC-2A	↓
I-10	1000	2	P1/2	CC-2B1	C-09
I-10	1000	4	P5/6	CS-1B1	E-25
I-10	1000	4	P7/8	CT-1BR2	↓
I-10	1000	4	P9/10	CT-2B1	
I-10	1000	4	P11/12	CT-1BL1	↓
I-10	1200	2	P1/2	CC-2A1	C-06
I-10	1200	4	P5/6	CS-1A1	E-37
I-10	1200	4	P7/8	CT-1AR2	↓
I-10	1200	4	P9/10	CT-2A1	
I-10	1200	4	P11/12	CT-1AL1	↓

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Functionally label operator used controls per DD-LAB-1 CN-1895 WCH 5/1/86 operator controls are P5/L on 404, 604, 1004, & 1204 WCH 5/1/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

PANEL	BAY	BIN	MODULE	INSTR.#	
I-10	400	2	P5/6	ISL-93208-4	E-35
I-10	400	2	P7/8	ISL-93208-3	E-35
I-10	400	4	P5/6	CS-1B2	E-20
I-10	600	2	P5/6	ISL-93207-4	E-37
I-10	600	2	P7/8	ISL-93207-3	E-37
I-10	600	4	P5/6	CS-1A2	E-22
I-10	1000	2	P5/6	ISL-93208-2	C-09
I-10	1000	2	P7/8	ISL-93208-1	C-09
I-10	1200	2	P5/6	ISL-93207-2	C-06
I-10	1200	2	P7/8	ISL-93207-1	C-06
I-10	1000	4	P5/6	CS-1B1	E-25
I-10	1200	4	P5/6	CS-1A1	E-27

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *No action - not operator used controls WCH 5/1/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

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PANEL	BAY	INSTR. #	PANEL	BAY	BIN	MODULE	INSTR. #
I-10	100	PSL-1109-1 PSM-1109-2	C-17 I-10	400	6	P5	SSL-21170-1 SSL-21170-2 SSH-21170
I-10	100	P2 B-96	I-10	400	6	P6	SSH-21170-1 XDIS-21322 XSH-11180
I-10	100	P3	I-10	400	6	P7	XSH-93470-B XDIS-21176
I-10	100	P4	I-10	400	6	P8	XDIS-21182 FSL-2212-1 FSL-2212-2
I-10	100	P8	I-10	400	6	P9	SSL-21164-1 SSL-21164-2
I-10	100	P9	I-10	400	6	P10	SSH-21164 SSH-21164-1
I-10	100	P10	I-10	400	6	P11	
I-10	100	P1 B-93	I-10	400	6	P12	
I-10	100	P2 B-93	E-21 I-10	500	4	P9	XSH-93456-C
I-10	100	P6 B-93	E-21 I-10	500	4	P11	XSH-93454-C
I-10	200	A-05	C-19 I-10	500	5	P6	TSL-22106
I-10	200	P1 B-95	C-19 I-10	500	5	P7	XSH-11224 XDIS-21330
I-10	200	P2	C-16 I-10	500	6	P1	XSH-11188 POS-21554-1 POS-21554-2
I-10	200	P3	I-10	500	6	P2	POS-21552-1 POS-21552-2
I-10	200	P4	I-10	500	6	P3	
I-10	200	P8	I-10	500	6	P4	FSL-2214-3 SSL-21172-1 SSL-21172-2
I-10	200	P9	I-10	500	6	P5	SSH-21172 SSH-21172-1
I-10	200	P10	I-10	500	6	P6	XDIS-21324 XSH-11182
I-10	200	P1 B-92	I-10	500	6	P7	
I-10	200	P2 B-92	I-10	500	6	P8	XSH-93470-C XDIS-21178 XDIS-21184
I-10	200	P6 B-92	I-10	500	6	P9	FSL-2214-1 FSL-2214-2 SSL-21166-1 SSL-21166-2
I-10	300	C-03	I-10	500	6	P10	SSH-21166 SSH-21166-1
I-10	300	P1 B-94	I-10	500	6	P11	
I-10	300	P2	I-10	500	6	P12	
I-10	300	P3	C-20 I-10	600	5	P6	TSL-22102
I-10	300	P4	C-20 I-10	600	5	P7	XSH-11220 XDIS-21326 XSH-11184
I-10	300	P8	G-09 I-10	600	6	P1	
I-10	300	P9	I-10	600	6	P2	XDIS-21180 XDIS-21156
I-10	300	P10	I-10	600	6	P3	
I-10	300	P1 B-91	I-10	600	6	P4	FSL-2210-3 SSL-21168-1 SSL-21168-2
I-10	300	P2	I-10	600	6	P5	SSH-21168 SSH-21168-1 XDIS-21320 XSH-11178
I-10	300	P6	I-10	600	6	P6	
I-10	400	P6 C-18	I-10	600	6	P7	
I-10	400	P7 C-18	I-10	600	6	P8	XSH-93470-A XDIS-21174 XDIS-21150
I-10	400	P1 C-17	I-10	600	6	P9	FSL-2210-2 FSL-2210-2 SSL-21162-1 SSL-21162-2
I-10	400	P2	I-10	600	6	P10	SSH-21162 SSH-21162-1
I-10	400	P3	I-10	600	6	P11	
I-10	400	P4	I-10	600	6	P12	

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PANEL	BAY	NAME	INSTR. #	PANEL	BAY	BIN	MODULE	INSTR. #
E-31	I-10	700	XSM-93449 XSM-93452	G-11	I-10	1000	6	P11 SSL-21163-1 SSL-21163-2 SSM-21163 SSM-21163-1
	I-10	700	XDSH-93133	G-11	I-10	1000	6	P12
	I-10	700	4 P5	E-26	I-10	1100	4	P9 XSM-93457-C
	I-10	700	4 P10	E-26	I-10	1100	4	P11 XSM-93455-C
	I-10	700	4 P11	G-06	I-10	1100	5	P6 TSL-22105
	I-10	700	4 P12		I-10	1100	5	P7 XSM-11223 XDIS-21329 XSM-11187
C-21	I-10	700	5 P5	G-07	I-10	1100	6	P1
C-21	I-10	700	5 P7		I-10	1100	6	P2 XDIS-21183 XDIS-21159
C-21	I-10	700	5 P9		I-10	1100	6	P3 FSL-2213-3
C-21	I-10	700	5 P11		I-10	1100	6	P4 SSL-21171-1 SSL-21171-2 SSM-21171 SSM-21171-1
E-32	I-10	800	4 P2		I-10	1100	6	P5 YDIS-21323 XSM-11187
	I-10	800	4 P6		I-10	1100	6	P6
	I-10	800	4 P7		I-10	1100	6	P7
	I-10	800	4 P10		I-10	1100	6	P8 XSM-93471-C
	I-10	800	4 P11		I-10	1100	6	P9 XDIS-21177 XDIS-21153
	I-10	800	4 P12		I-10	1100	6	P10 FSL-2213-1 FSL-2213-2 SSL-21165-1 SSL-21165-2 SSM-21165 SSM-21165-1
E-24	I-10	900	4 P3		I-10	1100	6	P11
	I-10	900	4 P4		I-10	1100	6	P12
	I-10	900	4 P5	A-69	I-10	1200	5	P6 TSL-22101
	I-10	900	4 P10		I-10	1200	5	P7 XSM-11219
	I-10	900	4 P11		I-10	1200	6	P1 XDIS-21325 XSM-11183 POS-21547-1 POS-21547-2 POS-21545-1 POS-21545-2
	I-10	900	4 P12		I-10	1200	6	P2 FSL-2209-3 SSL-21167-1 SSL-21167-2 SSM-21167 SSM-21167-1 XDIS-21319 XSM-11177
E-43	I-10	900	5 P5		I-10	1200	6	P3
	I-10	900	5 P7		I-10	1200	6	P4
	I-10	900	5 P9		I-10	1200	6	P5 FSL-2209-2 SSL-21161-1 SSL-21161-2 SSM-21161 SSM-21161-1
	I-10	900	5 P11		I-10	1200	6	P6
E-44	I-10	1000	6 P6		I-10	1200	6	P7
E-44	I-10	1000	6 P7		I-10	1200	6	P8 XSM-93471-A
C-11	I-10	1000	6 P1		I-10	1200	6	P9 XDIS-21173 XDIS-21179 FSL-2209-1 FSL-2209-2 SSL-21161-1 SSL-21161-2 SSM-21161 SSM-21161-1
	I-10	1000	6 P2		I-10	1200	6	P10
	I-10	1000	6 P3		I-10	1200	6	P11
	I-10	1000	6 P4		I-10	1200	6	P12
	I-10	1000	6 P5					
	I-10	1000	6 P6					
	I-10	1000	6 P7					
	I-10	1000	6 P8					
	I-10	1000	6 P9					
	I-10	1000	6 P10					



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0364

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

200
Form 344-22-4228

REVIEWER NAME <i>RON GARRETT</i>	DATE <i>7/26/83</i>
-------------------------------------	------------------------

A. HED TITLE ~~SWITCH CONVENTION~~
Labeling, Functional

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>SEE SEPARATE SHEET</i>			

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) *NO FAIL ILLUM PUSH-BUTTON SWITCHES FUNCTION UNDEFINED. (S3-PUSH-BUTTON IS THE SAME)*
Light illuminated indicates "no failures"

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

Show "Push to Reset" over Green Button
& Change to "System Status OK"

I. DISPOSITION No action - not operator used controls W&H 5/1/81

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

REL	BAY	BIN	MODULE	INSTR. #	PANEL	BAY	BIN	MODULE	INSTR. #
I-14	100	3	P1/3 A-17	RIS-6212	E-14 I-14	400	5	P5/6	RIS-93251-9
I-14	100	3	P4/6	RIS-6314-2	E-14 I-14	400	5	P7/8	RIS-93251-7
I-14	100	3	P7/9	RIS-7312	E-14 I-14	400	5	P11/12	RIS-93250-4
I-14	100	3	P10/12	RIS-9302	E-37 I-10	400	2	P1/2	CC-2B2
I-14	200	3	P1/3 A-16	RIS-31193	E-37 I-10	400	2	P11/12	RIS-93251-11
I-14	200	3	P4/6	RIS-21251	E-36 I-10	500	2	P11/12	RIS-93252-11
I-14	200	3	P7/9	RIS-7324-2	E-37 I-10	600	2	P1/2	CC-2A2
I-14	200	3	P10/12	RIS-46211	E-37 I-10	600	2	P11/12	RIS-93250-11
I-14	200	4	P3/4 E-17	RIS-93250-13	G24 I-10	700	2	P11/12	CC-2B
I-14	200	4	P7/8	RIS-93252-2	E-38 I-10	900	2	P11/12	CC-2A
I-14	200	4	P9/10	RIS-93252-1	C-09 I-10	1000	2	P1/2	CC-2B1
I-14	200	4	P11/12	RIS-7325-2	C-09 I-10	1000	2	P11/12	RIS-93251-10
I-14	200	5	P9/10 E-12	RIS-93250-8	E-25 I-10	1000	4	P5/6	CS-1B1
I-14	200	5	P11/12 E-12	RIS-93252-6	C-08 I-10	1100	2	P11/12	RIS-93252-10
I-14	300	3	P1/3 A-5	RIS-6213	C-06 I-10	1200	2	P1/2	CC-2A1
	300	3	P4/6	RIS-7325-1	C-06 I-10	1200	2	P11/12	RIS-93250-10
	300	3	P7/9	RIS-46212	E-27 I-10	1200	4	P5/6	CS-1A1
I-14	300	3	P10/12	RIS-2264					
I-14	300	4	P3/4 E-16	RIS-93251-4					
I-14	300	4	P5/6	RIS-93250-14					
I-14	300	4	P7/8	RIS-93251-1					
I-14	300	4	P9/10	RIS-93251-3					
I-14	300	4	P11/12	RIS-93252-4					
I-14	300	5	P1/2 E-13	RIS-93252-12					
I-14	300	5	P3/4	RIS-93251-12					
I-14	300	5	P7/8	RIS-93252-7					
I-14	300	5	P9/10	RIS-93251-6					
I-14	300	5	P11/12	RIS-93251-5					
I-14	400	3	P1/3 A-14	RIS-9301					
I-14	400	3	P4/6	RIS-6314-1					
I-14	400	3	P7/9	RIS-7324-1					
I-14	400	3	P10/12	RIS-2263					
	400	4	P3/4 E-15	RIS-93250-2					
	400	4	P5/6	RIS-93250-1					
I-14	400		P7/8	RIS-93250-3					
I-14	400	4	P9/10	RIS-93251-8					
I-14	400	4	P11/12	RIS-93250-5					
I-14	400	5	P1/2 E-14	RIS-93250-12					

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

Functionally label per DD-LAB-1 CN 1895 WEH 5/11/86

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION See attached sheet

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

HED 0384 RESOLUTION

TR-73335, PDR-73440, PDR-73441, PDR-73442, PDR-73449, PDR-73450, PDR-73451, PDR-73452 WERE COMBINED INTO A SINGLE RECORDER AND LOCATED WITHIN THE HEIGHT LIMITATIONS.

TR-73445, TR-73446, TR-73447, TR-73448, TR-73449, TR-73450, TR-73451 & TR-73452 WERE COMBINED INTO A SINGLE RECORDER AND LOCATED WITHIN THE HEIGHT LIMITATIONS.

TR-2232, TR-4637, TR-4638, TR-5156 & TR-92105 WERE RELOCATED TO I09 AND LOCATED BY HEIGHT LIMITATIONS.

TR-2321 WAS REMOVED FROM THE CONTROL ROOM

Mike Henderson 11/22/85

I-15 Devices CN-1893

TI-7316, 7317, 7318, 7321, 7553, 7555, 7557, MI-7322, 7DJ-7319, FI-7320, MI-7554, & PDI-7556 to be relocated on I-15 within constraints of DD-CBL-1. TR-5156 & TR-92105 to be relocated to I-09 per CN-1878.

Present location of XRP protective relays is acceptable. They do not require monitoring or adjusting. Operator does not use the devices.

W.C. Holmes 3/28/85

I-10 Devices CN-1895

Existing space constraints preclude relocating devices within limits. Those devices required by operators in emergency situations will be labeled or demarcated to enhance location.

W.C.A 5/1/86

A review of HED-0384 reflects the following:

(1) The following instruments/indicators are used by the operators in conducting plant normal & Emergency operations.

TSH-22136	105 - P10
- 22137	205 - P10
- 22135	305 - P10

RWP Logic	102 - P3/4
" "	302 P3/4

XI - 93236/7	} - { above 101	
XI - 93181/2		" 202
XI - 93193/235		" 301

RIS - 93251-11	402 P11/12
RIS - 93252-11	502 P11/12
RIS - 93250-11	602 P11/12

CS-2ZB	702 P7/8
CS-2ZA	902 P7/8

RIS-93251-10	1002 P11/12
RIS-93252-10	1102 P11/12
RIS-93250-10	1202 P11/12

XCR Bins (modules)	101 P9/10
↓	301 P9/10
↓	401 P9/10
↓	601 P9/10
	701 P9/10
	901 P9/10
	1001 P9/10
	1201 P9/10

TR-2232
TR-4637
TR-4638

FI-11263
PI-1130

I-13
I-13
I-13

I-13
I-13

⑤ Recorders

⑥ TI-21267 is above the recommended elevation however due to the size of the indicator ~~and~~ the scale increment the instrument may be read to within 10°F which is adequate for the intended purpose.

⑦ MI-11155/6-~~6~~ -11173/4/5/6 are not used ~~in~~ under the present operating philosophy. (These devices ~~to~~ should be removed)

⑧ Radiation Induction Switches - Walk-thru reflected that operators use indicators to verify a trip. (This is applicable during Emergency "Containment")
The dose assessment and only requirement for reading the meters on the RIS comes in the present RERP.

Ambiguity exist between existing procedural steps of Operating, ~~the~~ philosophies as to use & values (Does site Emergency planning encompass Emergency "Containment"?)

Due to this ambiguity and the unanswered question as to the possible result of consequences of any error,

the assessment team elected to classify this as a cat 1.

Radiation Indic Switches located in Bins 204, 304, & 404 are $1\frac{1}{2}$ " below the 41" value. The probability of ~~error~~ making an error due to elevation is considered only a minimal percentage higher than those located above 41".

these RIS's are not read for dose assessment nor is quantitative info required, the Operator may verify a trip and verify an up scale ~~trip~~ reading only before proceeding to locate and isolate.

XRP's (Diff Relaying & Metering) on I-15 is categorized as a 4 since these are not operator use items.

HS - maintained position - If operator actuates switch, the probability of an error is considered minimal

can recognize a switch (proper identification & position recognition and then ...

TR-8901/2/3 & Runa temp Monitor Panels rated Category 4 & HED 0833 initiated for these items as ex-unused equip.



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 014

FORM 344 22-4227

CRS. 10

Sheet 1 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		REMARKS
				YES	NO	YES	NO	
				HED#	HED#			
	I-7507X		7			7		
	I-7507X							see survey
	I-09			7				check list see survey
	I-09							check list see survey
	I-10							check list see survey
	I-10					7		check list see survey
	I-13							check list see survey
	I-13					7		check list see survey
	I-14							check list see survey
	I-14					7		check list see survey



CONTROL BOARDS
(Vertical)

FORM 344-22-4227

CONTROL ROOM SURVEY CHECKLIST

File #

CRS. 10

Sheet 4 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if No	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION		
				YES	NO	YES	NO	A	B	C
	I-10	105 P4						A	B	C
*		↓	PSH-1109-1	28 1/4"			✓	1/3	3	
		↓	TSH-22136				✓	1/2	1/2	2
		205	XMS-11262-15				✓	1/3	3	
		↓	PSL-1110-1				✓	1/3	3	
		↓	PSH-1110-1				✓	1/3	3	
		↓	PSL-1110				✓	1/3	3	
*		↓	TSH-22137				✓	1/2	1/2	2
		305	TSH-1238				✓	1/3	3	
		↓	PSH-1108-2				✓	1/3	3	
		↓	PSL-1108-1				✓	1/3	3	
		↓	PSH-1108-1				✓	1/3	3	
*		↓	TSH-22135				✓	1/2	1/2	2



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # _____

FORM 344 22 4227

CRS- 10

Sheet 8 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if No	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION			
				YES	NO	YES	NO	REMARKS			
					HED#		HED#	A	B	C	
	<i>I-10</i>	<i>MODULE</i> <i>POWER CHANNEL "B"</i> <i>10x4 MH</i>	<i>NSH-1137-1</i> <i>NSH-1137-2</i> <i>NSH-1137-3</i>	<i>39 1/4"</i>			<input checked="" type="checkbox"/>	<i>A-08</i>	<i>1/3</i>	<i>3</i>	
			<i>NSH-1137-4</i> <i>NSH-1137-3</i> <i>NSH-1137-4</i>				<input checked="" type="checkbox"/>	<i>A-08</i>	<i>1/3</i>	<i>3</i>	
			<i>NSH-1134-5</i> <i>NSH-1134-6</i>				<input checked="" type="checkbox"/>	<i>A-08</i>	<i>1/3</i>	<i>3</i>	
		<i>MH POWER CHANNEL "C"</i> <i>20x4</i>	<i>NSH-1138-1</i> <i>NSH-1138-2</i> <i>NSH-1138-3</i>				<input checked="" type="checkbox"/>	<i>B-98</i>	<i>1/3</i>	<i>3</i>	
			<i>NSH-1138-4</i> <i>NSH-1135-3</i> <i>NSH-1135-4</i>				<input checked="" type="checkbox"/>	<i>B-98</i>	<i>1/3</i>	<i>3</i>	
			<i>NSH-1135-5</i> <i>NSH-1135-6</i>				<input checked="" type="checkbox"/>	<i>B-98</i>	<i>1/3</i>	<i>3</i>	
		<i>MH POWER CHANNEL "A"</i> <i>30x4</i>	<i>NSH-1136-1</i> <i>NSH-1136-2</i> <i>NSH-1136-3</i>				<input checked="" type="checkbox"/>	<i>B-97</i>	<i>1/3</i>	<i>3</i>	
			<i>NSH-1136-4</i> <i>NSH-1133-3</i> <i>NSH-1133-4</i>				<input checked="" type="checkbox"/>	<i>B-97</i>	<i>1/3</i>	<i>3</i>	
			<i>NSH-1133-5</i> <i>NSH-1133-6</i>				<input checked="" type="checkbox"/>	<i>B-97</i>	<i>1/3</i>	<i>3</i>	
		<i>10x5 MH P3</i>	<i>PSL-1109-1</i> <i>PSL-1109-2</i>	<i>28 1/4"</i>			<input checked="" type="checkbox"/>	<i>B-96</i>	<i>1/3</i>	<i>3</i>	



CONTROL BOARDS
(Vertical)

FORM 344-22 4227

CONTROL ROOM SURVEY CHECKLIST

CRS. 10

File #

Sheet 10 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if No	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION			
				YES	NO	YES	NO	REMARKS	A	B	C
	I-10	TSH-1176 TSL-1176	17 1/2"						1/3	3	
	P1	TSH-1172 TSL-1172							1/3	3	
	P2	TM-1152-2							1/3	3	
	P3	TM-1152-1							1/3	3	
	P4	TM-1152-3							1/3	3	
	P5	TSH-93473							1/3	3	
	P6	TSH-1177 TSL-1177							1/3	3	
	P1	TSH-1173 TSL-1173							1/3	3	
	P2	TM-1153-2							1/3	3	
	P3	TM-1153-1							1/3	3	
	P4								1/3	3	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File #

