Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690 - 0767

December 20, 1988

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Dresden Station Units 2 and 3
Quad Cities Station Units 1 and 2
Request for Schedule Changes for
Human Engineering Discrepancy (HED)
Corrective Actions
NRC Docket Nos. 50-237/249 and 50-254/265

References (a): Memorandum for D.R. Muller from B.L. Siegel and T.M. Rodd dated November 23, 1988, summarizing a November 16,1988 Dresden and Quad Cities Stations HED Status Meeting.

(b): Letter from I.M. Johnson to T.E. Murley dated August 25, 1987 transmitting "Dresden Station Detailed Control Room Design Review, Supplement 2", August 1987.

(c): Letter from I.M. Johnson to T.E. Murley dated August 25, 1987 transmitting "Quad Cities Station Detailed Control Room Design Review, Supplement 2", August 1987.

Dear Dr. Murley:

Enclosed is the Commonwealth Edison Company (CECo) response to the NRC Staff's request for a formal submittal of the proposed changes in the HED corrective action implementation schedule for some of the Dresden and Quad Cities Station HEDs. The Reference (a) NRC memorandum documents a November 16, 1988 meeting between the NRC Staff and CECo's Nuclear Licensing, Dresden and Quad Cities Station, Engineering, and Human Factors Engineering personnel. The purpose of that meeting was to discuss the progress and present status in implementing corrective actions designed to resolve the HEDs at those two stations. The need to change the implementation schedule for some of the Dresden and Quad Cities HEDs was discussed, including detailed discussion of the reasons and justification for the proposed deferrals.

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As indicated in the meeting, the need for most of the schedule changes resulted from CECo decisions to go beyond the original commitments during the implementation phases of some corrective actions.

For those HEDs requiring a schedule change, the NRC Staff recommended that:

- A letter be submitted describing all Category 1A and 1B HEDs in detail. This description should also include the original commitment date for completion, the new completion date, the justification for the schedular slippage, and why this schedular change is not safety significant.

- For all remaining HEDs that will not be completed on schedule, the letter should identify these HEDs in the letter (including the original completion schedule and proposed new completion dates).

The attachments to this letter list the HEDs and provide the above requested information, according to Category 1A, 1B and all remaining HEDs for Dresden Unit 2 and Quad Cities Units 1 and 2. Although some additional schedule changes may be required for Dresden Unit 3, as discussed at the November 16, 1988 meeting, CECo will continue on a best efforts basis to maintain existing schedules for Dresden Unit 3 HEDs.

Please note that the outage start dates shown in the attached table and throughout this submittal have been updated to reflect the latest CECo Overhaul Schedule, which integrates all planned outages for both nuclear and fossil generating units. System reserve considerations have resulted in the shifting of some Dresden and Quad Cities outage start dates by several months relative to previous schedules.

Please contact this office if you have any questions regarding this matter.

Very truly yours,

J A Silady

J. A. Silady
Nuclear Licensing Administrator

/lm

Attachments

cc: A.B. Davis - Regional Administrator, RIII
B.L. Siegel - Project Manager, Dresden
T.M. Ross - Project Manager, Quad Cities
S.G. DuPont - Region III Inspector, Dresden
R.M. Higgins - Region III Inspector, Quad Cities

5401K

December 20, 1988

Messrs: J. S. Abel
R. L. Bax
H. E. Bliss
E. E. Eenigenburg
G. P. Wagner

Subject: Commonwealth Edison Company's (CECo) response to the NRC's Memmorandum (Ref a) documenting a November 16, 1988 Human Engineering Descrepancy (HED) corrective actions status meeting for Dresden and Quad Cities Stations. NRC Docket Nos. 50-237, 50-299, 50-259 & 50-265 (TAC Nos. 56118, 56119, 56156 and 56157)

References: a) Memorandum for D. R. Muller from B. L. Siegel and T. M. Ross dated 11/23/88 summarizing a 11/16/88 Dresden & Quad Cities Stations HED status meeting.

b) Letter from I. M. Johnson to T. E. Murley dated August 25, 1987 transmitting "Dresden Station Detailed Control Room Design Review, Supplement 2", August 1987.

c) Letter from I. M. Johnson to T. E. Murley dated August 25, 1987 transmitting "Quad Cities Station Detailed Control Room Design Review, Supplement 2", August 1987.

Dear Sirs:

Enclosed is CECo's response to the NRC staff's request (Ref a) for a formal submittal of our request for a change in the HED corrective action implementation schedule for some of the Dresden and Quad Cities Stations HEDs. That NRC memorandum documents a November 16, 1988 meeting between the NRC staff and CECo's Dresden and Quad Cities Station personnel, Engineering personnel and Human Factors Engineering personnel. The purpose of that meeting was to discuss the progress, and present status, in implementing corrective actions designed to resolve the HEDs at those two stations. In that meeting the need to change the implementation schedule for some of the HEDs, applicable to those two stations, was also discussed.

As indicated in the meeting decisions to go beyond the original commitments during the implementation phases of the corrective actions, resulted in the need for most of the changes in the schedule.

For those HEDs requiring a schedule change, the NRC staff stated in the memorandum mentioned above (Ref a) that:

- o CECo should submit a letter describing all Category 1A or 1B HEDs in detail. This description should also include the original commitment date for completion, the new completion date, the justification for the schedular slippage, and why this schedular change is not safety significant.

- o For all remaining HEDs that will not be completed on schedule, CECo should identify these HEDs in their letter (including the original completion schedule and proposed new completion dates).

The appendices to this letter list the HEDs, and above requested information, according to Category 1A, 1B and "all remaining HEDs" for Dresden Unit 2 and Quad Cities Units 1 and 2.

If you have any questions regarding this matter, please contact Kathleen Hesse (ext. 3458), or myself (ext. 8831).

Sincerely yours,

Robert E. Howard

Robert E. Howard
Human Factors Engineering Coordinator
Production Services Department
Commonwealth Edison Company

cc: K.P. Beverly
J.C. Blomgren
R.V. Castro
K.A. Hesse
I.M. Johnson
R.D. Koenig
J.J. Kopacz
R.A. Robey
V.R. Rockovski
R.J. Rosecky
J.A. Silady
N.P. Smith
G.J. Tietz
M.S. Tucker
E.B. Weinfurter
B.A. Zank
S.H. Cooley, ARD Corp.
File

Commonwealth Edison Company

Quad Cities and Dresden Stations

Human Factors Engineering

Corrective Action Schedule Change Request

December 20, 1988

Commonweatlth Edison Company

Quad Cities and Dresden Stations

Human Factors Engineering

Corrective Action Schedule Change Request

HED Open Item Index

DRESDEN STATION OUTAGE START DATES

	UNIT 2	UNIT 3
1st RF Outage	December 1986	March 1988
2nd RF Outage	October 1988	November 1989
3rd RF Outage	September 1990	March 1991

QUAD CITIES STATION OUTAGE START DATES

	UNIT 1	UNIT 2
1st RF Outage	November 1987	November 1986
2nd RF Outage	September 1989	May 1988
3rd RF Outage	October 1990	February 1990

Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

HED Category 1A/1B Open Items

Appendicies A & B

12/15/88

Quad Cities Station Units 1 & 2

1A/1B Open Items

DCRDR HEDS

Index No.	Unit No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
102	1,2	30	1.1.1.B OS 7	1st RF	2nd RF	1A
148	2	42	1.3.2.A 1	2nd RF	7-1-89	1B
149	2	42	1.3.2.B 1	2nd RF	6-1-89	1B
180	1,2	47	1.5.3.F 1	2nd RF	8-1-89	1B
191	1,2	214	8.2.2.A 4	2nd RF	6-1-89	1B
193	2	209	8.2.1.C.1 1	2nd RF	6-1-89	1B
258	1,2	47	1.5.3.F OS 2	2nd RF	8-1-89	1B
259	1,2	47	1.5.3.F OS 3	2nd RF	8-1-89	1B
262	1,2	47	1.5.3.F OS 4	2nd RF	8-1-89	1B
276	2	200	8.1.1.B OS 7	2nd RF	6-1-89	1B
277	1,2	201	8.1.1.B OS 8	2nd RF	6-1-89	1B
284	2	211	8.2.1.C.1 OS 4	2nd RF	6-1-89	1B
307	2	199	8.1.1.2.S 1	2nd RF	6-1-89	1A
316	2	356	8.3.1.B OS 1	2nd RF	6-1-89	1B
317	2	357	8.3.1.B OS 2	2nd RF	6-1-89	1B
360	1,2	116	5.1.2 OS 1	1st RF	6-1-89	1B
389	1,2	47	1.5.3.E.1 1	2nd RF	8-1-89	1B
390	1,2	47	1.5.3.E.2 1	2nd RF	8-1-89	1B
411	1,2	222	6.6.3 VL 1	2nd RF	6-1-89	1B
416	2	205	8.2.1 VL 1	2nd RF	6-1-89	1B
417	2	206	8.2.1 VL 2	2nd RF	6-1-89	1B
418	2	207	8.2.1 VL 3	2nd RF	6-1-89	1B
419	1,2	182	6.6.3 VL 2	2nd RF	6-1-89	1B
445	1,2	30	1.1.1.A VL 7	1st RF	2nd RF	1A
448	1,2	47	1.5.3.F V 5	2nd RF	8-1-89	1B
465	2	106	5.1.2.A V 2	2nd RF	8-1-89	1B

QUAD CITIES STATION 1A HEDs IN NEED OF RELIEF

Index No.: 102
HED Guideline No.: 1.1.1.B/OS-7
Category / Level: 1A
FSR Page No.: 30
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	1st Refueling Outage, 10-1-86
Unit 2 Proposed Implementation Date:	3rd Refueling Outage, 2-3-90
Unit 1 Original Implementation Date:	1st Refueling Outage, 9-1-87
Unit 1 Proposed Implementation Date:	2nd Refueling Outage, 9-9-89

FINDING

During validation, when the water level was beyond the range of the narrow range GEMAC and YARWAY instruments and the feedwater system was being used to maintain water level, it was observed that operators had to frequently traverse between 90X-4 and 90X-5 to monitor water level. In addition, response to the operator survey indicated that better level indication is needed on the 90X-3 panel where the emergency core cooling system is located. Reactor level indicators are on 90X-5, and it would be useful to have a redundant water level indicator on 90X-4.

Justification For the Delay

Engineering design and space constraints imposed by seismic support structures prevent the implementation of digital displays for Reactor Water Level on the 90X-3, 4, 5 and 7 panels from being acceptable from a Human Factors perspective.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the nonacceptability of the additional digital indicators on which Reactor Water Level can be displayed on the NSSS and 7 panels as minimal. The displays' nonacceptability is predicated upon its excessive protrusion from the panel and lack of point ID labeling. Otherwise, the indicators are acceptable and do provide the operator with potential locations from which to display Reactor Water Level.

QUAD CITIES STATION 1A HEDs IN NEED OF RELIEF

Index No.: 307
HED Guideline No.: 8.1.1.B/OS-1
Category / Level: 1A
FSR Page No.: 199
SER Response Page No: C3-4

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Operator survey results indicated that the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) Systems are difficult to operate when bieng used to reduce reactor presure. These systems are not laid out according to function, sequence of use, frequency of use, or other operator expectations.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for HPCI and RCIC as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the HPCI and RCIC systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1A HEDs IN NEED OF RELIEF

Index No.: 445
HED Guideline No.: 1.1.1.A/VL-7
Category / Level: 1A
FSR Page No.: 30
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 1st Refueling Outage, 10-1-86

Unit 2 Proposed Implementation Date: 3rd Refueling Outage, 2-3-90

Unit 1 Original Implementation Date: 1st Refueling Outage, 9-1-87

Unit 1 Proposed Implementation Date: 2nd Refueling Outage, 9-9-89

FINDING

During validation, when the water level was beyond the range of the narrow range GEMAC and YARWAY instruments and the feedwater system was being used to maintain water level, it was observed that operators had to frequently traverse between 90X-4 and 90X-5 to monitor water level. In addition, response to the operator survey indicated that better level indication is needed on the 90X-3 panel where the emergency core cooling system is located. Reactor level indicators are on 90X-5, and it would be useful to have a redundant water level indicator on 90X-4.

Justification For the Delay

Engineering design and space constraints imposed by seismic support structures prevent the implementation of digital displays for Reactor Water Level on the 90X-3, 4, 5 and 7 panels from being acceptable from a Human Factors perspective.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the nonacceptability of the additional digital indicators on which Reactor Water Level can be displayed on the NSSS and 7 panels as minimal. The displays' nonacceptability is predicated upon its excessive protrusion from the panel and lack of point ID labeling. Otherwise, the indicators are acceptable and do provide the operator with potential locations from which to display Reactor Water Level.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 148
HED Guideline No.: 1.3.2.A-1
Category / Level: 1B
FSR Page No.: 42
SER Response Page No.: C5-1

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Dedicated crews are not used on the mirror imaged units or the center desk.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for as minimal. Most importantly, the Background Shading was ocmpleted prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems, particularly the Emergency Core Cooling ones. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

Index No.: 149
HED Guideline No.: 1.3.2.B-1
Category / Level: 1B
FSR Page No.: 42
SER Response Page No.: C5-1

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Dedicated crews are not used on the mirror imaged units or the center desk.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems, particularly the Emergency Core Cooling ones. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 191
HED Guideline No.: 8.2.2.A-4
Category / Level: 1B
FSR Page No.: 214
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	1st Refueling Outage, 10-1-86
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Original Implementation Date:	1st Refueling Outage, 9-1-87
Unit 1 Proposed Implementation Date:	2nd Refueling Outage 9-9-89

FINDING

The organization and layout of the 90X-8 does not clearly show the hierarchy and directionality of the system. In addition, background shading and demarcation lines will be added to enhance functional groupings.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the 90X-8 Electrical Distribution panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems, particularly the Diesel Generator and non ESF Busses. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 193
HED Guideline No.: 8.2.1.C.1-1
Category / Level: 1B
FSR Page No.: 209
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

It would be helpful to have reactor pressure indication over controls for the auto blowdown system (on 90X-3). Having functionally related displays and controls grouped together facilitates their usage.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the Auto Blowdown system and the other systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 276
HED Guideline No.: 8.1.1.B/OS-7
Category / Level: 1B
FSR Page No.: 200
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Operator survey responses indicated that panel 90X-8, which is the electrical panel, is poorly laid out and should be redone. Currently the controls and displays on the electrical distribution panel are not arranged according to the function sequence, use frequency, or other obvious logical expectation. A poorly arranged central panel can contribute to operator confusion/error in an emergency situation. (Photo Log No. D-4)

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the 90X-8 Electrical Distribution panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 277
HED Guideline No.: 8.1.1.B/OS-8
Category / Level: 1B
FSR Page No.: 201
SER Response Page No.: C5-1