FORM 344-22 4227

CRS 10

Sheet 12 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if No	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION										
				YES	NO	YES	NO	REMARKS	A	B	C							
	I-10	II-93177	76"		✓													
		II-93179	76"		✓						C-04	1/3	3					
		SCRAM BRAKE PWR SUPPLY NO. 1	91 1/2"		✓						C-05	1/3	3					
		SCRAM BRAKE PWR SUPPLY NO. 2	91 1/2"		✓							1/3	3					
		XE-93235	85 1/2"		✓							4						
		XE-93181			✓							4						
		XI-93237			✓							4						
		XI-93183			✓							4						
		XI-93236			✓							4						
		XI-93182			✓							4						



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

CRS - 10

File #

Sheet 13 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Dist. if No	Record Instr. Numbers if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION			
				YES	NO	YES	NO	REMARKS	A	B	C
	I-10	407	P12	RIS-93251-1175"				E-35	1/2	1/2	2
		405	P1	SM-21170-2 39 1/2"			✓	C-18	1/3	3	
			P2	SM-21170-1			✓	C-18	1/3	3	
			P6	FSL-22104			✓	C-18	1/3	3	
			P8	FM-2212			✓	C-18	1/3	3	
			P10	SM-21164-2			✓	C-18	1/3	3	
			P11	ST-21164			✓	C-18	1/3	3	
			P2	PDS-21550-1 PDS-21550-2 28 3/4"			✓	C-17	1/3	3	
			P3	PDS-21548-1 PDS-21548-2			✓	C-17	1/3	3	
			P4	FSL-2212-2			✓	C-17	1/3	3	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File #

FORM 344-22-4727

CRS-10

Sheet 15 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if No	Dist. if NO	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION			
				YES	NO	HED#	HED#	REMARKS	A	B	C
I-10	502	P12	RIS-93254-1	75"				E-36	1/2	1/2	2
	505	P1	SM-21172-2	37 1/2"		✓	✓	C-19	1/3	1/3	3
		P2	SM-21172-1				✓	C-19	1/3	1/3	3
		P6	TSL-22106				✓	C-19	1/3	1/3	3
		P8	FM-2214				✓	C-19	1/3	1/3	3
		P10	SM-21166-2				✓	C-19	1/3	1/3	3
		P11	SM-21166-1	↓			✓	C-19	1/3	1/3	3
	506	P2	PDS-21554-1 PDS-21554-228 3/4"	↓			✓	C-16	1/3	1/3	3
		P3	PDS-21552-1 PDS-21552-2	↓			✓	C-16	1/3	1/3	3
		P4	FSL-2214-3	↓			✓	C-16	1/3	1/3	3



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # _____

CRS - 10 _____

Sheet 19 of 34

FORM 344-22-4227

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if No.	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION					
				YES	NO	YES	NO	REMARKS	A	B	C		
	I-10	905	P11	XSH-93455A	39 1/2"						A	B	C
		1002	P12	RIS-43251-0	75"					E-43	1/3	3	
		1005	P1	SM-31169-2	39 1/2"					C-09	1/2	2	
			P2	SM-31169-1						E-44	1/3	3	
			P6	TSL-22103						E-44	1/3	3	
			P8	FM-2211						E-44	1/3	3	
			P10	SM-31163-2						E-44	1/3	3	
			P11	SM-31163-1						E-44	1/3	3	
		1006	P2	PD5-21551-1 PD5-21551-2	28 3/4"					C-11	1/3	3	
			P3	PD5-21549-1 PD5-21549-2						C-11	1/3	3	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # _____

FORM 344-22-4227

CRS- 10

Sheet 21 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if No.	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION					
				YES	NO	YES	NO	REMARKS					
					HED#		HED#	A	B	C			
	I-10	1105	P6	TEL-22105	39 1/2"			✓		G-06	1/3	3	
			P8	FM-2213				✓		G-06	1/3	3	
			P10	SM-21165-2				✓		G-06	1/3	3	
			P11	SM-21165-1				✓		G-06	1/3	3	
			P2	PDS-21555-1 PDS-21555-2	28 3/4"			✓		G-07	1/3	3	
			P3	PDS-21553-1 PDS-21553-2				✓		G-07	1/3	3	
			P4	FSL-2213-3				✓		G-07	1/3	3	
			P5	SSL-21171-1 SSL-21171-1				✓		G-07	1/3	3	
			P6	SSH-21171-1 SSH-21171-1				✓		G-07	1/3	3	
			P8	XSH-93471C				✓		G-07	1/3	3	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File #

Sheet 33 of 34

CRS-10

FORM 344-22-4227

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if No.	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION		
				YES	NO	YES	NO	A	B	C
	I-10 1106	FSL-2215-1 FSL-2215-2	28 3/4"			✓		1/3	3	
		SSL-21165-1 SSL-21165-2	↓			✓		1/3	3	
		SSH-21165 SSH-21165-1	↓			✓		1/3	3	
		RIS-43150-1	75"	✓				1/2	1/2	2
	1207	SM-21167-2	39 1/2"			✓		1/3	3	
	1205	SM-21167-1	↓			✓		1/3	3	
		TSL-22101	↓			✓		1/3	3	
		FM-2209	↓			✓		1/3	3	
		SM-21163-2	↓			✓		1/3	3	
		SM-21161-1	↓			✓		1/3	3	



CONTROL BOARDS
(Vertical)

FORM 344-22 4227

CONTROL ROOM SURVEY CHECKLIST

CRS 10

File #

Sheet 25 of 34

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

COPY

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are all indicators located below a Panel Elevation of 70"?		Are all indicators located above a Panel Elevation of 41"?		CATEGORIZATION REMARKS					
				YES	NO	HED#	YES	NO	A	B	C		
	I-13	M1-11173	81"		X				4				
	I-13	M1-11175	81"		X				4				
	I-13	M1-11174	81"		X				4				
	I-13	M1-11176	81"		X				4				
	I-13	T1-21267	75 1/4"		X				4				
	I-10 West End by 400	XS-93515 TME4 XS-93520	24" ↓					X					

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION HS-73400, 73401, 73404, & 73405 on I-15 are $15/16$ " too low. The controls are hand switches. The indicators are above 34° . The existing discrepancy is not significant. No further action required CN-1893 WCH 4/1/86

I-7507X CONTROLS & INDICATIONS, RELOCATE ON I-7507X PER DD-CBL-1, Roll 22 APRIL 86 CN 1894

I-10 instruments to remain at present locations - no further action required CN-1895 WCH 5/1/86

TEAM ACTION

TEAM MEMBER SIGNATURE

CONCURRENCE OR
NON-CONCURRENCE

DATE

Team Manager

CRDR Coordinator

Human Factors Spec.

Senior Reactor Operator



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 048

FORM 344 22 4227

CRS. 11

Sheet 1 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
	I-09			AS-10		AS-9	NO	SEE SURVEY CHECKLIST
	I-7507X				NO		NO	
	I-7507X				HED #0385		NO	
	I-13						NO	
	I-13				NO		NO	
	I-14				HED #0385		NO	
	I-10						NO	
	I-10						NO	
	I-15				HED #0385		NO	
	I-49 + I-49B			YES			NO	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 052

FORM 344 22-4227

CRS- 11

Sheet 5 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
I-14	305 P 7/8	R15-93252-7	25 1/2" TO 30 1/2"				NO HED# 0385	
I-14	305 P 9/10	R15-93251-6	25 1/2" TO 30 1/2"				NO	
I-14	305 P 11/12	R15-93251-5	25 1/2" TO 30 1/2"				NO	
I-14	405 P 1/2	R15-93250-12	25 1/2" TO 30 1/2"				NO	
I-14	405 P 5/6	R15-93251-9	25 1/2" TO 30 1/2"				NO	
I-14	405 P 7/8	R15-93251-7	25 1/2" TO 30 1/2"				NO	
I-14	405 P 11/12	R15-93250-4	25 1/2" TO 30 1/2"				NO	
I-10	101 P 3/4	RWP LOGIC	72 3/4"		NO			NO INSTR. NUMBER.
I-10	101 P 7/8	TT-93473	71 5/16"		NO			
I-10	105 P 2	XSL-93363	27 5/16"				NO HED# 0385	



CONTRC. BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 053

FORM 344-22-4227

CRS. 11

Sheet 6 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS	
				YES	NO	YES	NO		
				AS-10	HED#	AS-9	HED#		
	I-10	105 P3	PSL-1109-1 PSL-1109-2	27 ⁵ / ₁₆ "				NO HED #0385	
	I-10	105 P4	PSM-1109-1	27 ⁵ / ₁₆ "				NO	
	I-10	105 P5	PT-1109	27 ⁵ / ₁₆ "				NO	
	I-10	105 P6/7	MT-1-1	27 ³ / ₄ " 10" 30 ⁷ / ₈ "				NO	
	I-10	105 P8	XSL-2271	27 ⁵ / ₁₆ "				NO	
	I-10	105 P9	XSL-2233	27 ⁵ / ₁₆ "				NO	
	I-10	105 P10	TSH-22136	27 ⁵ / ₁₆ "				NO	
	I-10	105 P11/12	TT-22136	27 ⁵ / ₁₆ "				NO	
	I-10	106 P1	TSH-1172 TSL-1172	16 ⁷ / ₁₆ "				NO	
	I-10	106 P2	TSH-1172 TSL-1172	16 ⁷ / ₁₆ "				NO	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 054

FORM 344 22-4227

CRS- 11

Sheet 7 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if NO	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES AS-10	NO HED#	YES AS-9	NO HED#	
	I-10	106 P3	16 7/16"					
	I-10	106 P4	16 7/16"				HED# 0385	
	I-10	106 P5	16 7/16"					
	I-10	106 P6	16 7/16"					
	I-10	106 P11/8	16 7/16"					
	I-10	106 P9/10	16 7/16"					
	I-10	201 P1	72"					
	I-10	201 P2	72"					
	I-10	201 P1/8	71 1/2" 70" 74 3/8"					
	I-10	201 P9/10	71 7/16"					



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 055

FORM 344 22-4227

CRS. 11

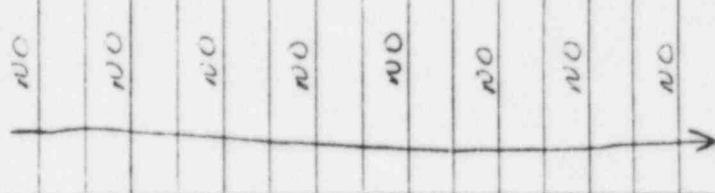
Sheet 8 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO.	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES AS-10	NO HED#	YES AS-9	NO HED#	
	I-10	201 P12	71 ⁷ / ₁₆ "					
	I-10	205 P1	27 ⁵ / ₁₆ "		HED #0385			
	I-10	205 P2	27 ⁵ / ₁₆ "					
	I-10	205 P3	27 ⁵ / ₁₆ "					
	I-10	205 P4	27 ⁵ / ₁₆ "					
	I-10	205 P5	27 ⁵ / ₁₆ "					
	I-10	205 P6/7	27 ³ / ₁₆ " 70 ² / ₁₆ " 30 ² / ₁₆ "					
	I-10	205 P8	27 ⁵ / ₁₆ "					
	I-10	205 P9	27 ⁵ / ₁₆ "					
	I-10	205 P10	27 ⁵ / ₁₆ "					

INSIN NUMBER PENETRATED IN BELOW MODULE.





CONTROL BOARDS
(Vertical)

FORM 346-22-4227

CONTROL ROOM SURVEY CHECKLIST

File # 056

CRS. 11

Sheet 9 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES AS-10	NO HED#	YES AS-9	NO HED#	
	I-10	205 P11/12	27 5/16"					
	I-10	206 P1	16 7/16"				HED #0385	
	I-10	206 P2	16 7/16"					
	I-10	206 P3	16 7/16"					
	I-10	206 P4	16 7/16"					
	I-10	206 P5	16 7/16"					
	I-10	206 P6	16 7/16"					
	I-10	206 P7/8	16 7/16"					
	I-10	206 P9/10	16 7/16"					
	I-10	301 P3/4	12 3/4"					NO INSTR NUMBER.



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 057

FORM 3-4 22-4227

CRS 11

Sheet 10 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?			Are the controls located above a Panel Elevation of 34"?			REMARKS
				YES AS-10	NO HED#	HED#	YES AS-9	NO HED#		
	I-10	301 P118	71 7/16"		NO					
	I-10	305 P1	27 3/8"		HED # D385			NO	HED # D385	
	I-10	305 P2	27 3/8"					NO		
	I-10	305 P3	27 3/8"					NO		
	I-10	305 P4	27 3/8"					NO		
	I-10	305 P5	27 3/8"					NO		
	I-10	305 P6/7	27 3/8" TO 30 7/8"					NO		
	I-10	305 P8	27 3/8"					NO		
	I-10	305 P9	27 3/8"					NO		
	I-10	305 P10	27 3/8"					NO		



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 058

FORM 344-22-4227

CRS- 11

Sheet 11 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10 305 P11/12	TT-22135	27 ³ / ₈ "				NO HED #0385	
	I-10 306 P1	TSH-1175 TSL-1175	16 ⁷ / ₁₆ "				NO	
	I-10 306 P2	TSH-1171 TSL-1171	16 ⁷ / ₁₆ "				NO	
	I-10 306 P3	TM-1151-2	16 ⁷ / ₁₆ "				NO	
	I-10 306 P4	TM-1151-1	16 ⁷ / ₁₆ "				NO	
	I-10 306 P5	TM-1151-3	16 ⁷ / ₁₆ "				NO	
	I-10 306 P6	TSH-93472	16 ⁷ / ₁₆ "				NO	
	I-10 306 P7/8	TT-1171	16 ⁷ / ₁₆ "				NO	
	I-10 306 P9/10	TT-1175	16 ⁷ / ₁₆ "				NO ↓	
	I-10 402 P1/2	CC-202	72"		NO HED #0385			



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 059

FORM 344-22-4227

CRS - 11

Sheet 12 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10	402 P3/4	TT-22104	71 ³ / ₈		NO HED # 0385		
	I-10	402 P5/6	15L-932084	71 ³ / ₈		NO		
	I-10	402 P7/8	15L-932083	71 ³ / ₈		NO		
	I-10	402 P11/12	R15-93251-11	72 ³ / ₄ TC 74-14		NO		
	I-10	406 P1	X34-11186 XDN-21328	27 ³ / ₈ TC 30 ³ / ₈			NO HED # 0385	
	I-10	406 P2	PDS-21550-1 PDS-21550-2	27 ³ / ₈			NO	
	I-10	406 P3	PDS-21548-1 PDS-21548-2	27 ³ / ₈			NO	
	I-10	406 P4	F5L-2212-3	27 ³ / ₈			NO	
	I-10	406 P5	SSL-21170-1 SSL-21170-2	27 ³ / ₈			NO	
	I-10	406 P6	S34-21170 SM-21170-1	27 ³ / ₈			NO	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 060

FORM 344 22-4227

CRS - 11

Sheet 13 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10 406 P7	XSN-11180 XDIS-21322	27 3/8" TO 30 1/2"				NO HED# 0385	
	I-10 406 P8	XSN-21170-8	27 3/8"				NO	
	I-10 406 P9	XDIS-21176 XDIS-21182	27 3/8" TO 30 1/2"				NO	
	I-10 406 P10	FSL-2212-1 FSL-2212-2	27 3/8"				NO	
	I-10 406 P11	SSL-21164-1 SSL-21164-2	27 3/8"				NO	
	I-10 406 P12	SSN-21164 SSN-21164-1	27 3/8"				NO	
	I-10 502 P3/4	TT-22106	71 1/2"		NO			
	I-10 502 P11/2	RIS-93252-11	72 3/4" TO 74 3/4"		HED# 0385			
	I-10 506 P1	XSN-11188 XDIS-21330	27 1/2" TO 30 3/4"				NO HED# 0385	
	I-10 506 P2	PDS-21554-1 PDS-21554-2	27 1/2"				NO	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 061

FORM 344-22-4227

CRS- 11

Sheet 14 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10 506 P3	PDS-2155A PDS-2155B-2	27 1/2"				NO HED# 0385	
	I-10 506 P4	FSL-2214-3	27 1/2"				NO	
	I-10 506 P5	SSL-21172-1 SSL-21172-2	27 1/2"				NO	
	I-10 506 P6	SSH-21172 SSH-21172-1	27 1/2"				NO	
	I-10 506 P7	XSH-11182 XDIS-21324	27 1/2" TO 30 3/4"				NO	
	I-10 506 P8	XSH-93470-C	27 1/2"				NO	
	I-10 506 P9	XDIS-21178 XDIS-21184	27 1/2" TO 30 3/4"				NO	
	I-10 506 P10	FSL-2214-1 FSL-2214-2	27 1/2"				NO	
	I-10 506 P11	SSL-21166-1 SSL-21166-2	27 1/2"				NO	
	I-10 506 P12	SSH-21166 SSH-21166-1	27 1/2"				NO V	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 062

CRS 11

Sheet 15 of 22

FORM 344-22 4227

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
I-10	602 P1/2	CC-2A2	72"		NO HED#0385			
I-10	602 P3/4	TT-22102	71 1/2"		NO			
I-10	602 P5/6	ISL-93207-4	71 1/2"		NO			
I-10	602 P7/8	ISL-93207-3	71 1/2"		NO			
I-10	602 P11/2	R15-93250-11	72 1/8" TO 74 7/8"		NO ↓			
I-10	606 P1	X54-11184 XD15-21326	27 1/8" TO 30 5/8"			NO HED#0385		
I-10	606 P2	PDS-21546-1 PDS-21546-2	27 3/8"			NO		
I-10	606 P3	PDS-21544-1 PDS-21544-2	27 3/8"			NO		
I-10	606 P4	FSL-2110-3	27 3/8"			NO		
I-10	606 P5	SSL-21168-1 SSL-21168-2	27 3/8"			NO ↓		



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 063

FORM 344-22-4227

CRS. 11

Sheet 16 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10 606 P6	SSH-21168 SSH-21163	27 ³ / ₈				NO HED# 0385	
	I-10 606 P7	XSH-11178 XD15-21320	27 ³ / ₈ to 20 ³ / ₈				NO	
	I-10 606 P8	XSH-92470-A	27 ³ / ₈				NO	
	I-10 606 P9	XD15-21174 XD15-21180	27 ³ / ₈ to 20 ³ / ₈				NO	
	I-10 606 P10	FSL-2210-1 FSL-2210-2	27 ³ / ₈				NO	
	I-10 606 P11	SSL-21162-1 SSL-21162-2	27 ³ / ₈				NO	
	I-10 606 P12	SSH-21162 SSH-21162-1	27 ³ / ₈				NO ↓	
	I-10 702 P1/2	TLT-1B	72 ¹ / ₈		NO HED# 0385			
	I-10 702 P5/6	CC-1B	72 ¹ / ₈		NO ↓			
	I-10 702 P7/8	CS-22B	72 ¹ / ₈		NO ↓			



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 064

FORM 344 22 4227

CRS 11

Sheet 17 of 32

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-TD	HED#	AS-9	HED#	
	I-10 702 P11/12	CC-2B	72 1/8"		NO HED# 0385			
	I-10 902 P1/2	TLT-1A	72 1/8"		NO			
	I-10 902 P5/6	CC-1A	72 1/8"		NO			
	I-10 902 P7/8	CS-22A	72 1/8"		NO			
	I-10 902 P11/12	CC-2A	72 1/8"		NO			
	I-10 1002 P1/2	CC-2B1	72 1/8"		NO			
	I-10 1002 P3/4	TT-22103	71 1/2"		NO			
	I-10 1002 P5/6	ISL-93208-2	71 1/2"		NO			
	I-10 1002 P7/8	ISL-93208-1	71 1/2"		NO			
	I-10 1002 P11/12	RIS-9325110	72 3/4" TO 74 7/8"		NO			



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 065

FORM 344-22-4227

CRS- 11

Sheet 18 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10 1006 P1	XSH-11185 XOIS-21327	27 ³ / ₈ TO 20 ⁵ / ₈				NO HED# 0385	
	I-10 1006 P2	PDS-21531-1 PDS-21551-2	27 ³ / ₈				NO	
	I-10 1006 P3	PDS-21549-1 PDS-21549-2	27 ³ / ₈				NO	
	I-10 1006 P4	FSL-2211-3	27 ³ / ₈				NO	
	I-10 1006 P5	SSL-21169-1 SSL-21169-2	27 ³ / ₈				NO	
	I-10 1006 P6	SSH-21169 SSH-21169-1	27 ³ / ₈				NO	
	I-10 1006 P7	XSH-11179 XOIS-21321	27 ³ / ₈ TO 30 ⁵ / ₈				NO	
	I-10 1006 P8	XSH-93471-B	27 ³ / ₈				NO	
	I-10 1006 P9	XOIS-21175 XOIS-21181	27 ³ / ₈ TO 30 ⁵ / ₈				NO	
	I-10 1006 P10	FSL-2211-1 FSL-2211-2	27 ³ / ₈				NO ✓	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 066

FORM 344 22-4227

CRS- 11

Sheet 19 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10 1006 P11	SSL-21163-1 SSL-21163-2	27 ³ / ₈ "				NO HED#0385	
	I-10 1006 P12	SSH-21163 SSH-21163-1	27 ³ / ₈ "				NO ↓	
	I-10 1102 P3/4	^{mm} TY-22105 TT-22265	71 ⁵ / ₈ "		NO HED#0385			
	I-10 1102 P11/12	RIS-93252-10	73" 70" 75"		NO ↓			
	I-10 1106 P1	XSH-11187 YD11-21329	27 ⁵ / ₈ " 70" 30 ³ / ₄ "				NO HED#0385	
	I-10 1106 P2	PDS-21555-1 PDS-21555-2	" 27 ⁵ / ₈ "				NO	
	I-10 1106 P3	PDS-21553-1 PDS-21553-2	" 27 ⁵ / ₈ "				NO	
	I-10 1106 P4	FSL-2213-3	27 ⁵ / ₈ "				NO	
	I-10 1106 P5	SSL-21171-1 SSL-21171-2	" 27 ⁵ / ₈ "				NO	
	I-10 1106 P6	SSH-21171 SSH-21171-1	" 27 ⁵ / ₈ "				NO ↓	



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 067

FORM 344 22-4227

CRS - 11

Sheet 20 of 22

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10 1106 P7	XSM-11181 XDIS-21323	27 ⁵ / ₈ " TO 30 ³ / ₄ "				NO HED# 0385	
	I-10 1106 P8	XSM-93471 C	27 ⁷ / ₈ "				NO	
	I-10 1106 P9	XDIS-21177 XDIS-21183	27 ⁵ / ₈ " TO 30 ³ / ₄ "				NO	
	I-10 1106 P10	FSL-2213-1 FSL-2213-2	27 ⁵ / ₈ "				NO	
	I-10 1106 P11	SSL-21165-1 SSL-21165-2	27 ⁵ / ₈ "				NO	
	I-10 1106 P12	SSH-21165 SSH-21165-1	27 ⁵ / ₈ "				NO	
	I-10 1202 P1/2	CC-2A1	72 ¹ / ₈ "		NO		HED# 0385	
	I-10 1202 P3/4	TT-22101	71 ³ / ₄ "		NO			
	I-10 1202 P5/6	ISL-93207-2	71 ³ / ₄ "		NO			
	I-10 1202 P7/8	ISL-93207-1	71 ³ / ₄ "		NO			



CONTROL BOARDS
(Vertical)

CONTROL ROOM SURVEY CHECKLIST

File # 068

CRS- 11

Sheet 21 of 22

FORM 344-22-4227

PRINCIPLE:

3.2.2.5 Controls should be located so they are reachable and accessible.

SEQ.	PANEL	Record Instr. Numbers if NO	Dist. if No	Are there controls located below a Panel Elevation of 70"?		Are the controls located above a Panel Elevation of 34"?		REMARKS
				YES	NO	YES	NO	
				AS-10	HED#	AS-9	HED#	
	I-10 1202 P11/12	RIS-93250-10	75 1/8" TO 75 1/8"		NO			
	I-10 1206 P1	XSH-11183 XD15-21225	27 5/8" TO 30 3/4"				NO HED#0385	
	I-10 1206 P2	PDS-21547-1 PDS-21547-2	27 5/8"				NO	
	I-10 1206 P3	PDS-21545-1 PDS-21545-2	27 5/8"				NO	
	I-10 1206 P4	FSL-22093	27 5/8"				NO	
	I-10 1206 P5	SSL-21167-1 SSL-21167-2	27 5/8"				NO	
	I-10 1206 P6	SSH-21167 SSH-21167-1	27 5/8"				NO	
	I-10 1206 P7	XSH-11177 XD15-21319	27 5/8" TO 30 3/4"				NO	
	I-10 1206 P8	XSH-93471A	27 5/8"				NO	
	I-10 1206 P9	XD15-21173 XD15-21179	27 5/8" TO 30 3/4"				NO	



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0403

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

200

Form 344-22-4228

REVIEWER NAME <i>RON GARRETT</i>	DATE <i>8/2/83</i>
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A. HED TITLE SWITCH CONVENTION

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>SEE SEPARATE SHEET</i>			

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) ILLUMINATED PUSH-BUTTONS AND THE INDICATING LIGHTS ARE NOT DISTINGUISHABLE FROM EACH OTHER.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

"CRDR INSTR. DATA FILE NUMBERS"

LOCATION
 I-04 CORE GRAPHIC DISPLAY PANEL
 I-06 SECT 1 GE PANEL I-5101X
 I-06 SECT 1 GE PANEL I-5102X
 I-03 NIC-1199

PANEL	BAY	BIN	
I-14	100	3	A-17
I-14	100	5	B-96
I-14	200	3	A-16
I-14	200	4	E-17
I-14	200	5	B-95
I-14	300	3	A-15
I-14	300	4	E-16
I-14	300	5	E-13
I-14	400	3	A-14
I-14	400	4	E-15
I-14	400	5	E-14
I-10	100	1	G-01
I-10	100	2	C-01
I-10	100	3	B-99
I-10	100	4	A-08
I-10	100	5	B-96
I-10	100	6	B-93
I-10	200	1	A-01
I-10	200	3	A-05
I-10	200	4	B-98
I-10	200	5	B-95
I-10	200	6	B-92
I-10	300	1	G-05
I-10	300	2	C-03
I-10	300	3	A-06
I-10	300	4	B-97
I-10	300	5	B-94
I-10	300	6	B-91
I-10	400	1	E-41
I-10	400	2	E-35
I-10	400	3	E-34
I-10	400	4	E-20
I-10	400	5	C-18

PANEL	BAY	BIN	PANE	BAY	BIN	
I-10	400	6	C-17	I-10	1200	5 A-67
I-10	500	2	E-36	I-10	1300	6 A-67
I-10	500	3	E-33			
I-10	500	4	E-21			
I-10	500	5	C-19			
I-10	500	6	C-16			
I-10	600	1	E-40			
I-10	600	2	E-37			
I-10	600	3	G-02			
I-10	600	4	E-22			
I-10	600	5	C-20			
I-10	600	6	G-09			
I-10	700	1	C-30			
I-10	700	2	C-24			
I-10	700	3	E-23			
I-10	700	4	E-31			
I-10	700	5	C-21			
I-10	800	4	E-32			
I-10	900	1	E-39			
I-10	900	2	E-38			
I-10	900	3	E-60			
I-10	900	4	E-24			
I-10	900	5	E-43			
I-10	1000	1	C-10			
I-10	1000	2	C-09			
I-10	1000	3	E-30			
I-10	1000	4	E-25			
I-10	1000	5	E-44			
I-10	1006	4	C-11			
I-10	1100	2	C-08			
I-10	1100	3	E-29			
I-10	1100	4	E-26			
I-10	1100	5	G-06			
I-10	1100	6	G-07			
I-10	1200	1	C-07			
I-10	1200	2	C-06			
I-10	1200	3	E-28			
I-10	1200	4	E-27			



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0488
 Page 1 of 13

Form 344-22 4228

REVIEWER NAME	<u>M. Hodgson / D. GLENN</u>	DATE	<u>10-25-83</u>
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A. HED TITLE Abbreviation & Acronym Convention

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO.
<u>Abbreviation</u>	<u>"TNK" should be "TK"</u>	<u>I-01 LI-6217</u>	<u>0003 F-13</u>
<u>Abbreviation</u>	<u>"TNK" should be "TK"</u>	<u>I-01 PI-6315</u>	<u>0005 F-13</u>
<u>Abbreviation</u>	<u>"COMP" should be "COMPR"</u>	<u>I-01 PDI-2340</u>	<u>0048 C-85</u>
<u>Abbreviation</u>	<u>"COMP" should be "COMPR"</u>	<u>I-01 PDI-2341</u>	<u>0049 C-85</u>
<u>Abbreviation</u>	<u>"VLV" should be "VA"</u>	<u>I-01 PDI-2367-1</u>	<u>0054 F-16</u>
<u>Abbreviation</u>	<u>"PR" should be "PRESS"</u>	<u>I-02 PI-21286 + FI-21445</u>	<u>0094 A-79</u>
<u>Abbreviation</u>	<u>"PR" should be "PRESS"</u>	<u>I-02 PI-21286-3 + PI-21244</u>	<u>0095 A-79</u>
<u>Abbreviation</u>	<u>"PT" NOT IN DD-AAS-1</u>	<u>I-02 HC-21417</u>	<u>0096 A-79</u>

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED)

Non-conformance to DD-AAS-1

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

*All instrumentation on I-01 relabeled per labeling
Conventions; DD-LAB-1 & DD-AAS-1 All 10/1/85
Functionally labeled per DD-LAB-1 and DD-AAS-1 on F02
in CN 1886 B per 10/23/85. Relabel all I-05 devices
in accordance with DD-SWI-1, DD-LAB-1, & DD-AAS-1
All 1/30/86 Relabel all I-06A devices per DD-SWI-1,
DD-LAB-1 WOH 2-7-86 Relabel all I-06B devices per DD-LAB-1
& DD-SWI-1 CN 1892 WOH 2-24-86 & DD-AAS-1*

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

Attachment to HED-0488

Relabel all I-15 devices per DD-LAB-1 & DD-AAS-1
CN-1893 WCH 4/1/86

I-10 relabel per DD-LAB-1 & DD-AAS-1 CN 1895
WCH 5/1/86

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ABBREVIATION	"PT" NOT IN DD-AAS-1	I-02 HS-21418	0097 A-97
	"DP" SHOULD BE "AP"	I-02 HS-2143	0128 A-77
	"DP" SHOULD BE "AP"	I-02 HS-2144	0129 A-78
	"LI" SHOULD BE "LP1"	I-01 TC-46209	0144 A-80
	"LP11 AVE" SHOULD BE "LP2 AVG"	I-01 TC-4638	0145 A-80
	"AVE" SHOULD BE "AVG"	I-01 TC-4637	0147 A-80
	"COMP" SHOULD BE "COMPR"	I-01 FR-2339 + FR-23112	0149 A-84
	"REACT" SHOULD BE "RX"	I-01 LR-4605	0152 A-80
	"VLV" SHOULD BE "VA"	I-01 PDC-2367-1	0155 E-47
	"TNK" SHOULD BE "TK"	I-01 HS-4610	0213 D-72
	"TNK" SHOULD BE "TK"	I-01 HS-4609	0214 D-71
	"TNK" SHOULD BE "TK"	I-01 HS-6335	0224 D-71
	"ANAYL" SHOULD BE "ANAL"	I-01 HS-23130	0236 N/A
	"TNK" SHOULD BE "TK"	I-01 HS-2525	0239 N/A
	"EMER" SHOULD BE "EMERG"	I-01 HS-2313	0254 D-73
	"EMER" SHOULD BE "EMERG"	I-01 HS-2314	0257 D-73
	"COMP" SHOULD BE "COMPR"	I-02 HS-21573	0284 F-97
	"COMP" SHOULD BE "COMPR"	I-02 HS-21574	0285 F-98
	"PUR" SHOULD BE "PURIF"	I-02 HS-23107	0290 F-96
✓	"PUR" SHOULD BE "PURIF"	I-02 HS-2366	0291 D-74

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ABBREVIATION	"FILT" SHOULD BE "FLTR"	I-01 XS-21568	0344 N/A
	"PUR" SHOULD BE "PURIF"	I-01 XS-21568	0344 N/A
	"FILT" SHOULD BE "FLTR"	I-01 XS-21569	0345 N/A
	"PUR" SHOULD BE "PURIF"	I-01 XS-21569	0345 N/A
	"GP" NOT IN DD-AAS-1	I-03 ZIN-1209-20 thru -37 ZIL-1210-20 thru -37 ZIC-1211-20 thru -37	0365 N/A
	"DR" SHOULD BE "DRN"	I-03 MC-21446 PI-21446 PGE-21446 Z1446 L 447	0450 F-54
	"PR" SHOULD BE "PRESS"	I-03	0450 F-54
	"DEAR" SHOULD BE "DA"	I-03	0450 F-54
	"COMP" SHOULD BE "COMPR"	I-03	0450 F-54
P. 4 of 4	"ABNORM" NOT IN DD-AAS-1	I-04 HS-1101-11137 XI-1212-1037 TXA-1101-11137 XI-1101-137	0477 N/A
	"F.W." SHOULD BE "FDWTR"	I-04 ZI-1171-78 TXA-1171-78 PR-2222-1-4 HS-22147-1	0477 N/A
	"FEEDWTR" SHOULD BE "FDWTR"	I-05 HZ22201 HS-93317	0551 A-22
	"EM" SHOULD BE "EMERG"	I-05 FC-2239	0605 D-38
	"EM" SHOULD BE "EMERG"	I-05 PR-2267/FR-2239	0606 D-38
	"FW" SHOULD BE "FDWTR"	I-05 FR-2205	0610 D-37
	"PT" NOT IN DD-AAS-1	I-05 FC-2205	0611 A-29
	"PT" NOT IN DD-AAS-1	I-05 FC-2206	0624 A-30
	"FW" SHOULD BE "FDWTR"	I-05 FR-2206	0625 A-42
↓	"EM" SHOULD BE "EMERG"	I-05 FC-2240	0626 A-33

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ABBREVIATION	"EM" SHOULD BE "EMERG"	I-05 PR-2269 / FR-2240	0627 A-33
	"CONTR" SHOULD BE "CONT"	I-05 NONE	0629 N/A
	"CLT" SHOULD BE "CONT"	I-05 PC-2243	0635 A-27
	"PRIM" SHOULD BE "PRI"	I-05 PC-22129	0636 D-39
	"PRIM" SHOULD BE "PRI"	I-05 PC-22130	0640 E-52
	"CLT" SHOULD BE "CONT"	I-05 PC-2244	0649 A-32
	"CLT" SHOULD BE "CONI" "VAL" SHOULD BE "VA"	I-05 PDC-22127	0669 A-43
	"CHNGR" NOT IN DD-AAS-1	I-06A HS-31165	0742 D-84
	"CHNGR" NOT IN DD-AAS-1	I-06A HS-31166	0745 D-85
	"REHT" SHOULD BE "RHT" "EXC" SHOULD BE "EXCH" (ATTACHMENT SHEET)	I-06A HS-3203	0751 D-90
	"DIR", "DEC", "HT", "LG", "FR" - NOT IN DD-AAS-1	I-06A HS-3220	0752 D-89
	"REHT" SHOULD BE "RHT"	I-06A HS-5221	0756 D-90
	"MD" NOT IN DD-AAS-1	I-06A HC-31207	0761
	"REHT" SHOULD BE "RHT"	I-06A PC-5214	0762 F-61
	^{SP} "DEARATOR" SHOULD BE "DEARATOR"	I-06A HC-3175	0776 F-69
	^{SP} "DEARATOR" SHOULD BE "DEARATOR"	I-06A LIC-3175	0777 F-60
	"EMER" SHOULD BE "EMERG"	I-06A LIC-3145	0779 F-61
	"FD PUMP" NOT IN DD-AAS-1	I-06A HS-3107	0789
	"POS" NOT IN DD-AAS-1	I-06A ZR-5155	0800 B-65
✓	"DESUP" SHOULD BE "DESUPER"	I-06A HC-5208	0820 B-69

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ABBREVIATION	"DESUP" SHOULD BE "DESUPER"	I-06A TIC-5208	0821 B-69
	"DESUP" SHOULD BE "DESUPER"	I-06A HC-5207	0822 B-69
	"DESUP" SHOULD BE "DESUPER"	I-06A TIC-5207	0823 B-69
	"EMER" SHOULD BE "EMERG"	I-06A LIC-3251	0824 B-68
	"PRE" NOT IN DD-AAS-1	I-06A LC-22219	0829 B-70
	"PRE" NOT IN DO-AAS-1	I-06A LC-22220	0830 B-75
	"DISH" SHOULD BE "DISCH"	I-06A FI-3101	0834 C-75
	"DISH" SHOULD BE "DISCH"	I-06A PI-3104	0835 C-75
	"DISH" SHOULD BE "DISCH"	I-06A FI-3102	0842 B-78
	"DISH" SHOULD BE "DISCH"	I-06A PI-3105	0843 B-78
	^{SP} "DEARATOR" SHOULD BE "DEARATOR"	I-06A PI-5301	0850 E-96
	^{SP} "DEARATOR" SHOULD BE "DEARATOR"	I-06A LT-1192-1	0851 E-96
	"STR" SHOULD BE "STOR"	I-06A LI-3138	0867 E-99
	"STR" SHOULD BE "STOR"	I-06A LI-3141	0858 E-99
See Page 13	^{MH} "FISH" NOT IN DD-AAS-1	I-06A PI-5225	0867 E-96
See Page 13	^{MH} "FISH" NOT IN DD-AAS-1	I-06A FI-3119	0868 E-96
	"HEL" SHOULD BE "HE"	I-06A PI-5217	0870 F-12
	"EXP" NOT IN DD-AAS-1	I-06A GR-515Y	0879 B-76
	^{SP} "DEARATOR" SHOULD BE "DEARATOR"	I-06A PI-5328	0882 C-82
	"DR" SHOULD BE "DRN"; "FXC" SHOULD BE "FXCH"	I-06A	0893
✓	"FR": "LUB", "CLR", "SLV"; "TNR" NOT IN DD-AAS-1	TR-3115 (TMS)	B-72

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ABBREVIATION	*DR* SHOULD BE *DRN*	I-06A	0894
	"GID", "EXT" - NOT IN DD-AAS-1	TR-3118 (T96)	B-73
	"SPRY" + "POS" - NOT IN DD-AAS-1	I-06A ZI-5207	0898
	"SPRY" + "POS" - NOT IN DD-AAS-1	I-06A ZI-5208	0899
	"EXHST" SHOULD BE "EXH"	I-06A ZI-5251-Y	0912
	"EXT" NOT IN DD-AAS-1	I-06A ZI-5383	0913
	"EXT" NOT IN DD-AAS-1	I-06A ZI-5365	0914
	"EXHST" SHOULD BE "EXH"	I-06A ZI-5251-3	0915
	"EMER" SHOULD BE "EMERG"	I-06B HS-4221	0922 E-03
	"RHEOSTAT" NOT IN DD-AAS-1	I-06B HS-5116	0923 D-95
	"NON-ESS" NOT IN DD-AAS-1	I-06B HS-4133	0925 E-02
	"DEC" NOT IN DD-AAS-1	I-06B HS-4225	0928 E-02
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9226	0946 D-99
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9232	0947 E-01
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9230	0948 E-01
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9208	0949 D-99
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9247	0950 D-98
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9224	0951 D-98
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9236	0952 D-98
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9222	0953 D-97
✓	"SYNC" NOT IN DD-AAS-1	I-06B HS-9234	0954 D-97

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ABBREVIATION	"SYNC" NOT IN DD-AAS-1	I-068 HS-9220	0955 D-96
	"SYNC" NOT IN DD-AAS-1	I-068	0956
	"STNDBY" SHOULD BE "STDRY"	HS-9243	D-96
	"SYNC" NOT IN DD-AAS-1	I-068 HS-9208	0957 D-96
	"SYNC" NOT IN DD-AAS-1	I-068 HS-9206	0958 D-95
	"SYNC" NOT IN DD-AAS-1	I-068 HS-9204	0959 D-95
	"SYNC" NOT IN DD-AAS-1	I-068 HS-9202	0960 D-94
	"SYNC" NOT IN DD-AAS-1	I-068 HS-9279	0961 D-94
	"RHEOSTAT" NOT IN DD-AAS-1	I-068 HS-5117	0982 D-95
	"SYNC" NOT IN DD-AAS-1	I-068 XEF-9253	0993 F-28
	"COMP" SHOULD BE "COMPR"	I-068 HS-8219	0996 F-33
	"COMP" SHOULD BE "COMPR"	I-068 HS-8220	0998 B-41
	"POS" NOT IN DD-AAS-1	I-068 ZI-8221	1001
	"POS" NOT IN DD-AAS-1	I-068 ZI-8255	1002
	"POS" NOT IN DD-AAS-1	I-068 ZI-8217	1003
	"POS" NOT IN DD-AAS-1	I-068 ZI-8218	1004
	"BAT" SHOULD BE "BATT"	I-068 ZI-9298	1013
	"BAT" SHOULD BE "BATT"	I-068 ZI-9297	1015
	"PL" NOT IN DD-AAS-1	I-068 ZI-92235	1021
	"PL" NOT IN DD-AAS-1	I-068 ZI-92229	1024
	"COMP" SHOULD BE "COMPR"	I-068 HS-8211-3	1039

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ABBREVIATION	"COMP" SHOULD BE "COMPR"	I-06B HS-8201	1041
	"COMP" SHOULD BE "COMPR"	I-06B HS-8211-1	1042
	"COMP" SHOULD BE "COMPR"	I-06B HS-8211-2	1043
	"COMP" SHOULD BE "COMPR"	I-06B HS-92102	1063
	"COMP" SHOULD BE "COMPR"	I-06B HS-92101	1064
	"STNDBY" SHOULD BE "STDBY"	I-06B SS-9249	1072
	"STNDBY" SHOULD BE "STDBY"	I-06B SS-9245	1073
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9212	1080 E-69
	"SYNC" NOT IN DD-AAS-1	I-06B HS-9210	1081
	"SYNC" NOT IN DD-AAS-1	I-06B EI-9250	1089 B-16
	"STNBY" SHOULD BE "STDBY"	I-06B EI-9273	1101 B-36
	"STNDBY" SHOULD BE "STDBY"	I-06B II-9249	1112 B-29
	"STNBY" SHOULD BE "STDBY"	I-06B XVI-9248	1122 B-22
	"STNDBY" SHOULD BE "STDBY"	I-06B XFI-9248	1123 B-22
	"STNDBY" SHOULD BE "STDBY"	I-06B XFI-9244	1129 B-20
	"STNBY" SHOULD BE "STDBY"	I-06B XVI-9244	1130 B-18
	"SYNC" NOT IN DD-AAS-1	I-06B EI-9251	1133 B-17
	"STR" NOT IN DD-AAS-1	I-06B LI-4505	1139 F-22
	"STNDBY" SHOULD BE "STDBY"	I-06B ZI-92202-1 + -2	1143
✓	"SRV" SHOULD BE "SERV"	I-06B ZI-4220+PI-4224	1152 F-22