Unit 2 Original Implementation Date: 1st Refueling Outage, 10-1-86

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Original Implementation Date: 1st Refueling Outage, 9-1-87

Unit 1 Proposed Implementation Date: 2nd Refueling Outage, 9-9-89

FINDING

The operator survey indicated that the following controls/displays should be grouped together: steam flow indicators (90X-5) Main Steam Isolation Valve (MSIV) controls (90X-3); and Turbine Throttle pressure indicators (90X-7). The operator needs to be able to use these controls while observing these indicators, and this control function is difficult with the current configuration.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems on the 90X-3, 5, 7 panels. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 284
HED Guideline No.: 8.2.1.C.1/OS-4
Category / Level: 1B
FSR Page No.: 211
SER Response Page No.: C4-19

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Operator survey response indicated that having the High Pressure Cooling Injection (HPCI) components between the Residual Heat Removal (RHR) Loops (A & B) creates interference.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for HPCI and RHR as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the HPCI and RHR systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 316
HED Guideline No.: 8.3.1.B/OS-1
Category / Level: 1B
FSR Page No.: 356
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Response to the operator survey indicated that control switches with the same shape are too close to one another though on different systems and can be inadvertently actuated. Example: closing or opening drywell sump valves and instead closing a recirculation pump discharge valve.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 317
HED Guideline No.: 8.3.1.B/OS-2
Category / Level: 1B
FSR Page No.: 357
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Response to the operator survey indicated that the main steam isolation valve switches could accidentally activated because of their proximity during containment valve operations.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 360
HED Guideline No.: 5.1.2/OS-1
Category / Level: 1B
FSR Page No.: 116
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	1st Refueling Outage, 10-1-86
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Original Implementation Date:	1st Refueling Outage, 9-1-87
Unit 1 Proposed Implementation Date:	2nd Refueling Outage, 9-9-89

FINDING

Operator survey results have indicated that the contaminated containment storage tank level on 90X-6 should read in gallons.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme. The devemopment of a label to present the conversion factor for converting the Contaminated Containment Storage Tank (CCST) level from Feet to Gallons is a function of the development of the panel enhancement package which includes the new hierarchical labeling program.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in relabeling the display as minimal. Current procedures, training and Technical Specification references are all consistent in referring to CCST level in Feet. Procedures have been revised to include the conversion factor and it is covered in training. In addition, a temporary label has been installed for the display. Background Shading has been added to the 902-6 panel providing clear differentiation between systems on the panel. Therefore, the potential for confusion and/or error in utilizing the display is minimized.

Index No.: 411
HED Guideline No.: 1.1.1.A/V-8
Category / Level: 1B
FSR Page No.: 222
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

NOTE: In its evaluations the Hedat determined that the HED description was erroneous and that the ACAD/CAM switch was in fact present in the control room but not appropriately labeled. Hence, a labeling corrective action was proposed for this HED.

FINDING

At present, the ACAD/CAM mode switches are not physically located in the control room.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the ACAD/CAM panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 416
HED Guideline No.: 8.2.1./VL-1
Category / Level: 1B
FSR Page No.: 205
SER Response Page No.: C4-10

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

During the validation it was observed that the controls and displays on the 90X-4 panel are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the system contained on the panel.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the 90X-4 panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 417
HED Guideline No.: 8.2.1./VL-2
Category / Level: 1B
FSR Page No.: 206
SER Response Page No.: C4-13

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

During the validation it was observed that the controls and displays on the 90X-4 panel are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the system contained on the panel.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package between the RHR and the Core Spray systems as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the RHR and Core Spray systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 418
HED Guideline No.: 8.2.1./VL-3
Category / Level: 1B
FSR Page No.: 207
SER Response Page No.: C4-16

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

During the validation it was observed that the controls and displays on the 90X-4 panel are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the system contained on the panel.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the 90X-8 Electrical Distribution panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems, particularly the Diesel Generator and non ESF Busses. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 419
HED Guideline No.: 6.6.3/VL-2
Category / Level: 1B
FSR Page No.: 182
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	1st Refueling Outage, 10-1-86
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Original Implementation Date:	1st Refueling Outage, 9-1-87
Unit 1 Proposed Implementation Date:	2nd Refueling Outage, 9-9-89

FINDING

During the validation it was observed that the Core Spray System, the Low Pressure Core Injection (LPCI) injection mode of Residual Heat Removal (RHR), and RHR in general do not have flowpath mimics. This lack of mimics can contribute to operational delays in the use of these systems. Proper use of mimics integrates system components into functionally oriented diagrams that reflect component relationships and thereby decrease operator decision making and search time.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for the RHR and the Core Spray systems as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the RHR and the Core Spray systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 180
HED Guideline No.: 1.5.3.F-1
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 8-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 258
HED Guideline No.: 1.5.3.F/OS-2
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 259
HED Guideline No.: 1.5.3.F/OS-3
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 262
HED Guideline No.: 1.5.3.F/OS-4
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 8-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 389
HED Guideline No.: 1.5.3.E.1-1
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 8-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 390
HED Guideline No.: 1.5.3.E.2-1
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 448
HED Guideline No.: 1.5.3.F/V-5
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 465
HED Guideline No.: 5.1.2.A/V-2
Category / Level: 1B
FSR Page No.: 106
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

At present, the following recorders (on 90X-7) read in backpressure: Single and dual pen recorders for "condenser vacuum 1A, 1B, 1C". The range is 0-30 and units are in "inches of Hg" in divisions of .5. Procedures and tech specs as well as training aids etc., always refer to vacuum. A multipoint recorder was suggested as well as keeping the existing recorders.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is a clear and distinct differentiation between systems, particularly the Emergency Core Cooling ones. Further, any temporary labels and "erroneous" labels such as those for condenser vacuum have been replaced with "temporary" permanent labels so that all components are clearly labeled and identified. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