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
Abbreviation	"DEC HT" NOT IN DD-MAS-1	I-06B TI-4222	1153 E-22
	"DISCHG" SHOULD BE "DISCH"	I-09 HS-4258-2	1576 N/A
	"DISCHG" SHOULD BE "DISCH"	I-09 HS-4263-1	1577 N/A
	"DISCHG" SHOULD BE "DISCH"	I-09 HS-4263-2	1578 N/A
	"DISCHG" SHOULD BE "DISCH"	I-09 HS-4259-2	1579 N/A
	"DISCHG" SHOULD BE "DISCH"	I-09 HS-4261	1580 N/A
	"DISCHG" SHOULD BE "DISCH"	I-09 HS-4260	1581 N/A
	"DISCHG" SHOULD BE "DISCH"	I-09 HS-4263-2	1587 N/A
	"DISCHG" SHOULD BE "DISCH"	I-09 HS-4259-1	1589 N/A
	"SYN" NOT IN DD-MAS-1	NONE	N/A
	"SNT" NOT IN DD-MAS-1	I-10	1721
	"FW" SHOULD BE "FDWTR"	BIN 704 P.10 + -11	E-31
	"SNT" NOT IN DD-MAS-1	I-10	1724 + 1725
	"FW" SHOULD BE "FDWTR"	BIN 904 P.10 + -11	E-24
	"SNT" + "SG" NOT IN DD-MAS-1	I-10	1726 + 1727
"FW" SHOULD BE "FDWTR"	BIN 605 P.6, -7, -8	C-20	
"SNT" + "SG" NOT IN DD-MAS-1	I-10	1726	
"FW" SHOULD BE "FDWTR"	BIN 505 P.6, -7, -8	C-19	
"SNT" + "SG" NOT IN DD-MAS-1	I-10	1726	
"FW" SHOULD BE "FDWTR"	BIN 405 P.6, -7, -8	C-18	
"SNT" + "SG" NOT IN DD-MAS-1	I-10	1728	
"FW" SHOULD BE "FDWTR"	BIN 1005 P.6, -7, -8	E-44	
"RUPT" NOT IN DD-MAS-1	I-10	1732	
"FW" SHOULD BE "FDWTR"	BIN 406 P.4, -8, -10	C-17	
"RUPT" NOT IN DD-MAS-1	I-10	1733 + 1734	
"FW" SHOULD BE "FDWTR"	BIN 506 P.4, -8, -10	C-16	
"RUPT" NOT IN DD-MAS-1	I-10	1736	
"FW" SHOULD BE "FDWTR"	BIN 1006 P.4, -8, -10	C-11	
"RUPT" NOT IN DD-MAS-1	I-10	1738 + 1739	
"FW" SHOULD BE "FDWTR"	BIN 1206 P.4, -8, -10	A-69	

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
		I-10	1748 + 1749
ABBREVIATION	"LLT", "HLT", + "RWP" NOT IN DD-AAS-1	BIN 104	A-08
		I-10	1749 + 1750
	"LLT", "HLT", + "RWP" NOT IN DD-AAS-1	BIN 204	A-98
		I-10	1750 + 1751
	"LLT", "HLT" + "RWP" NOT IN DD-AAS-1	BIN 304	B-97
		I-13	1325
	"PL" NOT IN DD-AAS-1	HS-7218 P	F-32
		I-13	1326
	"SUPT" SHOULD BE "SUP"	HS-46227	N/A
	"ANALY" SHOULD BE "ANAL"	I-13	1330
	"TNK" SHOULD BE "TK"	HS-6342	N/A
	"ANALY" SHOULD BE "ANAL"	I-13	1341
	"TNK" SHOULD BE "TK"	HS-6341	N/A
		I-13	1342
	"TNK" SHOULD BE "TK"	HS-2443	E-78
		I-13	1350
	"TNK" SHOULD BE "TK"	HS-2444	E-78
		I-13	1358
	"TNK" SHOULD BE "TK"	HS-2445	E-78
		I-13	1366
	"TNK" SHOULD BE "TK"	HS-2446	E-83
		I-13	1369
	"TNK" SHOULD BE "TK"	HS-2438	E-83
		I-13	1384
	"HR" SHOULD BE "HDR"	HS-46247	N/A
		I-13	1385
	"HR" SHOULD BE "HDR"	HS-46245	N/A
		I-13	1398
	"FLR" NOT IN DD-AAS-1	HS-46241	N/A
		I-13	1399
	"FLR" NOT IN DD-AAS-1	HS-46239	N/A
		I-13	1400
	"FLR" NOT IN DD-AAS-1	HS-46237	E-75
		I-13	1411
	"ANALY" SHOULD BE "ANAL"	HS-93256	N/A
		I-13	1412
	"ANALY" SHOULD BE "ANAL"	HS-9316	N/A
		I-13	1416
✓	"FW" SHOULD BE "FDWTR"	FR-2222	E-07

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ABBREVIATION	"WST" NOT IN DD-AAS-1	I-14 RIS-6212	1776 A-17
	"SJAЕ" NOT IN DD-AAS-1	I-14 RIS-31193	1776 A-16
	"COMP" SHOULD BE "COMPR"	I-14 RIS-46211	1776 A-16
	"WST" NOT IN DD-AAS-1	I-14 RIS-6213	1778 A-15
	"COMP" SHOULD BE "COMPR"	I-14 RIS-46212	1778 A-15
	"RFLG FL" NOT IN DD-AAS-1	I-14 RIS-93252-1	1780 E-17
	"HSF" NOT IN DD-AAS-1	I-14 RIS-93251-3	1782 E-16
	"ANALY" SHOULD BE "ANAL"	I-14 RIS-93252-4	1782 E-16
	"REFL" NOT IN DD-AAS-1	I-14 RIS-93250-1	1782 E-15
	"HSF" NOT IN DD-AAS-1	I-14 RIS-93250-3	1782 E-15
	"RAD CHEM LAB" NOT IN DD-AAS-1	I-14 RIS-93251-8	1784 E-15
	"RLF" NOT IN DD-AAS-1	I-14 RIS-93252-12	1784 E-13
	"VO" NOT IN DD-AAS-1	I-14 RIS-93252-7	1786 E-13
	"RFLG" NOT IN DD-AAS-1	I-15 TI-7316	1156 N/A
	"REACT" SHOULD BE "RX"	I-15 ZI-4527-1	1168 N/A
	"COMP" SHOULD BE "COMPR"	I-15 MI-7322	1175 E-65
	"REACT" SHOULD BE "RX"	I-15 PDI-7319	1176 E-65
	"RFLG" NOT IN DD-AAS-1	I-15 FI-7320	1177 E-65
	"REACT" SHOULD BE "RX"	I-15 XRP-92188	1180 F-47
	"STNDBY" SHOULD BE "STDBY"	I-15	1181
✓	"STNDBY" SHOULD BE "STDBY"	XRP-92189	F-46

HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

ITEMS INVOLVED (CON'T)

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.	
ABBREVIATION	"STNDBY" SHOULD BE "STDBY"	I-15 XRP-92190	1182 F-46	
	"STNDBY" SHOULD BE "STDBY"	I-15 XRP-92191	1183 F-46	
	"STNDBY" SHOULD BE "STDBY"	I-15 XRP-92193	1184 F-48	
	"STNDBY" SHOULD BE "STDBY"	I-15 XRP-92194	1185 F-45	
	"STNDBY" SHOULD BE "STDBY"	I-15 XRP-92195	1186 N/A	
	"STNDBY" SHOULD BE "STDBY"	I-15 XRP-92196	1187 C-50	
	"STNDBY" SHOULD BE "STDBY"	I-15 XRP-92186	1194 F-48	
	"STNDBY" SHOULD BE "STDBY"	I-15 XRP-92187	1195 F-47	
	"RT" NOT IN DD-AAS-1	I-15 XRP-92131	1202 B-01	
	"RT" NOT IN DD-AAS-1	I-15 XRP-92130	1203 A-99	
	"RT" NOT IN OD-AAS-1	I-15 XRP-92129	1204 A-99	
	"SINMTI" NOT IN DD-AAS-1	I-15 XRP-92123	1209 C-98	
	"TB" NOT IN DD-AAS-1	I-15 XS-92223	1288 N/A	
	"BU" SHOULD BE "BKUP" "BLK" NOT IN DD-AAS-1	I-15 XS-92192	1291 N/A	
	"BLK" NOT IN DD-AAS-1	I-15 XS-93155	1292 N/A	
	"BLK" NOT IN DD-AAS-1	I-15 XS-92154	1293 N/A	
	"BLK" NOT IN DD-AAS-1	I-15 XS-92153	1294 N/A	
	"BU" SHOULD BE "BKUP" "BLK" NOT IN DD-AAS-1	I-15 XS-92156	1295 N/A	





PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0518

Form 344 22 422B

REVIEWER NAME <i>D. Glenn / S. Shafer / R. Moler</i>			DATE <i>11/28/83</i>
A. HED TITLE <i>INSTRUMENT LABELING</i>			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO
(1) HS-2187-3	IA Buffer He Supply Blt	I-02	
(1) HS-2188-3	IC " " " "	"	
(1) HS-2189-3	IB " " " "	"	
(1) HS-2190-3	ID " " " "	"	
(2) LI-21110	L.P. Separator Level	"	F-20
(2) LI-21119	L.P. Separator Level	"	F-19
(3) SM-21165/66 SM-21171/72	Speed Wobble Instr	I-10	E-42
<i>Reference Task Analysis - Circ Start up 11/28/83</i>			
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED)			
(1) <i>Hand switch legend tags are red, implying PPS action</i>			
(2) <i>Redundant readings displayed on different scales. (could be displayed on a single dual scale indicator)</i>			
(3) <i>He Circ Speed Wobble Instrument Modules do not have legend markings or Instr number tags</i>			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR			
<i>Circ Start-up 21-02</i>			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION ~~Hand~~ Hand switches listed for I-02 will be relabeled in accordance with DP-SWI-1. LI-21119 will be rescaled in accordance with DP-AIS-1. All instruments will be relabeled in accordance with DP-LAB-1 and LI-21118 will be detuned per CN 1884B. SM-21165/66 and SM-21171/72 label per DP-LAB-1 CN-1895 UCH 5/1/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0521

Form 344-22 4228

REVIEWER NAME <u>D. Glenn / S. Shofer / R. Moler</u>			DATE <u>11/28/83</u>
A. HED TITLE <u>Instrument (switch) Color Coding</u>			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO
① S-3 on CC-	<u>Cue Trip Reset</u>	<u>I-10, 1202 P1</u>	<u>C-06</u>
"	" " "	<u>I-10 1002 P1</u>	<u>C-09</u>
"	" " "	<u>I-10 602 P1</u>	<u>E-37</u>
"	" " "	<u>I-10 402 P1</u>	<u>E-35</u>
② S-3 pushbutton	<u>Loop Shutdown Modules</u>	<u>I-10 404 P5/6</u> <u>(typical)</u>	<u>E-20</u>
<u>Reference Task Analysis - Cue Start-up</u>			<u>11/28/83</u>
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED)			
① <u>S-3 Reset Buttons are part of trip light.</u> <u>need to be color coded per ^{DO} SW1-1 and</u> <u>appropriate legend tag supplied</u> ② <u>2nd S-3 Pushbutton only</u> <u>on</u> <u>loop shutdown Modules typically I-10 404 P5/6</u> <u>is not marked as a reset.</u>			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR			
<u>21-02 He Cue Aux System</u>			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED

*Operation of wrong - laminated pushbutton
(Failure to operate proper pushbutton)*

F. LIST THE CONSEQUENCES OF OPERATOR ERROR

Not resetting circ trips

G. CLASSIFICATION

H. CORRECTIVE ACTION OPTIONS

(1) Color code (Blue) pushbutton lens for ease of recognition

I. DISPOSITION

Change lens on pushbuttons per DD-SWI-1 & label per DD-LAB-1 CN-1895 WCH 5/11/86 Re-evaluated since light does indicate trip leave color as red & color patch ground to designate reset CN-1895 WCH 5/14/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0542

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

Form 344 22 4228

REVIEWER NAME <u>D. Glenn M. Maddox</u>			DATE <u>10-22-83</u>
A. HED TITLE <u>Instrument Scaling</u>			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO.
	<u>Log Power Channel 2 meters & Log Power</u>		
	<u>Log Power</u>	<u>I-10-103</u>	<u>B-99</u>
	<u>Log Power</u>	<u>I-10-203</u>	<u>A-05</u>
	<u>Log Power</u>	<u>I-10 303</u>	<u>A-06</u>
	<u>Start-up</u>	<u>I-10 102</u>	<u>C-01</u>
	<u>Start-up.</u>	<u>I-10 302</u>	<u>C-03</u>
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) <u>Log Power channel 2 meters have excess markings on scale, all in Red (Special markings lose significance when used excessively) Markings are also extremely wide and ambiguous.</u>			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR <u>Power operation</u>			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

*Rescale per DD-A15-1 CN-1895 WCH 5/1/86
Remove existing calibration marks on scale. Present
scale is acceptable for log meter. CN-1895 WCH 5/14/86*

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

Consent labeling

I. DISPOSITION

Correctly label per DD-LAB-1 CN-1895 w/H 5/1/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0562

Form 344-22 422B

REVIEWER NAME <u>J. KELEMEN</u>	DATE <u>1/30/84</u>
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A. HED TITLE INSTRUMENT SCALING

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO
PI-3338 PI-450 PI-8306 TI-4332	INDICATING METER DISPLAY	I-06 ↓ I-06	F-12, F-22, C-79
SIW-21169 SIW-21170		I-10	F-22
SIW-21170-1 SIW-21170-2	AIR(406) Psi/Inch		C-17
SIW-21166 SIW-21166-1 SIW-21166-2	AIR(256) Psi/Inch		C-16
SIW-21162 SIW-21162-1 SIW-21162-2	AIR(406) Psi/Inch		G-09
SIW-21163 SIW-21163-1 SIW-21163-2	AIR(1006) Psi/Inch		C-11
SIW-21165 SIW-21165-1 SIW-21165-2	AIR(1106) Psi/Inch		G-07
SIW-21161 SIW-21161-1 SIW-21161-2	AIR(1006) Psi/Inch		H-69

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) METER SCALES DO NOT HAVE ADDITIONAL HIERARCHIAL SUBDIVISIONS WHEN THERE IS MORE THAN 5 GRADUATIONS BETWEEN MAJOR INTERVALS. VIOLATES SCALE DIVISIONS WITH USUAL NUMERICAL PROGRESSION PRINCIPLE. (REFERENCE CRS-44-3 SURVEY)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Rescale A-5238 in accordance with DD-AIS-1 by
CN-1891 ~~EGH~~ 1/17/82
PI-4502, PI-8206, & TI-4222 rescale per DD-AIS-1
CN-1892 WGH 2/25/86
I-10 meters not operator used indicators - no further
action WGH 5/1/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0563

Form 344-22-4228

REVIEWER NAME <u>J. KELEMEN</u>	DATE <u>1/30/84</u>
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A. HED TITLE INSTRUMENT SCALING

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
	<u>INDICATING METER DISPLAY</u>	<u>I-10</u>	
<u>MIS-1122 AIN(403) P10/11</u>			<u>E-34</u>
<u>MIS-1181 AIN(503) P10/11</u>			<u>E-33</u>
<u>MIS-1120 AIN(603) P10/11</u>			<u>G-02</u>
<u>MIS-1115 AIN(703) P10/11</u>			<u>E-23</u>
<u>MIS-1119 AIN(803) P10/11</u>			<u>E-60</u>
<u>MIS-1116 AIN(1003) P10/11</u>			<u>E-30</u>
<u>MIS-1117 AIN(1103) P10/11</u>			<u>E-29</u>
<u>MIS-1118 AIN(1203) P10/11</u>		<u>I-10</u>	<u>E-28</u>

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) METER SCALES DO NOT HAVE ADDITIONAL HIERARCHICAL SUBDIVISIONS WHEN THERE IS MORE THAN 5 GRADUATIONS BETWEEN MAJOR INTERVALS. VIOLATES SCALE DIVISIONS WITH USUAL NUMERICAL PROGRESSION PRINCIPLE. (REFERENCE CRS-44-3 SURVEY)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *No action - not operator used indicators*
WCH 5/1/81

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0568HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22 4228

REVIEWER NAME			DATE
J. KELEMEN			1/31/84
A. HED TITLE <u>INSTRUMENT SCALING</u>			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO
<u>TSM-22136 BW(105) P10</u>	<u>INDICATING METER DISPLAY</u>	<u>I-10</u>	<u>B-96</u>
<u>TSM-22137 BW(105) P10</u>			<u>B-95</u>
<u>TSM-22135 BW(105) P10</u>			<u>B-94</u>
<u>TSM-22133, TSM-1176</u> <u>TSM-1150-1</u> <u>TSM-1172 BW(106) P10/4/6</u>			<u>B-93</u>
<u>TSM-22134, TSM-1177</u> <u>TSM-1150-1</u> <u>TSM-1173 BW(106) P10/4/6</u>			<u>B-92</u>
<u>TSM-22132, TSM-1175</u> <u>TSM-1150-1</u> <u>TSM-1171 BW(106) P10/4/6</u>			<u>B-91</u>
<u>TSL-22102 BW(105) P6</u> <u>TSL-22104 BW(105) P6</u> <u>TSL-22104 BW(105) P6</u>			<u>C-20, C-19, C-18</u>
<u>TSL-22103 BW(105) P6</u> <u>TSL-22105 BW(105) P6</u> <u>TSL-22101 BW(105) P6</u>		<u>I-10</u>	<u>E-44, E-06, A-69</u>
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) <u>METER SCALES DO NOT CONTAIN ANY GRADUATION MARKINGS OR NUMERICS ON LOWER PORTION OF THE SCALE. (REFERENCE CRS-44-3 SURVEY) NOTE: THE INDICATOR HAS NO LOWER VALUES BECAUSE THE THERMOCOUPLE IS BELOW ITS FUNCTIONAL AND OPERATING RANGE.</u>			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION

*No action - not operator used indicators
5/1/86 WGH*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0572

Form 344 22 4228

REVIEWER NAME <u>J. KELEMEN</u>	DATE <u>1/31/84</u>
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A. HED TITLE INSTRUMENT SCALING & USEABILITY

P ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO.
LI-4505	INDICATING METER DISPLAYS ↓	I-06	
PI-8206		I-06	F-22, C-79
PI-1130		I-13	A-93
MIS-1200 BIN (603) P1/9 MIS-1201 BIN (503) P8/9 MIS-1202 BIN (403) P1/9		I-10	G-2, E-33, E-34
MIS-1115 BIN (703) P1/9 MIS-1116 BIN (703) P2/9 MIS-1117 BIN (703) P3/9 MIS-1118 BIN (703) P4/9 MIS-1119 BIN (703) P5/9 MIS-1120 BIN (703) P6/9 MIS-1121 BIN (703) P7/9 MIS-1122 BIN (703) P8/9 MIS-1123 BIN (703) P9/9		I-10	E-23, E-60, E-30
MIS-1112 BIN (1203) P1/9 MIS-1113 BIN (1203) P2/9 MIS-1114 BIN (1203) P3/9 MIS-1115 BIN (1203) P4/9 MIS-1116 BIN (1203) P5/9 MIS-1117 BIN (1203) P6/9 MIS-1118 BIN (1203) P7/9 MIS-1119 BIN (1203) P8/9 MIS-1120 BIN (1203) P9/9		I-10	E-29, E-28, C-18
MIS-1110 BIN (1003) P1/9 MIS-1111 BIN (1003) P2/9 MIS-1112 BIN (1003) P3/9 MIS-1113 BIN (1003) P4/9 MIS-1114 BIN (1003) P5/9 MIS-1115 BIN (1003) P6/9 MIS-1116 BIN (1003) P7/9 MIS-1117 BIN (1003) P8/9 MIS-1118 BIN (1003) P9/9		I-10	C-19, C-20, E-44
MIS-1110 BIN (1003) P1/9 MIS-1111 BIN (1003) P2/9 MIS-1112 BIN (1003) P3/9 MIS-1113 BIN (1003) P4/9 MIS-1114 BIN (1003) P5/9 MIS-1115 BIN (1003) P6/9 MIS-1116 BIN (1003) P7/9 MIS-1117 BIN (1003) P8/9 MIS-1118 BIN (1003) P9/9		I-10	G-06, A-69
ALL METERS IN BINS 103, 203, 303, 403		I-14	A-17, A-16, A-15, A-14

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) DISPLAYS DO NOT HAVE NUMERALS ON BOTH ENDS OF THE SCALE. NOTE I-10 INDICATORS HAVE NO NUMERICAL LOWER VALUES BECAUSE THE THERMOCOUPLE OR OTHER DEVICE IS BELOW ITS FUNCTIONAL AND OPERATING RANGE.