HED Category Non 1A/1B Open Items

Appendix C

Quad Cities Station Units 1 & 2

Non 1A/1B Open Items

DCRDR HEDS

Index No.	Unit No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
12	1,2	64	3.1.2.C.2 1	2nd RF	3rd RF	2B
13	1,2	65	3.1.2.C.3 1	2nd RF	3rd RF	2B
15	1,2	68	3.1.5.A 1	2nd RF	3rd RF	2C
16	1,2	68	3.1.5.B.1 1	2nd RF	3rd RF	2C
17	1,2	71	3.2.1.F 1	2nd RF	3rd RF	2B
18	1,2	72	3.3.1.A 1	2nd RF	3rd RF	2B
20	1,2	74	3.3.2.B 1	2nd RF	3rd RF	2C
24	2	78	3.3.3.C.1 2	2nd RF	6-1-89	3C
27	1,2	62	3.3.4.C 1,2,3	2nd RF	3rd RF	1C
32	1,2	80	3.3.4.A 1	2nd RF	3rd RF	2A
50	2	187	7.1.8.B.1.C 1	2nd RF	6-1-89	2C
55	2	189	7.2.7.H 1	2nd RF	7-1-89	2C
57	2	190	7.2.7.K.1 1	2nd RF	7-1-89	2C
59	2	193	7.2.7.L.3 1	2nd RF	7-1-89	2C
67	2	346	7.3.2.F.1 1	2nd RF	3rd RF	2C
74	1,2	62	3.1.2.C.1 1	2nd RF	3rd RF	1C
78	2	346	7.3.2.F.2 1	2nd RF	3rd RF	2C
79	2	339	7.2.5.K.1 1	2nd RF	7-1-89	2C
102	2	250	2.1.6.F 1	2nd RF	Jan 89	2C
107	2	179	6.6.3 OS 1	2nd RF	6-1-89	3B
109	1,2	54	2.2.1.B 1	2nd RF	3rd RF	2B
110	1,2	54	2.2.1.C.2 1	2nd RF	3rd RF	2B
111	1,2	54	2.2.2.A 1	2nd RF	3rd RF	2C
117	2	50	2.1.7.B 1	2nd RF	12-31-89	2C
118	2	136	5.4.1.A 1	2nd RF	3rd RF	1C
119	2	136	5.4.1.B 1	2nd RF	3rd RF	1C
121	2	138	5.4.1.K 1	2nd RF	6-1-89	3C
122	2	137	5.4.2.A.1 1	2nd RF	3rd RF	3C
124	2	136	5.4.2.B.3 1	2nd RF	3rd RF	1C
125	1,2	121	5.1.5.C 1	2nd RF	3rd RF	1C
129	2	119	5.1.4.A.1 3	2nd RF	6-1-89	3C
130	2	119	5.1.4.A.1 2	2nd RF	6-1-89	3C
131	2	119	5.1.4.A.1 1	2nd RF	6-1-89	3C
133	2	292	5.1.2.E.2 2	2nd RF	6-1-89	2C
136	2	292	5.1.2.E.1 2	2nd RF	6-1-89	2C
140	2	115	5.1.2.E.2 3	2nd RF	6-1-89	3C
151	2	125	5.2.1.B 1	2nd RF	Complete	1C
159	2	141	6.1.1 1	12-31-87	6-1-89	3C
159	2	142	6.1.1 2	12-31-87	6-1-89	3C

Quad Cities Station Units 1 & 2

Non 1A/1B Open Items

DCRDR HEDS

Index No.	Unit No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
162	1,2	131	5.3.2.A.1 1	1st RF	6-1-89	3C
163	2	133	5.3.3.A.2 1	2nd RF	3rd RF	1C
164	2	133	5.3.3.A.3 1	2nd RF	3rd RF	1C
166	2	197	8.1.1.B 2	2nd RF	6-1-89	1C
166	2	198	8.1.1.B 3	2nd RF	6-1-89	3C
171	2	129	5.3.1.A.1 1	2nd RF	Pending	1C
172	2	130	5.3.1.A.3 1	2nd RF	Pending	1C
176	2	220	1.1.1 OS 2	2nd RF	3rd RF	2B
186	2	135	5.3.3.C 1	2nd RF	6-1-89	2B
187	1,2	142	6.1.1 3	12-31-87	6-1-89	3C
190	1	354	8.2.1.C.2 1	2nd RF	3rd RF	2C
193	2	210	8.2.1.C.1 2	2nd RF	6-1-89	1C
208	2	203	8.1.2.A 1	2nd RF	6-1-89	2C
209	2	204	8.1.2.A 2	2nd RF	6-1-89	2C
214	2	215	8.3.2.D.1 1	2nd RF	6-1-89	3C
216	2	91	4.2.2.F.1 1	2nd RF	6-1-89	3C
223	2	269	4.4.4.B 1	2nd RF	6-1-89	1C
260	1,2	118	5.1.3.D.2 1	12-31-88	6-1-89	3C
264	2	117	5.1.3.A 1	12-31-88	6-1-89	3C
265	2	261	4.1.1.B.1 OS 2	2nd RF	3rd RF	2A
271	1,2	350	8.1.1.B OS 5	2nd RF	3rd RF	1C
274	2	208	8.2.1.A.2 H 1	2nd RF	6-1-89	2B
281	2	181	6.6.3 OS 2	2nd RF	6-1-89	3B
288	2	145	6.1.1 H 5	2nd RF	3rd RF	3C
314	2	299	5.2.4 OS 1	2nd RF	12-31-89	3C
323	1,2	71	3.2.1.F OS 2	2nd RF	3rd RF	2C
333	2	188	7.2.2.B.1 OS 2	2nd RF	7-1-89	2C
336	2	155	6.1.2.A.2 1	2nd RF	6-1-89	3C
336	1,2	160	6.2.1.B 1	2nd RF	6-1-89	3C
337	2	156	6.1.2.A.3 1	2nd RF	6-1-89	3C
340	2	160	6.1.2.A 1	2nd RF	6-1-89	3C
342	2	164	6.3.1.A 1	2nd RF	6-1-89	3C
345	2	164	6.3.2.B 1	2nd RF	6-1-89	3C
346	2	164	6.3.2.C 1	2nd RF	6-1-89	3C
347	2	164	6.3.2.D 1	2nd RF	6-1-89	3C
348	2	164	6.3.2.E 1	2nd RF	6-1-89	3C
351	2	160	6.3.7.A 1	2nd RF	6-1-89	3C
352	2	310	6.3.8.A 1	2nd RF	6-1-89	3C

Quad Cities Station Units 1 & 2

Non 1A/1B Open Items

DCRDR HEDS

Index No.	Unit No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
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Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

SPDS HEDs

Appendix D

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Quad Cities Station

SPDS HEDS

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Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

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Appendix E

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0412, 0266

04 HED NO.: 1.1.1.B/VL-3, 8.2.1.C.1/OS-2

CATEGORY: 1 LEVEL: B

FINDING:

During the validation, it was noted that HPCI turbine vibration must be monitored when operating the HPCI turbine on the 90X-3 panel. However, the recorder which displays that information is on the 90X-7. Moreover, only the last 3 points on that multipoint recorder measure HPCI turbine vibration and the operator must wait for those points to cycle through before he can obtain a current reading. It is desirable to have functionally related controls and displays grouped together and these factors of location and information accessibility could adversely affect operations in an emergency event.

RESPONSE:

The HPCI turbine vibration instruments are required for testing HPCI during non-emergency conditions. The operator has adequate time to monitor the turbine vibration during the slow roll start-up procedure. There is no requirement to monitor turbine vibration during an automatic initiation when the controls will accelerate the turbine to full flow as fast as possible. A higher speed recorder has been installed on both units.

IMPLEMENTATION:

Completed.

4416/c/58

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0418

04 HED NO.: 1.1.1.A/V-15

CATEGORY: 1 LEVEL: C

FINDING:

There is presently no diesel generator cooling water pump control or indicating lights in the control room. An equipment attendant is sent to the respective diesel generator to start the cooling pump unless it started automatically. It would have to be stopped locally. The 1 or 2 diesel cooling water pumps supply cooling water to the respective units ECCS room coolers. The 1/2 can be valved into the supply room coolers. Indication that the pump has started is of primary importance. The ability to start and stop it from the control room is secondary.

RESPONSE:

The respective diesel generator cooling water pump indicating lights will be installed on the 90X-8 panels. The pump starts automatically when the diesel starts. Therefore, a control is unnecessary; there is only a need for an indication of whether it has started.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/34

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0445, 0102

04 HED NO.: 1.1.1.A/VL-7, 1.1.1.B/OS-7

CATEGORY: 1 LEVEL: A

FINDING:

During validation, when the water level was beyond the range of the narrow range GEMAC and YARWAY instruments and the feedwater system was being used to maintain water level, it was observed that operators had to frequently traverse between 90X-4 and 90X-5 to monitor water level. In addition, response to the operator survey indicated that better level indication is needed on the 90X-3 panel where the emergency core cooling system is located. Reactor level indicators are on 90X-5, and it would be useful to have a redundant water level indicator on 90X-4.