(REFERENCE CRS-46 SURVEY)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *LI-9505 & PI-8206 reread per 7D-415-1 CN-1892*
WGH 2-25-86
I-10 no action - not operator used indicators
SH/BL WGH

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO
 FORT ST. VRAIN NUCLEAR GENERATING STATION
 HUMAN ENGINEERING DISCREPANCY EVALUATION
 HEDE - 1

Log Number 0573

Form 344 22 4228

REVIEWER NAME <u>J. KELEMEN</u>	DATE <u>1/31/84</u>
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A. HED TITLE INSTRUMENT SCALING & USEABILITY

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO.
<u>NSP-1131-1 DIN(102)</u> <u>NSP-1132-1 DIN(102)</u>	<u>PPS INDICATING METER DISPLAYS</u>	<u>I-10</u>	<u>C-01, C-03</u>
<u>NSP-1133-1 DIN(103)</u> <u>NSP-1134-1 DIN(103)</u> <u>NSP-1135-1 DIN(103)</u> <u>NSP-1136-1 DIN(103)</u>			<u>B-99, A-05, A-06</u>
<u>FIN-2216-1 DIN(105) P10</u> <u>FIN-2217-1 DIN(105) P10</u> <u>FIN-2218-1 DIN(105) P10</u>			<u>B-96, B-95, B-94</u>
<u>ESN-4228</u>			<u>B-94</u>
<u>FIN-1170-1 DIN(106) P1</u> <u>FIN-1171-1 DIN(106) P2</u> <u>FIN-1172-1 DIN(106) P4</u>			<u>B-93</u>
<u>FIN-1173-1 DIN(106) P6</u> <u>FIN-1174-1 DIN(106) P7</u> <u>FIN-1175-1 DIN(106) P8</u>			<u>B-92, B-93</u>
<u>FIN-1176-1 DIN(106) P4</u> <u>FIN-1177-1 DIN(106) P6</u> <u>FIN-1178-1 DIN(106) P7</u> <u>FIN-1179-1 DIN(106) P8</u> <u>FIN-1180-1 DIN(106) P9</u> <u>FIN-1181-1 DIN(106) P10</u>			<u>B-92, B-91</u>
<u>FIN-1182-1 DIN(106) P4</u>			<u>B-91</u>

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) INDICATOR SCALES HAVE NO LOWER NUMERALS BECAUSE THE THERMOCOUPLE OR OTHER DEVICE IS BELOW ITS FUNCTIONAL OR OPERATING RANGE.

(REFERENCE CRS-46 SURVEY)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR _____

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *No action required - not operator used indicators.*
WCH 5/16/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22-4228

REVIEWER NAME <u>J. KELEMEN</u>	DATE <u>1/31/84</u>
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A. HED TITLE INSTRUMENT SCALING + USEABILITY

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.	
SCRAM BEARS PWR SUPPLY #1 VOLTS METER AMPERES METER	PPS INDICATING METERS ↓	I-10 ↓		
SCRAM BEARS PWR SUPPLY #2 VOLTS METER AMPERES METER				
ISN-938700 SW(406) P8				C-17
ISN-938700 SW(150) P8				C-16
ISN-938700 SW(106) P8				G-09
ISN-938548 TRM. ISN-938570 AIN(105) PS/19/11				C-21
ISN-938560 SW(104) P9				E-21
ISN-938560 SW(100) P11				E-26
ISN-938570 SW(110) P11				E-26
ISN-938570 SW(110) P9				C-11
ISN-938710 SW(100) P8				G-07
ISN-938710 SW(106) P8				A-69
ISN-938710 SW(200) P8				
ISN-938710 SW(200) P8				

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) PROCESS ON ENGINEERING UNITS ON METER SCALES ARE NOT CONSISTENT WITH THE REQUIRED PARAMETER. DISPLAYS SHOULD HAVE SCALES FOR WAKH UNITS OR RATE, VOLUME, ETC., ARE CONSISTENT, AT LEAST WITHIN SYSTEM.
(REFERENCE CRS-46 SURVEY)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *No action - not operator used indicators*
WCH 5/1/81

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0531

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22 4228

REVIEWER NAME J KELEMEN	DATE 1/31/84
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A. HED TITLE INSTRUMENT SCALING

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO.
1) XPI-5119	INDICATING METER DISPLAYS	I-06A	C-89
2) 9TH STAGE PRESSURE METER (EHC PANEL)	↓	I-06A	
3) COUNTS PER SECOND + PERCENT POWER METERS		I-10	
BINS (A2, 103, 203, 302 AND 303).			C-01, B-99, A-05, C-03, A-06

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) 1) METER SCALE ON XPI-5119 HAS A RED ABNORMAL OPERATING RANGE MARKING. 2) 9TH STAGE PRESSURE METER HAS GRAYISH BLUE BACKGROUND ON METER FACE. 3) THESE INDICATORS HAVE SOME MARKINGS IN RED, THE QUESTION ASKED ON CRS 48-1 WAS DO METERS HAVE BLACK MARKINGS ON A WHITE BACKGROUND.

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

XPI-5119 determined to be acceptable as is - bonded scale meter acceptable for Hydrogen 2. 8th stage pressure indicator plastic face has slightly different tint than adjacent indicators. Determined to be acceptable as is. *WCH 1/17/86*

I. DISPOSITION *XPI-5119 determined to be acceptable as is - bonded scale meter acceptable for Hydrogen 2. 8th stage pressure indicator plastic face has slightly different tint than adjacent indicators. Determined to be acceptable as is. WCH 2-9-86*
I-10 rescale per DD-AHS-1 CN 1895 WCH 5/1/81
I-10 meters re-evaluated - No action required. Not operator used indicators. WCH 5/16/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION _____

Install new dial cards per DD-AIS-1 by CN-1891 ~~1/20/86~~ 1/20/86
for PDI-22229/30, PI-8212, Lead set & Rated Press Indicators
Lead set & Rated pressure indicators ~~will~~ to be provided
with functional label which indicates that steam quality affects
reading. ~~1/22/86~~ 1/22/86 PI-8212, PI-8206, KI-9244 & 9249
rescale per DD-AIS-1 WCH 2-25-86
I-10 No action - not operator used indicators WCH 5/1/86

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *No action - not operator used meters.
WAF 5/1/81*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0559

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22 4228

REVIEWER NAME J. KLEMMEN	DATE 2/1/84
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A. HED TITLE **INSTRUMENT SCALING**

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO PHOTO NO
EI-9250.	INDICATING METER DISPLAY	I-06B	B-16
EI-9251.			B-17
EI-92217.			A-38
EI-92218.			A-38
EI-92219			
EI-92220.			B-80
EI-92221.			B-23
EI-92222			B-29
II-9267.			B-30
II-9268.			B-33
KI-9257.			B-34
KI-9258.			B-35
KI-9259.			B-34
XFI-9257.			B-35
KI-9244.			I-10
BOTH METERS IN BINS (105, 205, 305)			B-96, B-95, B-94

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) **CIRCULAR TYPE METERS DO NOT HAVE 4 OR LESS GRADUATION MARKS BETWEEN NUMERALS ON THE CENTER 2/3 OF THE SCALE. DISPLAYS SHOULD SCALE DIVISIONS WITH USUAL NUMERICAL PROGRESSIONS.**

(REFERENCE CRS 52-3 SURVEY)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *All I-06B meters rescale per DD-1AS-1 CN-1892
WCH 2-25-86.*

*I-10 rescale both meters per DD-AIS-1 CN1895
WCH 5/1/86 Re-evaluated meters are not used by
operators. Duplicate info. on I-03 for operator use. No
Further action. WCH 5/19/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0590

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22-4228

REVIEWER NAME <u>J. KELEMEN</u>	DATE <u>2/1/84</u>
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A. HED TITLE INSTRUMENT SCALING

B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO
<u>DPM METERS IN BINS 102, 103, 204, 302, 303</u>	<u>INDICATING METER DISPLAYS</u>	<u>I-10</u>	<u>C-01, B-99, B-98, C-03, A-06</u>

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) CIRCULAR TYPE METERS DO NOT HAVE ADDITIONAL HIERARCHIAL SUBDIVISIONS WHEN THERE IS MORE THAN 5 GRADUATIONS BETWEEN MAJOR INTERVALS.
(REFERENCE CRS 5.2-3 SURVEY)

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Rescale per DDMS-1 CN 1895 WCH 5/1/84*
Re-evaluated Hed generated as a response to a standard
survey question. Does not apply to log meters.
WCH 5/19/85

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0592

HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

Form 344-22 4228

REVIEWER NAME J. KELEMEN			DATE 2/1/84
A. HED TITLE INSTRUMENT SCALING			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
ME-9306	INDICATORS ↓	I-05	C-95 E-34 E-33 G-02 E-23 E-60 E-30 E-29 E-28
ME-9307		I-05	
MIS-1133 BIN 403 P9/9		I-10	
MIS-1131 BIN 503 P9/9		↓	
MIS-1120 BIN 603 P9/9			
MIS-1115 BIN 703 P9/9			
MIS-1119 BIN 903 P9/9			
MIS-1116 BIN 1003 P9/9			
MIS-1117 BIN 1103 P9/9			
MIS-1118 BIN 1203 P9/9	I-10		
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) BIN/MODULE INDICATORS HAVE DUAL METER SCALES, VIOLATES PRINCIPLE; INDIVIDUAL DISPLAYS SHOULD HAVE ONLY ONE SCALE.			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *ME-9306/07 subject to Removal by CN-1871 (non-CRDR change)*
RJH 1/30/86
I-10 No action - not operator used indicators W/H 5/1/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0597

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

Form 344-22-4228

REVIEWER NAME <u>D. Glenn</u>	DATE <u>2/3/84</u>
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A. HED TITLE Instrument Labeling

B. ITEMS INVOLVED

ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
HS-1131-2	Channel Select	I-03	C-51
HS 1133-1	Channel Select	I-03	C-52
NI-1131-2;	Rate of Change	I-03	D-67
NI-1132-2,	Long & Power channels	↓	D-67
NI-1133-2,3,-1			C-72, D-68, C-73
NE-1134-2,3,-1			C-72, D-68, C-73
NI-1135-2,3,-1			C-72, D-68, C-73
N-1136,37,38	Power Range		C-73

C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) These Nuclear Instruments Marked in Arabic I=10 Start up, Wide range of Power (Nuclear Channels) are marked in Arabic numbers, while the corresponding references on I-03 are in Roman numerals.

4/2/85

D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Maintain Roman numerals on I-03 & change arabic numerals on I-10 to Roman (CN 1895). This is consistent with industry practice 11-7-85 WCH*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Change button & ring per DD-SWI-1 CN 1895
WCH 5/1/86 Assign instrument numbers to KS-700
& KS-900 CN-1895 WCH 5/19/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *TR2255 & TR2227 removed from I-01 - The function of these recorders is to monitor Steam Generator temperatures during bail-out. A new graphics display (situational display) is being proposed for I-01, with these recorders serving as hard-copy back-ups. The information derived from these recorders is trend type with the important information being a single point denoting from the other 11 points, therefore 12 points being printed together is desirable for this particular application.*

(Continued on ATTACHED SHEET)

TEAM MEMBER SIGNATURE	TEAM ACTION	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager			
CRDR Coordinator			
Human Factors Spec.			
Senior Reactor Operator			

HED 0658 RESOLUTION CONTINUED

TR-3115, TR3118, FR-2222, & TR2232 ARE BEING REPLACED BY ALTERNATE INDICATION AND MOVED TO IO9 TO BE USED FOR HISTORICAL INFORMATION. TR-2321 IS BEING REMOVED FROM THE CONTROL ROOM. CR-5154, TR-5154 & TR-92105 ARE USED TO MONITOR PLANT PARAMETERS, ~~HOWEVER REQUIRED~~ ^{NOT} ~~REQUIRED ON A CONTINUED BASIS~~ ^{THE} FROM WHICH PLANT ADJUSTMENTS ARE MADE, HOWEVER NOT REQUIRED ON A CONTINUED BASIS ⇒ THE RESOLUTION FOR THESE IS ADEQUATE. M. K. Hulevan 11/22/85

TR-1192 USED BY RESULTS ONLY. NO REQUIRED BY OPERATOR. NO FURTHER ACTION WCH 5/1/86

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Label per DD-LAB-1 CN 1875 NCH 5/1/81*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Changed on CN-1882 WCA 5/1/86*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Change per DD-SWI-1 CN-1895 WCH 5/1/81*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Label per DD-LRB-1 CH 1895 WCH 5/1/81*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

I. DISPOSITION *Functionally label per DD-LAB-1 CN 1895*
WCH 5/1/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

ATTACHMENT B
SAMPLE COPIES
OF
INVESTIGATIVE INFORMATIONAL RECORDS



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 089

INVESTIGATIVE INFORMATIONAL RECORD

Sh. 1 of 1

Investigator's Name William C. Holmes DATE May 14, 1986

Problem Description: Nuclear Fox Meters on I-10

ITEMS INVOLVED

ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.
	<u>I-10</u>			

Questions: How do you use these meters? Are they a results item?

Responses (Include Respondent's Name) Bob Kevan
We are required by a surveillance to read them once a day. I find the log meters are difficult to read. Mainly used by results for calibration. We use the meters on I-03

Provide Conclusion on separate or final sheet.

William C. Holmes 5/14/86
Signature Date



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 090

INVESTIGATIVE INFORMATIONAL RECORD

Sht 1 of 1

Investigator's Name William C. Holmes DATE May 15, 1986

Problem Description: Initial Review of I-10 Control Board proposed Changes by Control Room Systems Review Group 5/1/86

ITEMS INVOLVED

ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.

Questions: General comments on proposed changes.

Responses (Include Respondent's Name) Like labeling XCRs, but I don't think you'll be able to include Functional labeling. Will be too small of lettering & chopped abbreviations w. Ashmore

We need more than just a "Reset" label on 53 switches to aid operator. D. Hood

Provide Conclusion on separate or final sheet.

William C. Holmes 5/15/86
Investigator's Signature Date



PUBLIC SERVICE COMPANY OF COLORADO
FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number CGI

INVESTIGATIVE INFORMATIONAL RECORD

Sht 1 of 1

Investigator's Name

William C. Holmes

DATE

5/16/86

Problem Description:

Final review of I-10 control board
proposed changes by Control Room System Review
Group 5/15/86

ITEMS INVOLVED

ITEM	LOC.	DESCRIPTION	E-1203	P & I NO.

Questions:

General comments on proposed changes

Responses (Include Respondent's Name)

Marty Denistan

would like to see reset on Penetration Drain
modules highlighted. They are not a critical reset
function, but they are a latched control requiring
reset and are presently difficult to locate.

(These modules are located at 406, 606, 1006,
& 1206 P1 & P7 WCH)

Provide Conclusion on separate or final sheet.

William C. Holmes

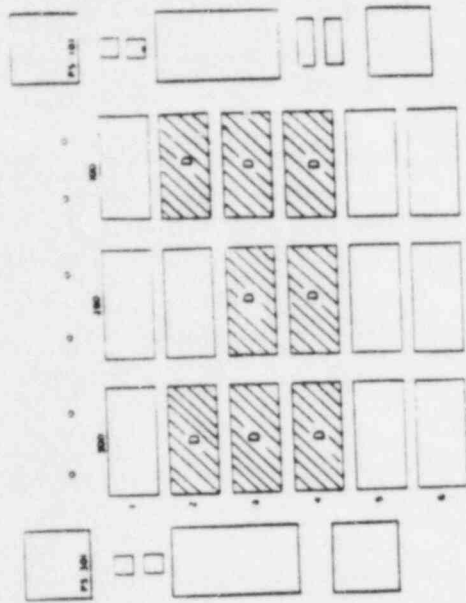
Investigator's Signature

5/16/86

Date

ATTACHMENT C
 Examples of
 Proposed Location
 Aids & Labeling

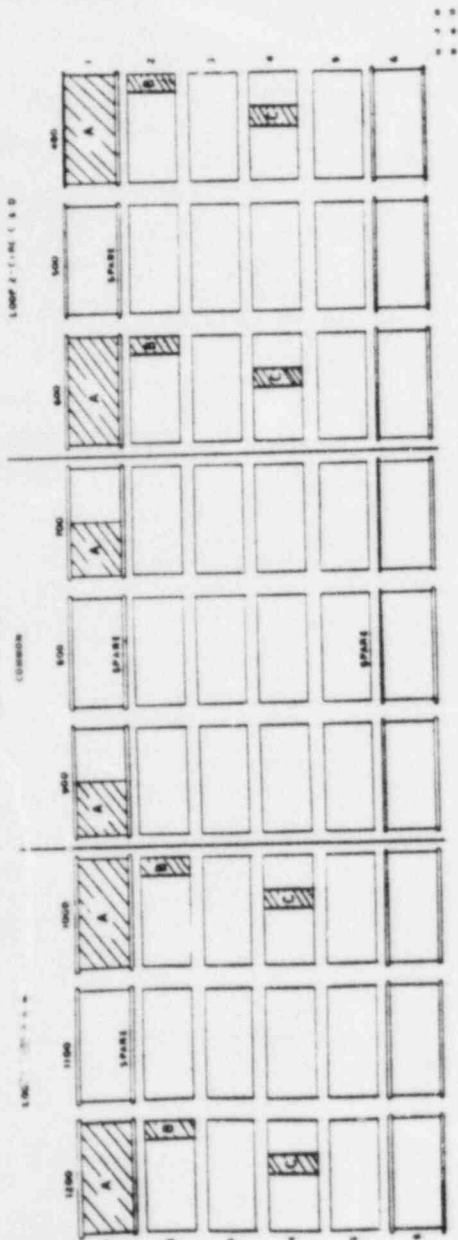
1-9310
 MCRAM PPS



NOTES:

1. Proposed Hierarchical Labels Shown
2. Shaded Areas Represent Those Areas Subject to Identification and Marking Changes
3. For Specific Module Details, See Attached Detail Sheets

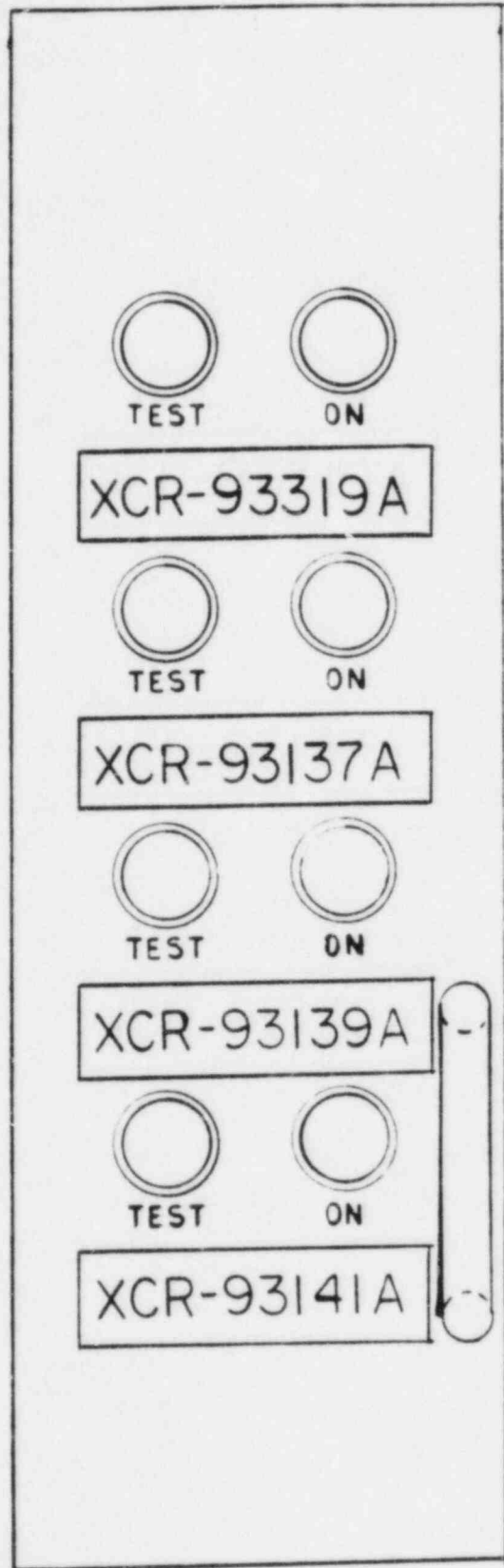
1-9310
 LAMP & LAMP PPS
 COMMON



ATTACHMENT C

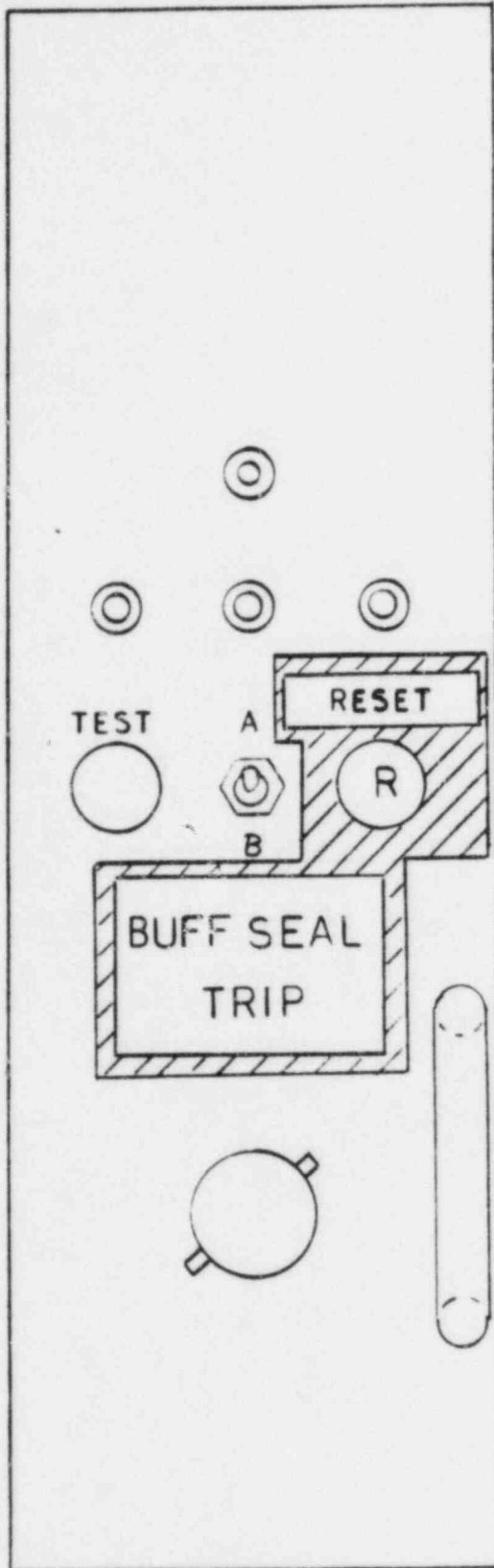
Detail A

Typical for all XCR Relay
Relay Drivers. Operational
Aid to Provide Function &
Reset Information