RESPONSE:

Digital displays indicating water level will be installed on 90X-3, 90X-4, and 90X-5.

IMPLEMENTATION:

By the completion of the first refueling outage.

4415/c/40

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0406

04 HED NO.: 1.1.4/VL-1

CATEGORY: 1 LEVEL: B

FINDING:
It was observed during the validation that some procedure statements were unclear, ambiguous, or incomplete. Specifically noted were:

Procedure	Step	Discrepancy
QGP 1-1	D3A	Potential confusion and error could be avoided if the procedure step specifically identified the "A" pressure regulator as the controlling one.
QOP 1300-1	F4	The procedure could be written more clearly. This step directs the operator to verify valve position but does not tell which one.
QGP 2-3	D3D	Procedure clarity could be enhanced, as well as consistency with labeling, if the word "suppression" was inserted before "pool".
QGP 2-3	D3D	The procedure step should reference the appropriate procedures for reactor pressure.
QOP 2300-1	F7	No annunciators should be up; therefore this step should be deleted.
QOP 2300-3	F11	This step is unnecessary and should be deleted.
QGP 2-3	D3 A&B	Step B is redundant to Step A and should be incorporated into Step A as a reference on how to accomplish the first part of the step.
QGP 2-3	D3C	There should be a procedure reference for RHR suppression pool cooling.
QOA 1600-3 (QOA 201-2)	N/A (D1)	Procedure QOP 1000-09 should be referenced directly from QOA 201-2 at step 01.

RESPONSE:
The cited ambiguous procedure statements will be corrected.

IMPLEMENTATION:
By the completion of first refueling outage.

4404/c/56

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0407

04 HED NO.: 1.1.4/VL-2

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that in some procedures the procedural steps were out of sequence. Proper procedural step sequencing minimizes the probability of error and reduces operational confusion. Specifically the following were noted:

Procedure	Step	Discrepancy
QGP 1-1	D3H5 & 6	Step D3H5 should follow step D3H2 and step D3H6 should follow step D3H4 because respectively steps H2 and H5 concern the opening of HPCI valve MO 2301-4 and steps H4 and H6 concern the opening of RCIC valve MO 1301-16.
QOP 2300-1	F8	This step is in the wrong sequence in the procedure which checks instruments as they are layed out on the panel not as they are functionally used. In this instance the 4 and 5 valves must be reset before they can be opened.
QOP 1000-4	5 & 6	Step 5 and 6 should be reversed. Step 6 should preceed step 5.

RESPONSE:

The cited discrepancies will be corrected.

IMPLEMENTATION:

By the completion of first refueling outage.

4404/c/58

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0085

04 HED NO.: 1.1.4.D-1

CATEGORY: 3   LEVEL: C

FINDING:

Although documents are protected by binders, the pages are loose and torn. The potential for information to become lost or destroyed increases each time the procedures are used. (Photo Log No. A-6)

RESPONSE:

The discrepant documents will be repaired and replaced. The control room procedures will be reviewed periodically by the personnel assigned to the operating department communication center and replaced as necessary to maintain them in a quality condition.

IMPLEMENTATION:

By the completion of the first refueling outage.

4407/c/62

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0148, 0149

04 HED NO.: 1.3.2.A-1, 1.3.2.B-1

CATEGORY: 1 LEVEL: B

FINDING:

Dedicated crews are not used on the mirror imaged units or the center desk.

RESPONSE:

The major systems are mirror imaged on their respective panels, but the controls and instrumentation within the major systems are arranged in the same left to right order. Therefore, when an operator is operating equipment within major systems, all equipment is in the same relative position on both units.

The station has not encountered problems during its operating life with the control panel arrangements. The operators rotate through the three control room positions (Unit 1, Unit 2, and common service) on a daily basis which keeps them current on the panel differences.

Enhancements (background shading, demarcation) as well as summary level labels will be added to the control panels. Labels will include system names and panel numbers (including unit designator). This will aid the operators in rapid identification of panels.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/30

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0389, 0390, 0180, 0258, 0259, 0262, 0448

04 HED NO.: 1.5.3.E.1-1, 1.5.3.E.2-1, 1.5.3.F-1, 1.5.3.F/OS-2, 1.5.3.F/OS-3, 1.5.3.F/OS-4, 1.5.3.F/V-5

CATEGORY: 1 LEVEL: B

FINDING:

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

RESPONSE:

The lighting in the control room will be modified to a level of 20-50 footcandles and the glare minimized. Alternatives considered include configuration of louvers, different size louvers, modifying light configuration, and changing wattage of light bulbs.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/35

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0117

04 HED NO.: 2.1.7.B-1

CATEGORY: 2 LEVEL: C

FINDING:

When control room personnel are wearing protective masks they cannot sufficiently communicate information over the present communication equipment. Voice communication is distorted in reception and transmission. This may result in operators unable to perform duties as required.

RESPONSE:

Protective masks, capable of allowing operators to communicate, will be provided.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/74

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0109, 0110

04 HED NO.: 2.2.1.B-1, 2.2.1.C.2-1

CATEGORY: 2 LEVEL: B

FINDING:

Auditory signals do not provide localization cues that direct operators to those control room work stations where their attention is required. Auditory signals in the control room are not coded. Several panels will share one alarm. Alarms on Unit 1 are not easily distinguished from alarms on Unit 2 or the common panels. Telephone bells on the center desk and the SCRE's desk are not easily distinguishable.

RESPONSE:

Auditory coding will be used to provide localization cues to those control room work stations where the operators' attention is required. In addition, bells on the telephone on the center desk will be modified.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/48

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0399

04 HED NO.: 2.2.5.A-1

CATEGORY: 2 LEVEL: B

FINDING:

The frequencies of the auditory signals for the annunciator system are not between 200 and 5000 Hz.

ALARM LOCATION	FREQUENCY (Hz)
901-3	125-4000
901-7	500-16000
901-54	250-16000
901-56	500-8000
902-3	250-8000
902-6	500-8000
902-55	250-16000
902-56	250-16000
912-1	2000-16000
912-2	2500-4000
912-7	1000-16000
912-8	250-16000

The 912-1, 902-55, 902-56 alarms have tape on them to reduce the intensity. Tape was removed for frequency evaluation.

Alarms with frequencies between 200 and 5000 Hz will ensure that the alarms will be heard clearly.

RESPONSE:

The alarms will be replaced with alarms of frequencies between 200 and 5000 Hz.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/11

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0398

04 HED NO.: 2.2.5.B-1

CATEGORY: 2 LEVEL: B

FINDING:

The bandwidth of the auditory alarms for the annunciator system are greater than 200 Hz.

Alarm Location	Frequency (Hz)
901-3	125-4000
901-7	500-16000
901-54	250-16000
901-56	500-8000
902-3	250-8000
902-6	500-8000
902-55	250-16000
902-56	250-16000
912-1	2000-16000
912-2	2500-4000
912-7	1000-16000
912-8	250-16000

Alarms with narrower bandwidths provide much clearer signals at lower intensities and allow operators to easily differentiate between alarms.

RESPONSE:

The alarms will be replaced with alarms with bandwidths of less than 200 Hz.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/12

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0400

04 HED NO.: 2.2.6.A-1

CATEGORY: 2 LEVEL: B

FINDING:

The sound levels of annunciator signals at workstations 901-55, 902-54, 902-3 and 912-2 do not have a signal to noise ratio of at least 10 dB(A). Depending on the background noise characteristic, it could be difficult to detect the annunciator signal.

RESPONSE:

Discrepant auditory signals will be modified to provide an intensity of at least 10 dB(A) above ambient noise level.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/13

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0401

04 HED NO.: 2.2.6.C-1

CATEGORY: 2 LEVEL: B

FINDING:

Some auditory signal intensities are startling to the operators.

RESPONSE:

The discrepant auditory signals will be modified to provide an intensity (singular and additive) of 10 dB(A) over ambient noise to prevent startling.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/14

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0074, 0027

04 HED NO.: 3.1.2.C.1-1, 3.3.4.C-1, 3.3.4.C-2, 3.3.4.C-3, 3.3.4.C-4

CATEGORY: 1 LEVEL: C

FINDING:

There are several annunciators with inputs from more than one plant parameter. These include "High-Low", "A/B", and non-specific "trouble" alarms.

RESPONSE:

The operators have control panel or local panel instrumentation available to determine the specific "trouble". In all cases, annunciators are referenced in the annunciator procedures. The operators are trained to look up multi-input alarms in the procedure book when necessary.

IMPLEMENTATION:

Accept as is.

4403/c/38

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0012

04 HED NO.: 3.1.2.C.2-1

CATEGORY: 2 LEVEL: B

FINDING:

An alarm printout capability is not provided for all multi-input annunciators. Printing the specific alarm of all multi-input alarms would allow for ready clarification of the nature of the alarms.

RESPONSE:

The operators have control panel or local panel instrumentation available to determine the specific "trouble". In all cases, annunciators are referenced in the annunciator procedures. The operators are trained to look up multi-input alarms in the procedure book when necessary.

IMPLEMENTATION:

Accept as is.

4403/c/68

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0013

04 HED NO.: 3.1.2.C.3-1

CATEGORY: 2 LEVEL: B

FINDING:

For alarms with inputs from more than one parameter, a reflash capability is not provided which allows subsequent alarms to activate the auditory alert mechanism and reflash the visual tile even though the first alarm has not cleared.

RESPONSE:

The "trouble" alarms are critical to plant safety. The multi-input alarms that could affect plant safety have other control room indications.

IMPLEMENTATION:

Accept as is.

4403/c/67

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0016, 0015

04 HED NO.: 3.1.5.B.1-1-1, 3.1.5.A-1

CATEGORY: 2 LEVEL: C

FINDING:

There is no visual signal which indicates that an alarm has cleared. Also, there is no dedicated distinctive audible signal to indicate cleared alarms. At present, the operator must periodically activate the annunciator reset control to find out which alarms have cleared.

RESPONSE:

A visual signal will be provided to indicate cleared alarms. The audible signal is not needed since the visual signal will be provided.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/63

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0404

04 HED NO.: 3.2.1.D-1

CATEGORY: 2 LEVEL: B

FINDING:

The individual annunciators are not within ± 2.5 dB of 90.2 dB(A), which is the combined sound level of all the annunciators.

RESPONSE:

The annunciators will be adjusted to a level of ±2.5 dB(A) of the average of all annunciator auditory signals.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/15

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0017, 0323

04 HED NO.: 3.2.1.F-1, 3.2.1.F/OS-2

CATEGORY: 2 LEVEL: B

FINDING:

Individual work stations do not have separate distinct auditory alarms. At present, each unit (901 and 902) has two separate alarms. Individual distinct alarms at each panel would aid the operator by allowing a quicker response to the problem. This is particularly true for reactor scrams where it is difficult for the operators to determine which station (3, 4 or 5) has the problem.

RESPONSE:

Separate distinct auditory alarms will be provided for individual work stations.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/4

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0018

04 HED NO.: 3.3.1.A-1

CATEGORY: 2 LEVEL: B

FINDING:

There are visual alarm tiles which are not located above related controls and displays required for corrective or diagnostic action in response to the alarm. This may cause a delay in performing the actions needed to respond to the alarm.

RESPONSE:

The cited annunciators are located as close as possible to their related controls and displays. In all cases, annunciators are referenced in the annunciator procedures. The operators are trained to look up multi-input alarms in the procedure book as necessary.

IMPLEMENTATION:

Accept as is.

4403/c/64

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0020

04 HED NO.: 3.3.2.B-1

CATEGORY: 2 LEVEL: C

FINDING:

The alarm flash rate does not meet the 3 to 5 flashes per second criterion. The existing flash rate is approximately 2 flashes per second.

RESPONSE:

The alarm flash rate will be increased to 3 to 5 flashes per second.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/33

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0024

04 HED NO.: 3.3.3.C.1-2 /

CATEGORY: 3 LEVEL: C

FINDING:

The vertical and horizontal axes of the following annunciator panels are not labeled: 902-55, 902-56, 901-55 and 912-7. The axes labeling on 901-56 is white adhesive lettering attached to the metal surrounding the annunciator tiles.

RESPONSE:

The axes of the discrepant annunciator panels will be relabeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/37

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0451

04 HED NO.: 3.3.3.C.1/V-3

CATEGORY: 3 LEVEL: C

FINDING:

At present, the vertical and horizontal axes of the annunciator panel on the 901-56 panel are not labeled. Labeled axes aid in ready coordinate designation of a particular visual tile.

RESPONSE:

The axes of the 901-56 annunciator panel will be labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/18

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0032

04 HED NO.: 3.3.4.A-1

CATEGORY: 2 LEVEL: A

FINDING:

There are some visual tile legends which are ambiguous and non-specific. They alert the operator to system "Trouble" and fail to elaborate on the specific trouble. The operators are provided with little or no indication as to what the trouble is and have no other means to investigate the problem further (other than sending EAs and EOs out to identify the specific trouble).

RESPONSE:

The operators have control panel or local panel instrumentation available to determine the specific "trouble". In all cases, annunciators are referenced in the annunciator procedures. The operators are trained to look up multi-input alarms in the procedure book when necessary.

IMPLEMENTATION:

~~By the completion of the second refueling outage.~~ e

4418/c/24

accept as is.

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0216

04 HED NO.: 4.2.2.F.1-1

CATEGORY: 3 LEVEL: C

FINDING:

The color coding of the J-handle controls do not follow the recommendations of the guideline.

RESPONSE:

The red J-handles will be repainted orange to insure consistent use of color. In addition, color coding of J-handles has been added to the color coding standards.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/42

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0460

04 HED NO.: 5.1.2.A/V-1

CATEGORY: 3 LEVEL: C

FINDING:

Scale units on displays are not consistent with the degree of precision and accuracy needed by the operator to perform tasks during emergency operations. Displays are discrepant in the following ways: units are not labeled on the display, units are incorrect and/or labeling appears on the display face and not on the display itself.

RESPONSE:

The cited scales will be relabeled correctly.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/59

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0465

04 HED NO.: 5.1.2.A/V-2

CATEGORY: 2 LEVEL: B

FINDING:

At present, the following recorders (on 90X-7) read in backpressure: Single and dual pen recorders for "condenser vacuum 1A, 1B, 1C". The range is 0-30 and units are in "inches of Hg" in divisions of .5. Procedures and tech specs as well as training aids etc., always refer to vacuum. A multipoint recorder was suggested as well as keeping the existing recorders.