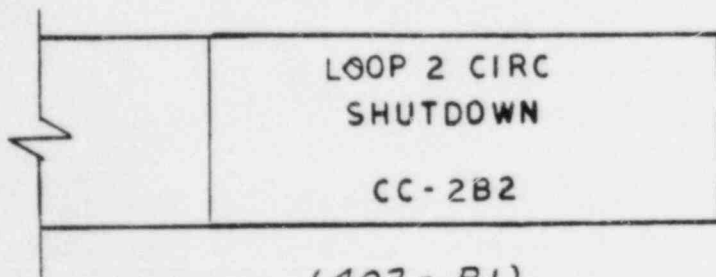


ATTACHMENT C
Detail B

Typical for 402, 602, 1002,
& 1202 P1



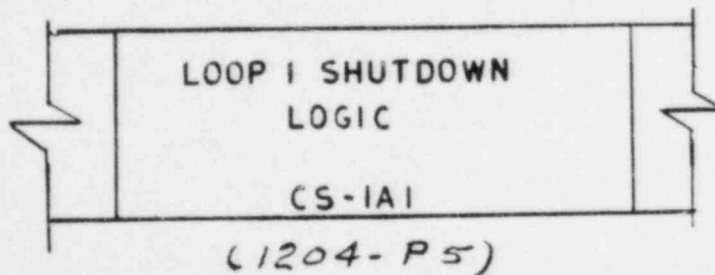
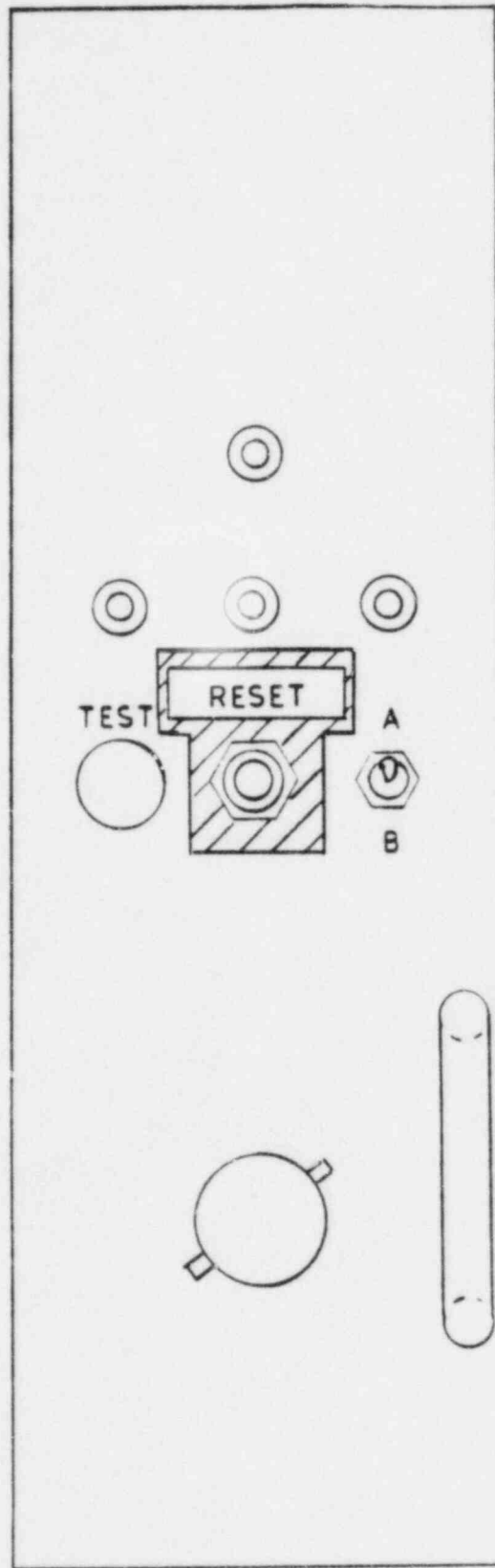
Function Label Not to Scale



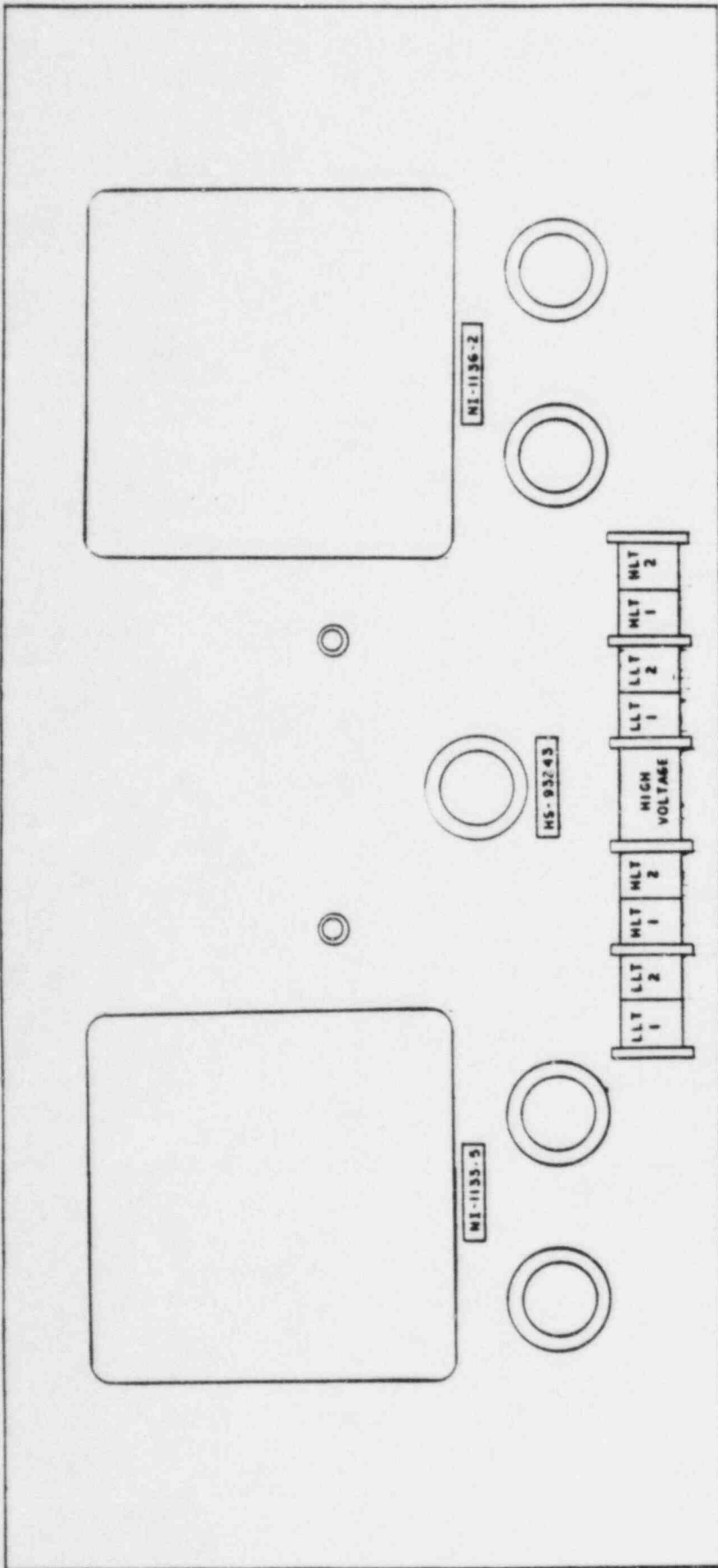
(402 - P1)

ATTACHMENT C
Detail C

Typical for 404, 604, 1004,
& 1204 P5



ATTACHMENT C
Detail D



POWER RANGE CHANNEL III	NSH-1133-3 NSH-1133-4 NSH-1133-5 NSH-1133-6	LLT 1 LLT 2 HLT 1 HLT 2	6% RWP 29% RWP RWP SCRAM	POWER RANGE CHANNEL VI
----------------------------	--	----------------------------------	-----------------------------------	---------------------------

Provide Instrument Label
for Meters & RWP Switch.
Increase Height of Bin
Label to 1 1/4" and In-
crease Letter Size to
5/32".

ATTACHMENT D
SUMMARY OF
PROPOSED CHANGES TO
I-9310

1. Provide location aids for logic reset functions on modules:

402 P1/2 CIRC SEAL TRIP
602 P1/2 CIRC SEAL TRIP
1002 P1/2 CIRC SEAL TRIP

404 P5/6 Loop Shutdown Logic
606 P5/6 Loop Shutdown Logic
1006 P5/6 Loop Shutdown Logic
1206 P5/6 Loop Shutdown Logic

406 P1, P7 Main Drain to Steam Water Drain Trips
606 P1, P7 Main Drain to Steam Water Drain Trips
1006 P1, P7 Main Drain to Steam Water Drain Trips
1206 P1, P7 Main Drain to Steam Water Drain Trips

2. Provide instrument labels to identify XCR outputs.
3. Provide instrument number identification labels for Rod Withdrawl Prohibit Selection Switch on Nuclear Instrumentation bins 104, 204, and 304.
4. Correct labels with functional description discrepancies.
5. Add missing functional labels.
6. Provide demarcation and hierarchial labeling as practical.

ATTACHMENT E

SAMPLE OF LABEL LIST

I-9310

LABELING LEGEND LIST

CONTROL BOARD #	INSTRUMENT #	STYLE	FUNCTIONAL LABEL	STYLE	HED # (if applicable)
I-10			I-9310	1 RED	014
↑			LOOP # CIRC PPS	2 RED	
			LOOP 1 - CIRC A & B	3 RED	
	XCR-93319A	8b RED			
	XCR-93137A	↑			
	XCR-93139A				
	XCR-93141A				
	XCR-93321A				
	XCR-93149A				
	XCR-93151A				
	XCR-93153A				
	XCR-93159A				
	XCR-93165A				
	XCR-93239A				
	XCR-93329A				
	XCR-93163A				
	XCR-93167A				
↓	XCR-93241A	↓			
I-10	XCR-9331A	8b RED			

LABELING LEGEND LIST

CONTROL BOARD #	INSTRUMENT #	STYLE	FUNCTIONAL LABEL	STYLE	HED # (if applicable)
I-10	XCR-93161A	8b RED			
↑	XCR-93367A	↑			
	XCR-93503A				
	XCR-93195A				
	XCR-93197A				
	XCR-93199A	↓ 8b			
	XCR-93216A	RED			
				10	
			RESET		
				9	
			CIRC SEAL MALFUNCT		
				10	
			RESET		
	NI-1133-5	11a RED			
	NI-1136-2	↑ ↓			
	HS-93243	11a RED			
	XCR-93319B	8b RED			
	XCR-93137B	↑			
	XCR-93139B				
	XCR-93141B				
↓	XCR-93321B	↓			
I-10	XCR-93149B	8b RED			

SUPPLEMENT
to
ATTACHMENT 9

ATTACHMENT 9
 HEDs Having
 Final Dispositions Different From The
 Proposed Disposition Shown In Attachment B
 Of The Summary Report

HED	PROBLEM CLASSIFICATION	ORIGINAL DISPOSITION	FINAL DISPOSITION	REMARKS
0319	Labeling	Label	None	Bins 1102 & 1202 are not operator used controls
0320	Labeling	None	Relabel	Relabel 1203 bin
0323	Labeling	None	Relabel	Relabel entire bin
0359	Instrument	Change-out	Label	Label and enhance location of operator used controls
0362	Labeling	None	Label	Label operator used controls
0521	Instrument	Change-out	Label	Label and enhance location of operator used controls
0589	Instrument	Rescale	Evaluated	Not an operator used indicator-No further action required
0590	Instrument	Rescale	Evaluated	HED initiated in response to standard checklist item-Not applicable to log scale
0597	Labeling	None	Relabel	Labeling on I-03 CN-1887 unchanged-Change Arabic numbers on I-10 to Roman numerals

ATTACHMENT 6b-19

SUMMARY OF THE
CONTROL ROOM IMPROVEMENT
DESIGN PROCESS
AS APPLICABLE TO
THE ANNUNCIATOR SYSTEM
(MISCELLANEOUS ALARM MODIFICATIONS)

FOREWORD - NUREG-0737 Supplement 1, Section 5.1b requires that a Control Room Design Review (CRDR) be conducted to identify human engineering discrepancies. Section 5.1c requires that these discrepancies be assessed and design improvements selected to correct these discrepancies.

Public Service Company (PSC) has conducted the required review of the Fort St. Vrain Control Room. Approximately eight hundred forty eight (848) discrepancies or classes of discrepancies were cited. These discrepancies were assessed to determine their potential for causing an operating error and the potential effect of any error. (Certain discrepancies are known to have caused errors). An improvement program has been selected which meets the regulatory requirements and proposes to improve the operability and functionality of the Control Room.

The regulatory requirement for the CRDR and the follow-on improvement program was directed toward the improved handling of emergencies and not specifically toward improved production. Public Service Company's improvement program is directed toward both normal operation and the handling of emergencies.

BACKGROUND - Public Service Company has initiated an integrated improvement program based on functionality rather than particular classifications of problems. This approach is first, one of determining functional groupings, followed by demarcating, hierarchial labeling, correcting indicator scaling, complying with established conventions (color coding, switch positions, etc.).

The following steps constituted the planning portion of the integrated improvement program.

- Elevation Drawings of each control panel were color coded to show applicable HEDs as either, relabeling, relocations, scaling, deletions, or equipment changeout. This scheme provides an overview of the problems documented on each control board.
- All HEDs involving Alarm Locations, and multipoint alarms were reviewed. System function and operator response were considered in grouping, deleting and adding alarms. Paste ups of all alarm panels were completed to show proposed rearrangements.
- Functional grouping of controls and indications was approached by first preparing point interaction sketches for various systems or by direct reference to system P&Is. This effort was, in effect, an extensive operational analysis which considered the dynamic considerations of control groups and

arrangements. This activity reviewed the purpose and use of each and every component on the main control boards. Interviews with operators and training personnel were conducted to determine operator interpretations and actions.

- Controls and indications were then arranged in functionally related groups. Associated alarm locations were rechecked to verify that the more desirable locations were selected. The function relationship of adjacent indicator and control groupings were reviewed.
- Revised drawings were prepared to show the proposed arrangements. Certain of these drawings were color coded to aid in differentiating between groupings. These drawings were then utilized to determine the scope of each change package (change notice).
- Change notice (CNs) numbers were assigned to each effort identified above.

IMPROVEMENT PROCESS METHODOLOGY

The Improvement Process for the annunciator system starts with the documentation and drawings produced during the improvement planning process described in the BACKGROUND presentation portion of this summary. An individual designer was assigned the responsibility of evaluating the annunciator system. Since this individual had not participated in previous efforts, an educational process was initiated to acquire a thorough understanding of the annunciator system and each alarm. System descriptions, Piping & Instrument diagrams, electrical drawings, operating procedures and O & M manuals were studied to gain this thorough understanding. An operational analysis was conducted for the system. (This in-depth analysis was in addition to that completed for the CRDR and planning purposes.) This Operational Analysis provided additional basis for determining any changes to the annunciator control switches.

Operating and training personnel were interviewed to solicit operational philosophies for the annunciator system. The Operational value and function of each alarm was addressed. Informational requirements were again discussed. (This informational requirements effort is in addition to that conducted for Emergency Operating Procedures task analysis).

All HEDs applicable to the annunciator system were reviewed and the tentative fix evaluated for its corrective value within the integrated approach. HEDs written against the alarms and control switches by the Emergency Operating Procedure task analysis "Information and Control Requirements" effort, were reviewed with

particular attention to any potential safety considerations. Any previously prepared investigative information was studied. All factors were evaluated in considering any changes to the system.

SPECIFIC - Miscellaneous Alarm Modifications Synopsis - (Change Notice (CN)-1925 preparation package.)

Research - During this phase, the fire alarms and the annunciator system were studied as listed below:

1. Abstracts of the fire protection/detection system were reviewed.
2. The control room was surveyed to obtain a complete list of audio alarm horns, bells, etc.
3. Applicable HEDs were reviewed.
4. Operators and trainers were interviewed to determine the need/response to special audio alarms.
5. Operators and trainers were interviewed to determine operational needs of the fire protection/detection system.

Conceptual Design - After the original design and all relevant documents were reviewed, a proposed design was developed which addressed the HEDs and met the operational requirements. This approach is one of functional grouping HVAC and fire alarms on the associated control panel or board according to function, separating the general alarm audible alert according to control board responsibility assignments, and providing a visual indication of unacknowledged alarms. This proposed design provides for the following:

1. The general annunciator horn will be segmented into two separately distinguishable horns. One horn will provide an audible alert for the I-01, I-02, I-03, I-05 and I-13 alarms. The other horn will provide an alert for the I-06 and I-15 alarms. This segmentation of the annunciator horn closely corresponds with the control room operator division of responsibility.
2. New general annunciator horns will be installed that are adjustable for waveform, tone and amplitude. Waveform and tone will be adjusted to assure that the horns are separately distinguishable. Amplitude will be adjusted adequately above normal background

noise levels. Adjustments will not be available to the operators.

3. Red indicating lights will be installed above all the I-01, I-02, I-03, I-05, I-06, I-13 and I-15 alarm panels. The red light control circuit will be modified so that the lights will illuminate above the panel upon actuation of an alarm. The red light will stay illuminated until the respective alarm control station "ACKNOWLEDGE" button has been pushed.
4. The annunciator control circuit will be modified to permit the operator to silence either general annunciator horn from the I-01, I-02, I-03, I-05, I-06 Section A, I-06 Section B, I-13, or I-15 control stations.
5. Modify the control circuitry on the I-01D and I-01E BetaAlert-10 annunciator. The "RESET" and "TEST" switches will be removed from the face of these units. The test feature of the BetaAlert units will be controlled from the I-02 annunciator control station.
6. Relabel the various fire zone windows on XC-45153P to provide explicit operator information.
7. Functionally relocate related instrumentation (indicating lights and alarms) to the XC-45153P panel.
8. Modify or replace existing XC-45153P alarm controls to conform to the established convention for Fort St. Vrain Control Room alarm controls.

The following Design Directives apply to work assigned to CN-1925:

<u>NUMBER</u>	<u>ISSUE</u>	<u>DESCRIPTION</u>
DD-AAS-1	A	ABBREVIATION, SYMBOL, AND ACRONYM SELECTION
** DD-APL-1		ANNUNCIATOR PANEL LEGENDS
** DD-CBL-1		CONTROL BOARD LAYOUT
DD-LAB-1	B	CONTROL ROOM PANEL AND COMPONENT LABELING
DD-SWI-1	A	SWITCH SELECTION
** DD-ASP-1		ANNUNCIATOR SELECTION AND PLACEMENT
DD-ILS-1	A	INDICATING LAMP SELECTION & LOCATION

**IN DRAFT FORM

ATTACHMENTS
TO
SUMMARY OF THE
CONTROL ROOM IMPROVEMENT
DESIGN PROCESS

- A. HED Summary List & Copies of HED's
- B. Original XC-45153P Panel Layout
- C. Proposed XC-45153P Panel Layout
- D. Alarm Panel Layout for XC-45153P
- E. Sample of XC-45153P Labels
- F. Summary of Changes

ATTACHMENT A
HED SUMMARY LIST
&
COPIES OF HED'S

HUMAN ENGINEERING DISCREPANCIES LISTED FOR MISCELLANEOUS ALARMS & ALARM CONTROLS

HED NO.	PROBLEM CLASSIFICATION		LOCATION IDENTIFICATION	INSTRUMENT NUMBER	CATEGORY	DISPOSITION		REMARKS
	GROUP	CODE (SEE FIGURE 1)				RESOLUTION	CHANGE NOTICE	
0316	Alarms	8a	XC-45153		3	Change-out	1925	Change switches per DD-SWI-1 and relocate to front panel
0459	Alarms	8d	XC-45153		1	Relabel	1925	Relabel per DD-LAB-1
0472	Alarms	8d	XC-45153		1	Relabel	1925	Relabel per DD-LAB-1
0478	Alarms	8d	XC-45153		2	Change-out	1925	Change switches per DD-SWI-1 and relocate to front panel
0492	Alarms	8b	I-03B		3	Change-out	1925	Add red panel indicating lights
0492	Alarms	8b	I-05A		3	Change-out	1925	Add red panel indicating lights
0492	Alarms	8b	I-05D		3	Change-out	1925	Add red panel indicating lights

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

Probably not operator Error. Inconvenient and not located for expediency.