RESPONSE:

The cited recorders will be relabeled to indicate backpressure.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/49

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0466

04 HED NO.: 5.1.2.A/V-3

CATEGORY: 2 LEVEL: C

FINDING:

Presently, the following meters show direction of flow to either the north or south: "west branch cw dp" and "east branch cw dp". The ranges are "south +30 to 0 to +30 north" the fact that one is actually looking at "dp" is not stated on the meter.

RESPONSE:

"dp" will be added to the meter faces for the cited meters.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/48

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0464

04 HED NO.: 5.1.2.D.1/V-4

CATEGORY: 3 LEVEL: C

FINDING:

Scales are not selected to span the expected range of operational parameters. At present, the wide range reactor level (cold calibration) meters have a range of -243 to +57 inches in divisions of 6. Major tic marks and numerical notation are listed on the meter from 57 to -273 every 30 inches. These are difficult to read. The total range of 300 inches may be appropriate to monitor reactor level after an accident.

RESPONSE:

Control room reactor level scales will be modified to insure that all contain consistent scales.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/61

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0494

04 HED NO.: 5.1.2.D.1/V-6

CATEGORY: 3 LEVEL: C

FINDING:

Meter 6 for Unit 1 and meters 5 and 9 on Unit 2 are not consistent with similar bypass valve meters (on 90X-7).

RESPONSE:

The discrepant meter scales will be modified to insure consistency between similar meters.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/62

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0140 -

04 HED NO.: 5.1.2.E.2 3

CATEGORY: 3 LEVEL: C

FINDING:

Scale ranges for lift pump amps meters (on 90X-7) are expanded by multiplying indicated scale values by five. Unit 1 meter is not labeled to indicate this. Unit 2 meter is labeled with dynotape (not permanently engraved). (Photo Log No. A-22)

RESPONSE:

The cited meters will be permanently labeled with the conversion factor.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/67

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0360

04 HED NO.: 5.1.2/OS-1

CATEGORY: 1 LEVEL: B

FINDING:

Operator survey results have indicated that the contaminated containment storage tank level on 90X-6 should read in gallons.

RESPONSE:

The indicator will be permanently labeled with the conversion factor.

IMPLEMENTATION:

By the completion of the first refueling outage.

4403/c/3

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0264

04 HED NO.: 5.1.3.A-1

CATEGORY: 3   LEVEL: C

FINDING:

The guideline states that the character height on displays should subtend a visual angle of 15 minutes. This means that at a viewing distance of 30 inches (the depth of the benchboards), the character height must be at least .132 inches. Listed are examples of displays that are not in accordance with the guideline. This guideline is stated to ensure that lettering on displays is legible.

Label	Comment
reactor water level	Required Char Ht .132 Measured Char Ht .090
containment pressure	Required Char Ht .132 Measured Char Ht .080
bypass valve-1	Required Char Ht .132 Measured Char Ht .075

RESPONSE:

The deviation in character height for the cited displays presents no problems in readability to the operators. The 5th percentile operators can lean slightly across the benchboard. Guardrails will be added to the front of each benchboard to prevent inadvertent actuation of the controls.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/8

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0260, 0257

04 HED NO.: 5.1.3.D.2-1, 5.1.3.D.3-1

CATEGORY: 3 LEVEL: C

FINDING:

The guideline states that display letter characters and numerics are to have a width-to-height ratio of 1.00-.60 and .60, respectively. Several displays are not in accordance with the guideline. This guideline is stated to ensure that displays are legible and somewhat consistent.

RESPONSE:

The discrepant ratios range from .33 to .53. This is an insignificant deviation and results in no difficulty in readability for the operators.

IMPLEMENTATION:

Accept as is.

4407/c/46

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0129, 0131, 0130

04 HED NO.: 5.1.4.A.1-3, 1-1, 1-2

CATEGORY: 3 LEVEL: C

FINDING:

Scales do not have labels or required information to use the scales. In some instances, the information is inappropriately located.

RESPONSE:

Discrepant scales will be permanently labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/17

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0127

04 HED NO.: 5.1.5.A.1-1

CATEGORY: 1 LEVEL: C

FINDING:

More than 9 graduations are used between major numerals on displays. Having more than 9 graduations can make accurate reading of the display difficult. (Photo Log No. A-27)

RESPONSE:

All meters are easy to read and provide several redundant measures of identification. The scale units and parameter measured are provided on the scales as well as a label appended to the instrument for identification. These various items add to a rapid identification of measurement. In addition, color banding will be added to the meters to provide critical ranges.

IMPLEMENTATION:

By completion of the second refueling outage.

4404/c/36

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0125

04 HED NO.: 5.1.5.C-1

CATEGORY: 1 LEVEL: C

FINDING:

Successive values indicated by unit graduations are not multiples of 1, 2 or 5, or those values multiplied by some power of 10. These values are quickly and easily interpretable, which leads to less chance for error in their reading. (Photo Log No. A-29)

RESPONSE:

Zone banding will be added to the meters to insure that the operators will be able to identify critical ranges. In addition, consistent graduations will be marked on all reactor level instrumentation.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/37

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0497

04 HED NO.: 5.1.6.D.1/V-3

CATEGORY: 2 LEVEL: B

FINDING:

The meaning assigned to particular colors is not consistent across all applications within the control room. At present, lights are all a yellowish faded white. This includes the "in" light, the "out" light and the "channel selected" light.

RESPONSE:

The cited lights will be replaced with white lights.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/24

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0151

04 HED NO.: 5.2.1.B-1

CATEGORY: 1 LEVEL: C

FINDING:

Vertical straight scale values do not increase with upward movement of the pointer. Some of the vertical meters have a negative and positive scale around zero but are not marked so. (Photo Log No. B-10)

RESPONSE:

Scales on discrepant vertical meters will be labeled with plus (+) and minus (-) signs to indicate the true values on the scale.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/39

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0426

04 HED NO.: 5.2.3/VL-1

CATEGORY: 2 LEVEL: B

FINDING:

During the validation some indicators were observed with red grease pencil hash marks on the meter's face to indicate upper operating limits. This is a form of "zone banding" which when applied properly and consistently can enhance and facilitate operations. Specifically observed were the 1, 2 and 1/2 diesel generator AC kilowatt indicators and the TR 18 and 19 amp meters.

RESPONSE:

Zone banding techniques will be applied to the 1, 2, and 1/2 diesel generator AC kilowatt meters and the TR/18 and 19 amp meters.

IMPLEMENTATION:

By the completion of second refueling outage.

4404/c/59

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0171

04 HED NO.: 5.3.1.A.1-1

CATEGORY: 1 LEVEL: C

FINDING:

No method is provided for determining lamp failure in indicating lights, except by visual inspection.

RESPONSE:

The legend lights cited in this HED are part of the turbine control panel (90X-7). These lights are provided with a lamp test.

IMPLEMENTATION:

Accept as is.

4407/c/11

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0172

04 HED NO.: 5.3.1.A.3-1

CATEGORY: 1 LEVEL: C

FINDING:

Burned out bulbs in indicator lights are not always easily replaced. The sockets are aging and they have a tendency to fall apart when removing or installing new bulbs. Due to the heat generated by the lamps, the plastic lamp covers are melting to one another (typical of lights side-by-side), making it impossible to replace bulbs.

RESPONSE:

The legend lights cited in this HED are part of the turbine control panel (90X-7). These lights are provided with a lamp test.

IMPLEMENTATION:

Accept as is.