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

N/A

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS _____

Relocate to accessible location outside panel - Provide function legends on outside of panel.

I. DISPOSITION _____

Locate alarm reset button to panel surface for operator accessibility. Label to provide operator information and identification. Date 2/10/86

TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

H. CORRECTIVE ACTION OPTIONS
Change to Permanent Legend Plates

I. DISPOSITION *Label in accordance with DD-LAB-1, §
DD-APL-1 [Signature] 2/13/85*

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0472

HUMAN ENGINEERING DISCREPANCY EVALUATION

HEDE - 1

Form 344-22-4228

REVIEWER NAME HENDERSON			DATE 9/29/83
A. HED TITLE ANNUNCIATOR NOMENCLATURE / ACRONYMS			
B. ITEMS INVOLVED			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
	① AUX ELECT EQUIP ROOM DUCT IONIZATION	XL4513P ZONE 4	
	② WELL VALVES LOW PUMP DISCHG PRESS	I09-14	
PAH-2437	③ HI PRESS HE STOR TK RUPTURE DISK LEAK	I13A 5-1	D-63
FAL-11212	④ HTFA PURGE FLOW LOW MAIN POWER TRANS SUDDEN PRESS TRIP	I13C 2-2 I06E 2-5	F-99
XA-1106	⑥ ACKNOWLEDGE RESERVE SHUT DOWN OR CTL ROD PURGE SYS LOCAL ALARM	I01A 1-9	D-43
FAL-6323	⑦ GAS WASTE COMP 1A LOW LUB FLOW TRIP	I01A 4-4	D-43
FAL-6324	⑦ GAS WASTE COMP 1B LOW LUB FLOW TRIP	I01A 4-5	D-43
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) LEGEND DOES NOT COMPLY WITH CONVENTION			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED

F. LIST THE CONSEQUENCES OF OPERATOR ERROR

G. CLASSIFICATION

H. CORRECTIVE ACTION OPTIONS ① ELECT SHOULD BE ELEC ② DISCHG SHOULD BE DISCH ③ HI IS NOT AN APPROVED ABBREVIATION ④ HTFA IS NOT ON ACRONYM LIST ⑤ TRANS IS NOT ACCEPTED FOR TRANSFORMER ⑥ CTL SHOULD BE CONT ⑦ LUB SHOULD BE SPELLED OUT, LUBE

I. DISPOSITION RELABEL PER DD-APL-1 AND DD-AAS-1 BY CN-1880. RLD 1/17/86
XA-1106, FAL-6323, FAL-6324, PAH-2437, & FAL-11212
FUNCTIONALLY GROUP XA-1106, FAL-6323, FAL-6324 PER DD-ASP-1 AND DD-CBL-1
BY CN-1880. RLD 1/27/86
Relabel other listed alarms per DD-APL-1 and DD-AAS-1 by CN-1880. RLD per DD-APL-1 & DD-AAS-1
XA-1106: Relabel well valves ^{1/24/86} by CN-1924B 2/13/86
Relabel XC-45153P alarm per DD-LAB-1 and DD-AAS-1 by CN-1925. SKA 5/2/86

TEAM ACTION		
TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

Log Number 0478HUMAN ENGINEERING DISCREPANCY EVALUATION
HEDE - 1

See HED 0316

Form 344-22-4228

REVIEWER NAME <i>D. Glass / R. Mohr / G. Moore</i>			DATE <i>10-10-83</i>
A. HED TITLE <i>Annunciator Controls Layout, Identification and markings. Ref HEDs 459, 461, & 316</i>			
B. ITEMS INVOLVED <i>§ 0740</i>			
ITEM TYPE	NOMENCLATURE	LOCATION	INSTRUMENT DATA FILE NO. PHOTO NO.
<i>Alarm P.B.</i>	<i>Sil Act, test & Reset P.B Alarm Control Buttons</i>	<i>I-01</i>	
		<i>I-02</i>	<i>A-70</i>
		<i>I-03</i>	<i>D-77</i>
		<i>I-05</i>	<i>A-23, A42</i>
		<i>I-06</i>	<i>D-88</i>
		<i>I-09</i>	
		<i>I-13</i>	
		<i>XC-45153P I-7507X</i>	
C. PROBLEM DESCRIPTIONS (GUIDELINES VIOLATED) <i>(1) Alarm Buttons do not conform to DD-SWI-1 (2) Function identification is inconsistent. (3) Button location and layout is inconsistent. (4) Buttons for 2nd Alarm panel on I-7507X are not functionally grouped. (5) Test sequences vary between Panels. (6) I-03, Red Comp Reset Legend Tag is Red. (7) Alarm Controls are not separated (demarkated) from similar equip. controls.</i>			
D. LIST THE PROCEDURES OR OPERATIONS THAT USE THE LISTED ITEMS IN A MANNER TO INDUCE THE OPERATOR ERROR <i>All procedures involving Alarms</i>			
<i>(8) I-06B is not equipped with act-sil-test & reset Buttons (operator must walk to west end of I-06A)</i>			
<i>NOTE See attached sketches</i>			

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED

- (1)(2)(4) Confusion in silencing and acknowledging alarms.
- (5) Failure to execute proper tests
- (3) Clearing or acknowledging alarms unintentionally.
- (4)(6) Actuating equipment control by mistake.
- (7) Confusion in interpreting function tag color coding.

F. LIST THE CONSEQUENCES OF OPERATOR ERROR

Actuating or tripping critical equipment inadvertently
 i.e. water and/or steam turbine PPS trip
 inputs on I-05.

G. CLASSIFICATION

H. CORRECTIVE ACTION OPTIONS

- (1) Change all alarm buttons to extra long Black.
- (2) Establish & Apply a consistent function identification scheme.
- (3) Locate alarm control P.B.s consistently. (4) Group test & Silence pushbuttons with alarm window group on I-7507X.
- (5) Establish & Apply consistent test sequences.
- (6) After consistently locating & grouping alarm control P.B.'s, demarcate these groups. (7) Apply legend tag color code. (8) Provide as a minimum an Ack, and silence P.B on the east end of I-06.

I. DISPOSITION

I-01, I-02, I-03, I-05, I-06 and I-13 annunciator control switch operators changed to conform to DD-SWI-1 per CN-1879. I-01, I-02, I-03, I-05 and I-06 annunciator control switches functionally labeled, functionally grouped and demarcated by CN-1879. SKA 10/19/85
 XG 45153P & I-7507X annunciator control switch operators will be changed to conform to DD-SWI-1, functionally grouped and labeled in CN 1924B with I-7507X SWITCHES TO BE CHANGED, FUNCTIONALLY GROUPED PER DD-SWI-1 ON CN 1894 R/S 2/13/86

TEAM ACTION

TEAM MEMBER SIGNATURE

CONCURRENCE OR NON-CONCURRENCE

DATE

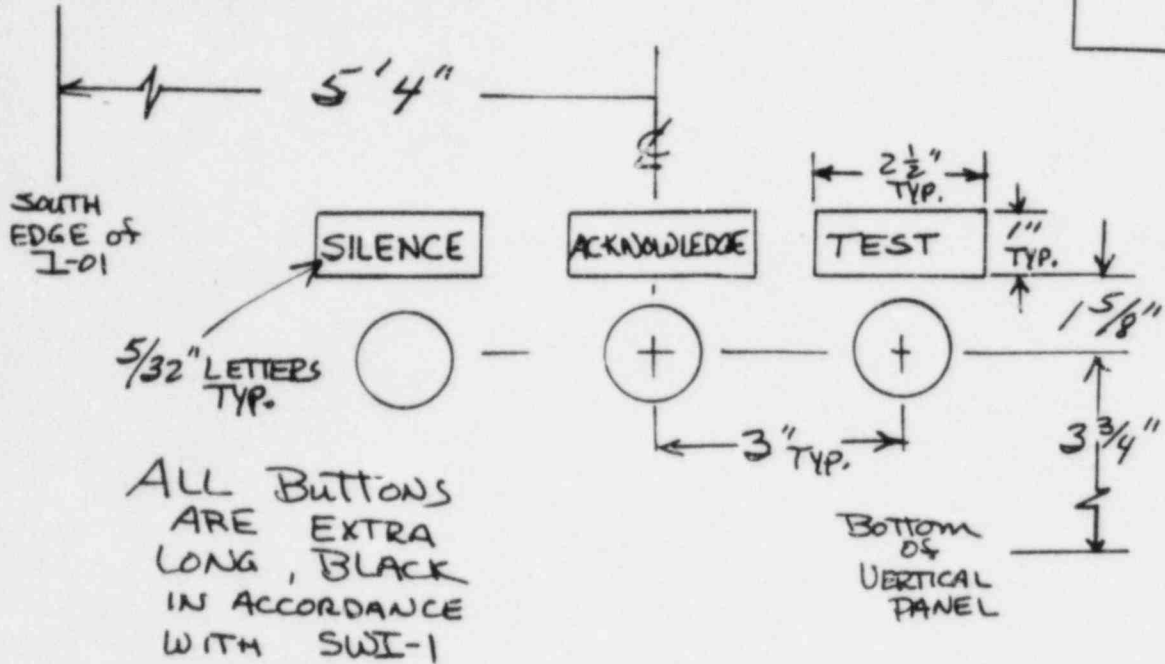
Team Manager

CRDR Coordinator

Human Factors Spec.

Senior Reactor Operator

I-01

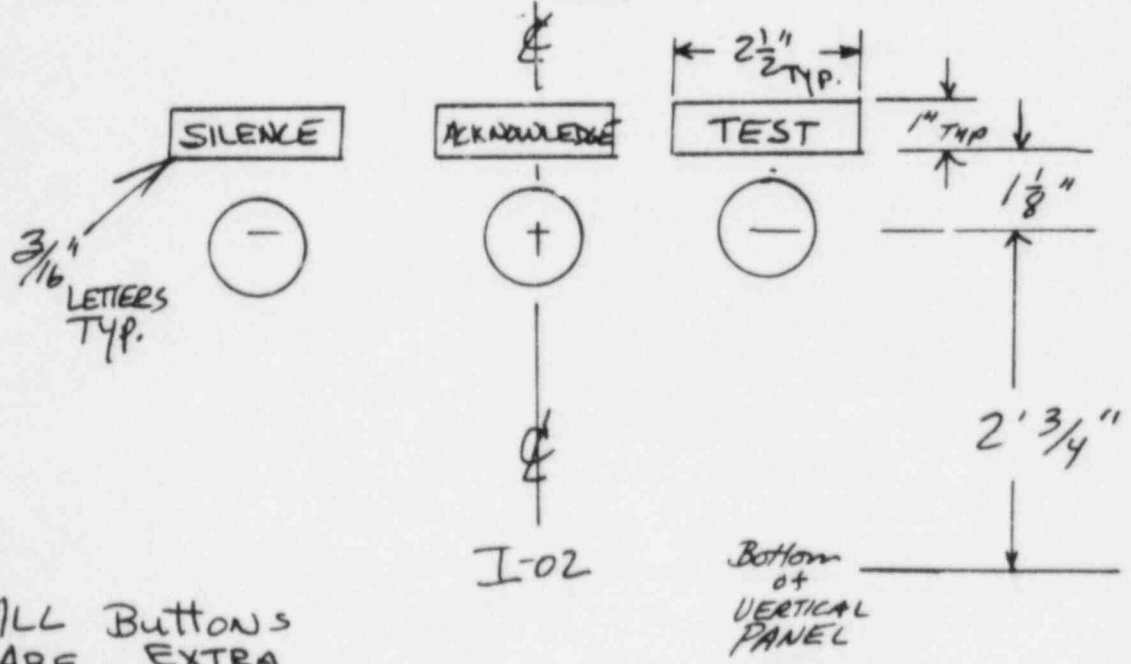


5/32" LETTERS
 TYP.

ALL BUTTONS
 ARE EXTRA
 LONG, BLACK
 IN ACCORDANCE
 WITH SWI-1

LETTER SIZE =

I-02

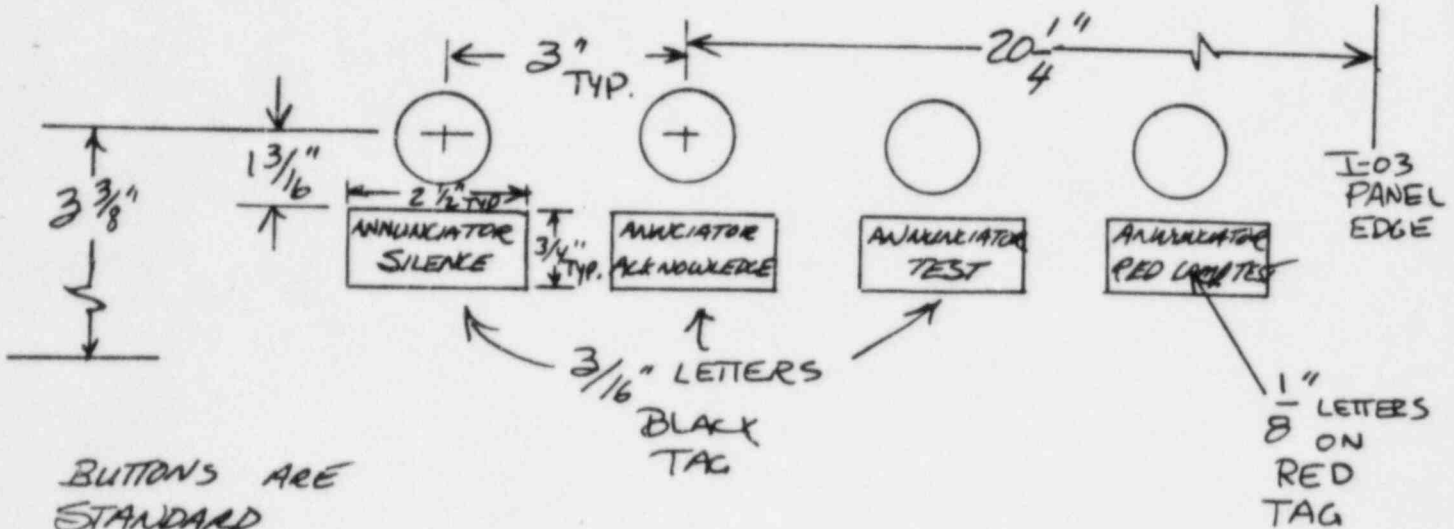


3/16" LETTERS
 TYP.

ALL BUTTONS
 ARE EXTRA
 LONG, BLACK
 IN ACCORDANCE
 WITH SW-1

I-02

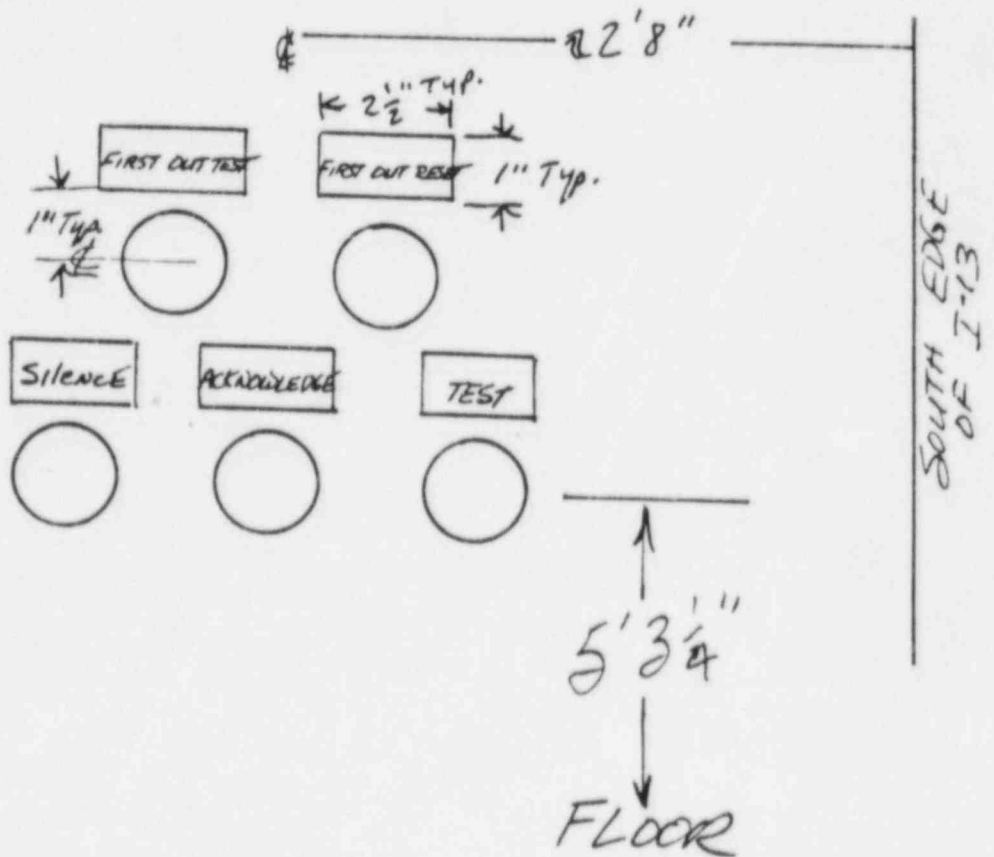
I-03



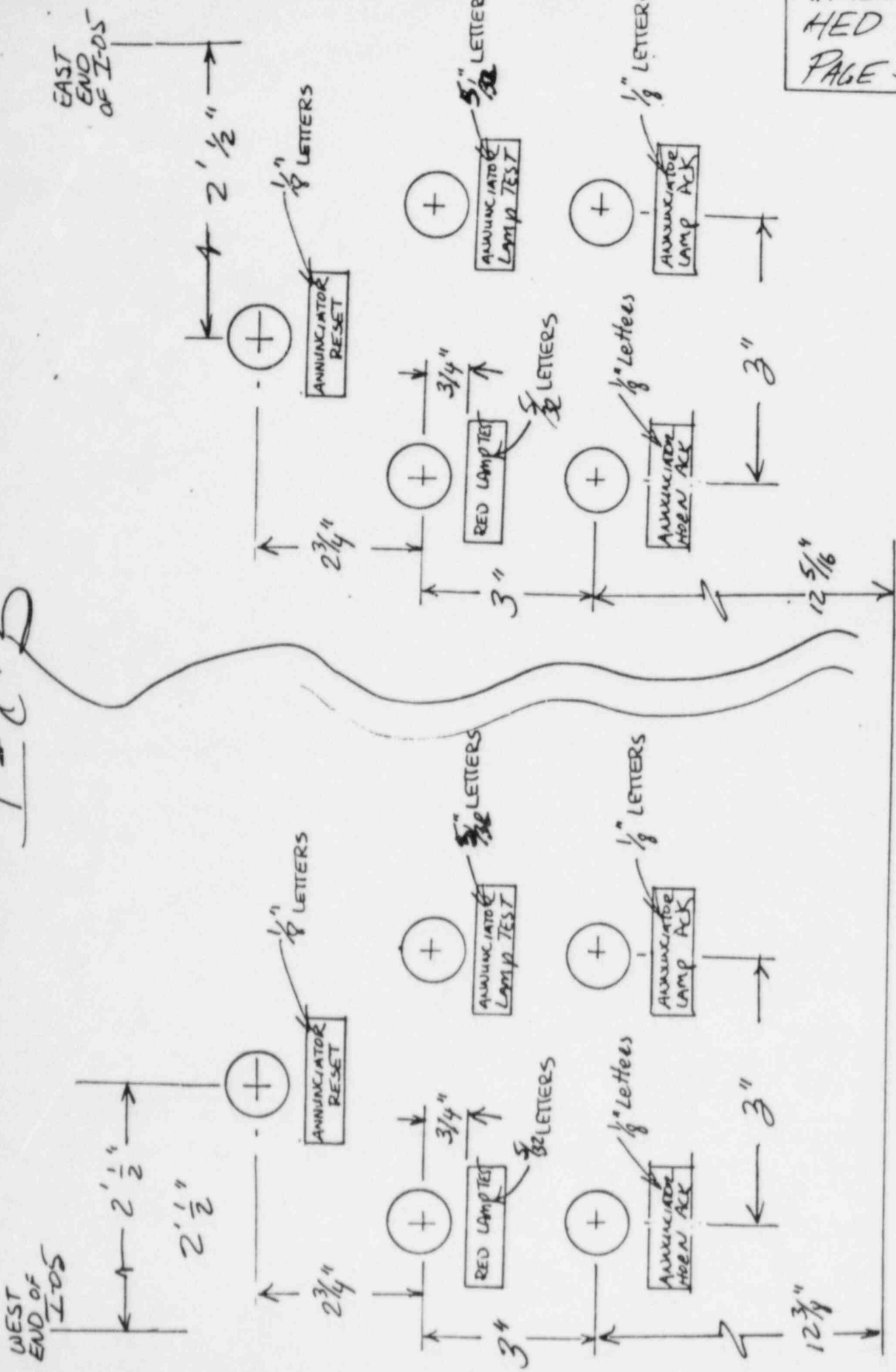
BUTTONS ARE
 STANDARD
 LENGTH, SILVER,
 NOT IN
 CONFORMANCE
 WITH DD-SWI-1

I-13

All
 Buttons
 ARE
 EXTRA
 LONG
 BLACK

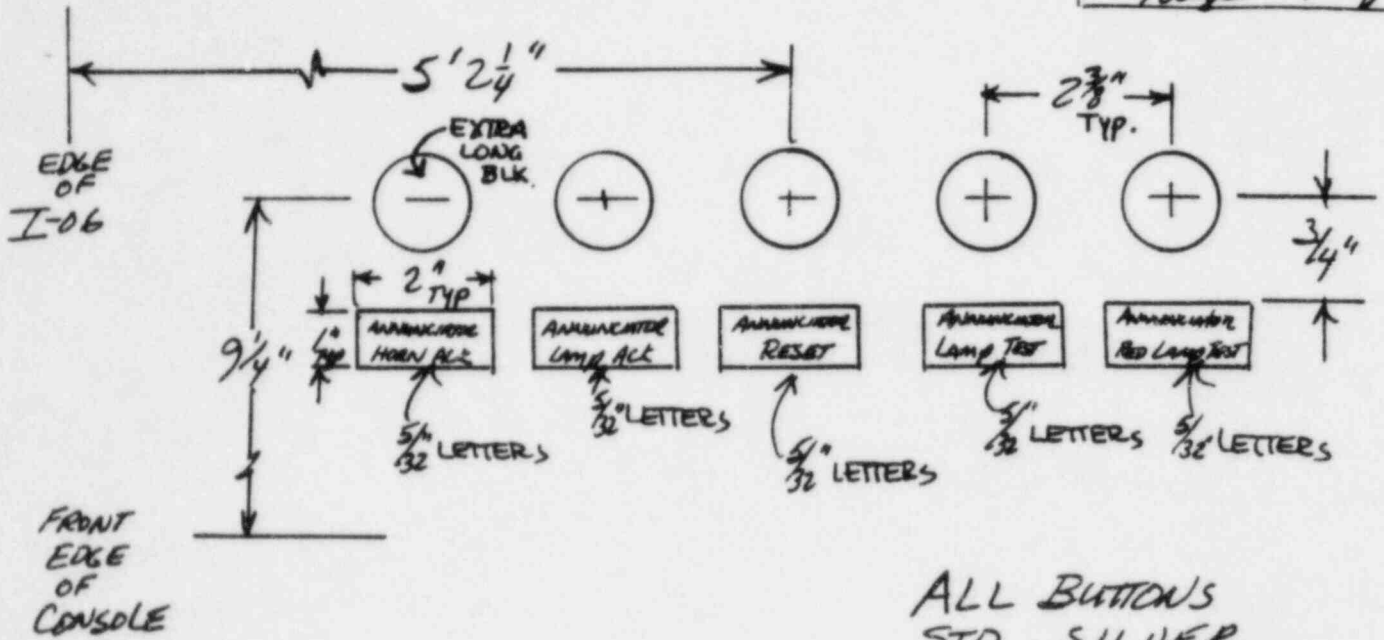


I-C-5



ALL PUSHBUTTONS
EXTRA LONG
IN ACCORDANCE
UNIT DRAWING - 1

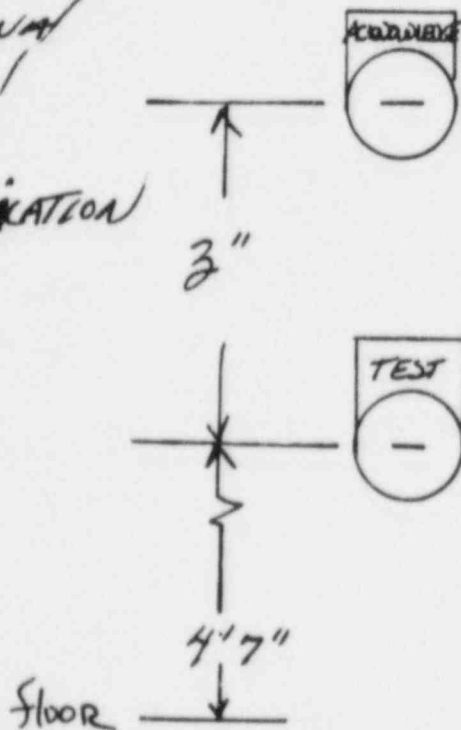
I-06 A



ALL BUTTONS
STD, SILVER
EXCEPT AS
NOTED
(NOT IN CONFORMANCE
WITH DD-SWI-1)

I-09

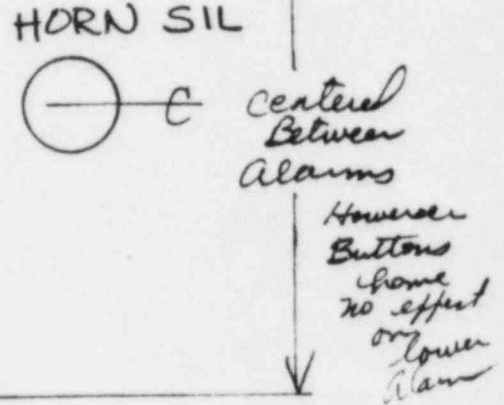
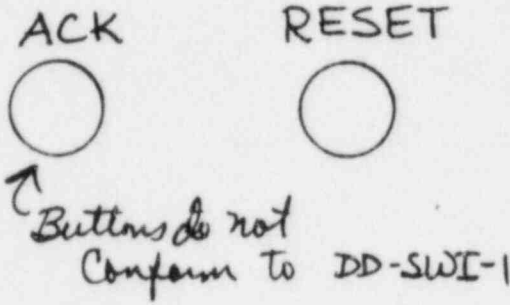
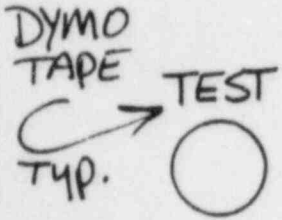
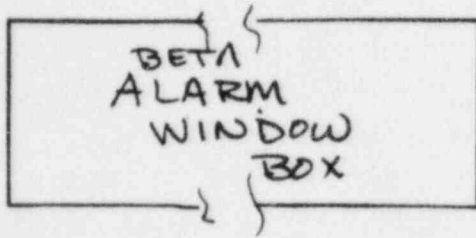
No Additional
Functional
Tagging
OR
IDENTIFICATION



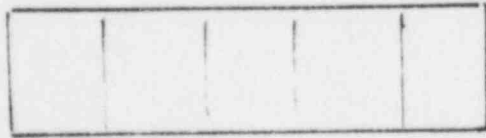
STANDARD
SILVER
BUTTONS
CENTERED
HORIZONTALLY
UNDER ALARM
PANELS ON
3rd section
of I-09
3rd from West
total 7 sections

PANEL I-7507X

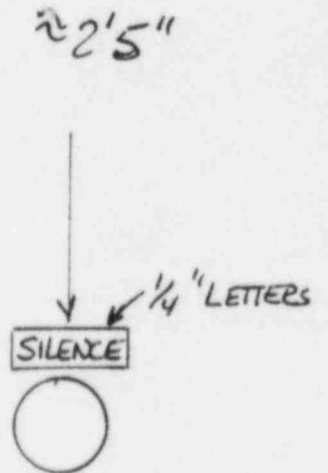
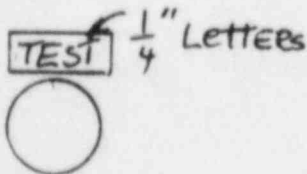
Attachment to
HED # 0478
Page 5 of 6



Alarm Box w/
INDIVIDUAL
ALARM
CUBICLES



Alarm Assy w/
Individual Cub.
test
&
Silence
Buttons are
remote from
the Alarm
Assy.



~2'5"

XC-45153P

ATTACHMENT TO
HED # 0478
Page 6 of 6

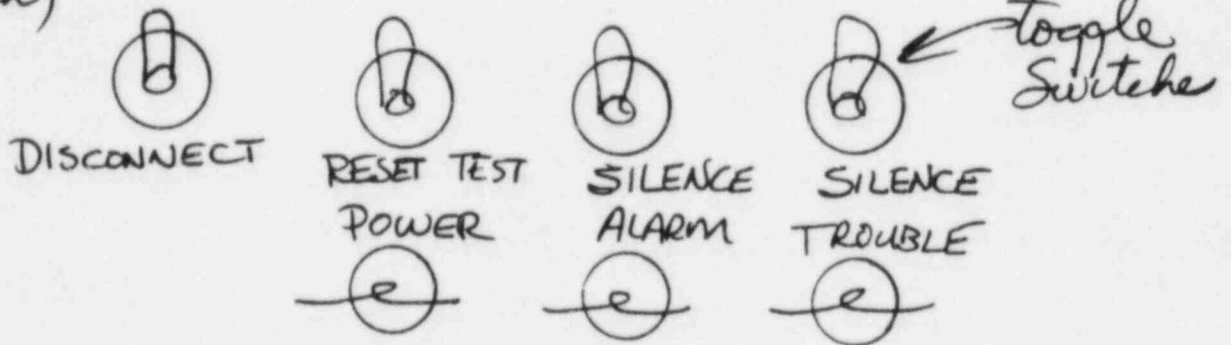
Alarm Windows

"POWER" "ALARM" "TROUBLE"

Illuminates thru panel.

Silence Buttons are inside
See HED # 316

Inside
Panel
under Keylock
(Key remains in
lock)



On an actual alarm (Horn & light)
operator must first silence "TROUBLE"
before "ALARM" will clear.
Instructions are not posted.

E. SPECIFIC OPERATOR ERROR(S) THAT COULD RESULT FROM HED _____

F. LIST THE CONSEQUENCES OF OPERATOR ERROR _____

G. CLASSIFICATION _____

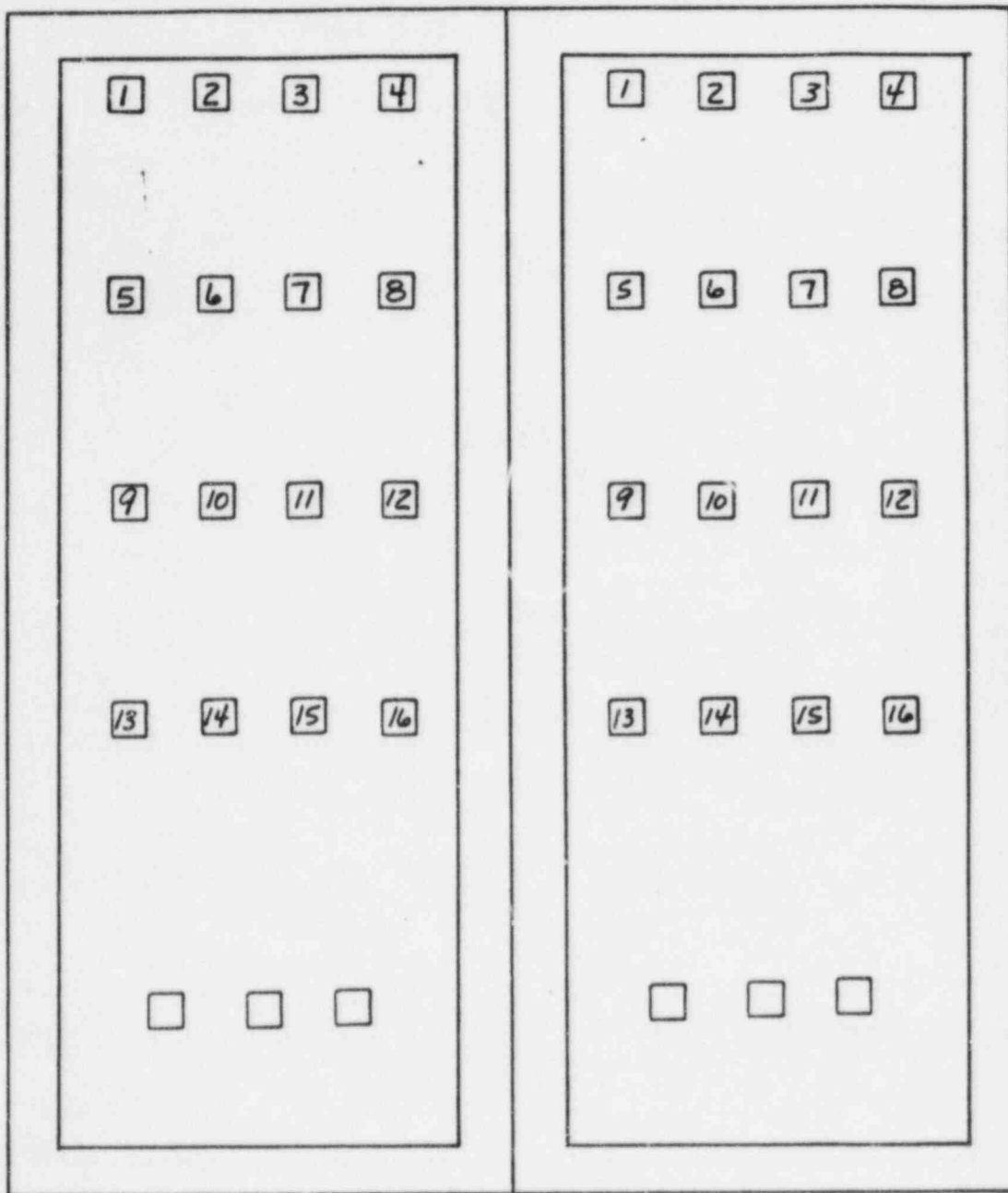
H. CORRECTIVE ACTION OPTIONS Add RED INDICATING LIGHTS TO IO3B, IO5A AND IO5D

I. DISPOSITION Panel indication lights to be added for IO3B, IO5A and IO5D in CN 1925- Miller 2/13/84

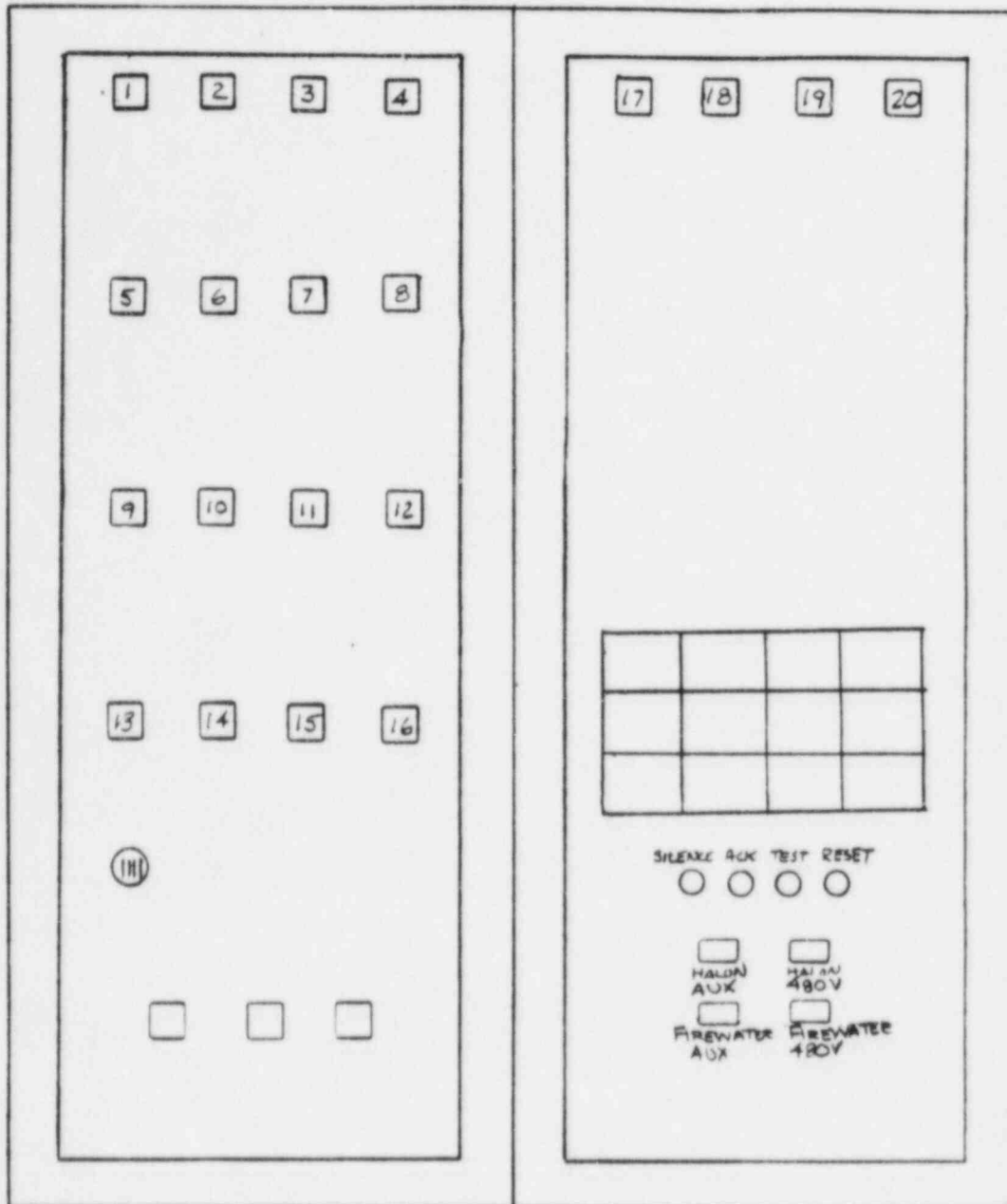
TEAM ACTION

TEAM MEMBER SIGNATURE	CONCURRENCE OR NON-CONCURRENCE	DATE
Team Manager		
CRDR Coordinator		
Human Factors Spec.		
Senior Reactor Operator		

ATTACHMENT B
Existing XC-45153P
Panel Layout



ATTACHMENT C
Proposed XC-45153P
Panel Layout



ATTACHMENT D
Alarm Panel Layout
for XC-45153P

REACTOR BLDG DETECTORS LOSS OF POWER 1-1	1-2	1-3	1-4
TURBINE BLDG DETECTORS LOSS OF POWER 2-1	2-2	2-3	2-4
3-1	3-2	3-3	3-4

ATTACHMENT E
SAMPLES OF LABEL LIST
(XC-45153P)

LABELING LEGEND LIST

CONTROL BOARD #	INSTRUMENT #	STYLE	FUNCTIONAL LABEL	STYLE	HED # (if applicable)
XL-45153	ZONE 1 INDICATING LIGHT		CONTROL ROOM	7a	
	ZONE 2 INDICATING LIGHT		4815'-T G-5 PNL	7a	
	ZONE 3 INDICATING LIGHT		4815'-T G-5 PNL	7a	
	ZONE 4 INDICATING LIGHT		4815'-T G-5 PNL	7a	
	ZONE 5 INDICATING LIGHT		4795'-T G-7 PNL	7d	
	ZONE 6 INDICATING LIGHT		4795'-T G-7 PNL	7d	
	ZONE 7 INDICATING LIGHT		4744'-R J-5 PNL	7d	
	ZONE 8 INDICATING LIGHT		4819'-R J-5 PNL	7d	
	ZONE 9 INDICATING LIGHT		4832'-R J-4A PNL	7d	
	ZONE 10 INDICATING LIGHT		4852'-R J-5 PNL	7d	
	ZONE 11 INDICATING LIGHT		4795'-T G-7 PNL	7d	
	ZONE 12 INDICATING LIGHT		4815'-T G-5 PNL	7d	
	ZONE 13 INDICATING LIGHT		4832'-R J-5 PNL 4796'-R J-5 PNL	7d	
	ZONE 14 INDICATING LIGHT		4832'-R J-5 PNL 4796'-R J-5 PNL	7d	
	ZONE 15 INDICATING LIGHT		4832'-R J-5 PNL 4796'-R J-5 PNL	7c	
	ZONE 16 INDICATING LIGHT		HYD OIL MIST	7a	
	ZONE 17 INDICATING PANEL		TSC HVAC	7a	
	ZONE 18 INDICATING PANEL		BLDG 10 PNL	7a	
Y			AUX ELECTRIC ROOM FIRE SUPPRESSION	5d	

ATTACHMENT F
SUMMARY OF
ACTUAL CHANGES TO
CN-1925

The following is a summary of the CN-1925 changes:

1. The control room annunciator horn will be segmented into two horns, each dedicated to specific control panels. (These horns will be adjusted for waveform, tone and amplitude.)
2. Red indicating lights will be installed above all alarm panels that when illuminated, indicate an unacknowledged alarm condition on the panel.
3. The annunciator controls will be modified so that the horns may be silenced from any alarm control station.
4. Control of the I-01D and I-01E annunciator units will be simplified by controlling the test function from the I-02 control station.
5. Panel XC-45153P will be relabeled to clarify instrument functions.
6. Functionally related instrumentation will be relocated to XC-45153P panel.
7. XC-45153P controls will be modified or replaced to conform to human engineering requirements.

SUPPLEMENT
to
ATTACHMENT 9

APPLICABLE TO MISCELLANEOUS ALARMS AND ALARM CONTROLS

ATTACHMENT 9
 HEDs Having
 Final Dispositions Different From The
 Proposed Disposition Shown In Attachment B
 Of The Summary Report

HED	PROBLEM CLASSIFICATION	ORIGINAL DISPOSITION	FINAL DISPOSITION	REMARKS
0316	Alarms	Special	Change-out	Change switches to conform to DD-SWI-1 and relocate to front of panel for operator access