4407/c/12

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0162

04 HED NO.: 5.3.2.A.1-1

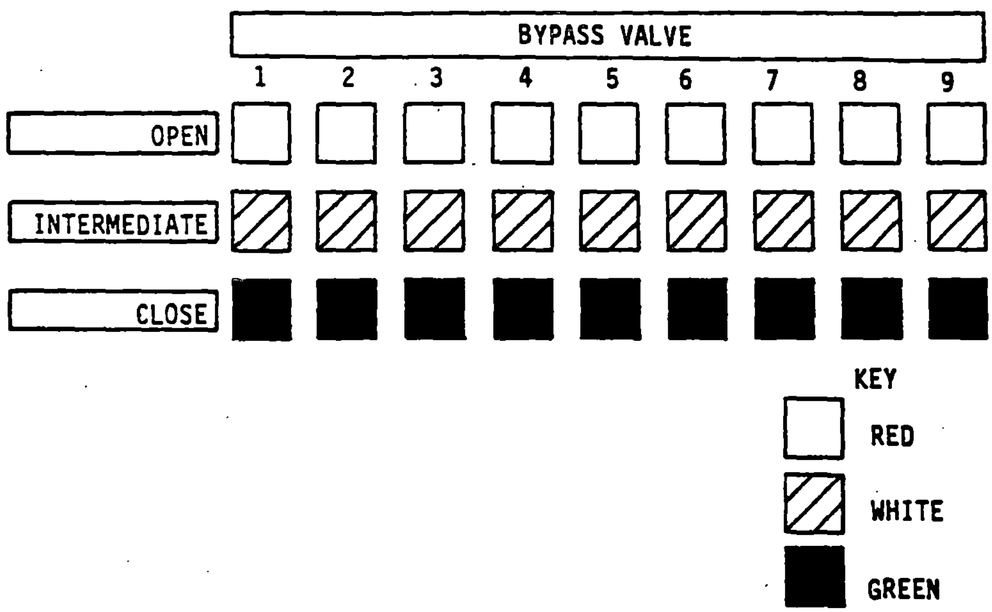
CATEGORY: 3 LEVEL: C

FINDING:

For a number of non-legend light indicators, there is no labeling, or labels are temporary. (Photo Log No. B-2)

RESPONSE:

All temporary labels will be replaced with permanent labeling. Matrix labeling will be added to the bypass valve matrix of lights on 90X-7 to adequately identify the meaning of each light.



IMPLEMENTATION:

By the completion of the first refueling outage.

4404/c/29

FINAL DRAFT 12/85

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0374

04 HED NO.: 5.3.3.A.1-1

CATEGORY: 1 LEVEL: C

FINDING:

The standard square legend indicating lights used throughout the control room do not meet the criteria of being 10% brighter than the surrounding panel. This is always true of the blue and yellow lights, sometimes true of the white, green, and red lights and never true for the amber lights. The legend lights on the turbine panel also have this problem.

RESPONSE:

The standard square legend indicating lights which have faded from age will be replaced.

IMPLEMENTATION:

By the completion of the second refueling outage.

4418/c/18

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0163, 0164

04 HED NO.: 5.3.3.A.2-1, 5.3.3.A.3-1

CATEGORY: 1 LEVEL: C

FINDING:

The legend lettering does not contrast well with legend background for legend lights. The legends are difficult to read under ambient lighting when the indicator light is extinguished. (Photo Log No. B-1 and A-34)

RESPONSE:

The legend lights which have faded from age will be replaced.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/38

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0186

04 HED NO.: 5.3.3.C-1

CATEGORY: 2 LEVEL: B

FINDING:

Some legend lights are not distinguishable from legend pushbuttons.

RESPONSE:

Demarcation will be added to pushbuttons to ensure that they are distinguishable from legend lights.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/12

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0118, 0119, 0124

04 HED NO.: 5.4.1.A-1, 5.4.1.B-1, 5.4.2.B.3-1

CATEGORY: 1 LEVEL: C

FINDING:

There are recorders in which pens, ink and paper do not provide clear and distinct markings. The ink is bleeding, making discrete recordings difficult. Blue grids on paper make it difficult to read light blue markings. Dark green grids make it difficult to read light markings. Dual pen recorders typically have one color marking over another color. Some markings are recorded on the border of the grid. For multipoint recorders, multiple points are not readable. Points are being recorded on top of one another, and ink is too light or is bleeding, making several points appear as a large smudge. Grid-to-marking contrast typically is poor. Some recorders have paper that does not match the scale on the recorder. (Photo Log No. A-7, A-10, A-8)

RESPONSE:

All discrepant recorders will be corrected.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/3

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0387, 0122

04 HED NO.: 5.4.1.C-1, 5.4.2.A.1-1

CATEGORY: 3 LEVEL: C

FINDING:

Recorder scales are not marked and numbered according to the specified guidelines. Some of the recorders have been cited for inappropriate graduation marking and numbering, others have been cited for a lack of labeling to identify parameter being recorded.

RESPONSE:

Recorder scales will be modified to implement the appropriate change for each recorder.

IMPLEMENTATION:

By the completion of the second refueling outage.

4418/c/26

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0121

04 HED NO.: 5.4.1.K-1

CATEGORY: 3 LEVEL: C

FINDING:

Not all data is visible through the window of the following recorders: (Photo Log No. A-9)

conductivity reactor demin (90X-4)
adsorber vessel temperatures (90X-54)
expansion and metal temperature (90X-7)
eccentricity and vibration (90X-7)

RESPONSE:

Labels (and job placement aids) for the cited recorders will be relocated to insure that recorder data is visible to the operators.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/4

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0414

04 HED NO.: 5.4.2.B.4/VL-2

CATEGORY: 1 LEVEL: C

FINDING:

During the validation it was observed that specific points, such as suppression pool temperatures and drywell temperatures on multipoint recorders, must be monitored, but the operator has no means of selecting a point to be printed. He must wait for the recorder to cycle through to the point. This causes unnecessary delay, which could have negative impact on operation, particularly in a time critical situation.

RESPONSE:

Suppression pool temperature and drywell temperature indications will be added to the control panel and will provide the necessary monitoring. The delay for waiting until the completion of the cycle is minimal. In addition, all points are trended.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/44

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0159

04 HED NO.: 6.1.1-1

CATEGORY: 3 LEVEL: C

FINDING:

Equipment is not properly labeled.

RESPONSE:

All control room equipment will be permanently labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/22

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0159, 0187

04 HED NO.: 6.1.1-2, 6.1.1-3

CATEGORY: 3 LEVEL: C

FINDING:

Controls have improperly labeled switch positions, related displays and controls do not have corresponding labels. (Photo Log No. B-15)

RESPONSE:

The switch positions on the cited controls will be relabeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/18

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0288

04 HED NO.: 6.1.1.H-5

CATEGORY: 3 LEVEL: C

FINDING:

On the A recirculation controller, the manual/auto deviation meter is not labeled, the speed demand meter has labels "open" and "closed," which are meaningless for a pump, and both scales display no parameters. These factors lead the operator to use the wrong meter.

RESPONSE:

The meters will be labeled "% speed demand" and the "close" and "open" labels will be removed.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/19

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0471

04 HED NO.: 6.1.1/V-8

CATEGORY: 3 LEVEL: C

FINDING:

Controls, displays, and other equipment items are not appropriately and clearly labeled. The items have: Labels in dynotape, no label, or labels are penciled or inked in. Also, items are mislabeled.

RESPONSE:

All control room instrumentation will be permanently labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/4

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0472

04 HED NO.: 6.1.1/V-9

CATEGORY: 3 LEVEL: C

FINDING:

Some pieces of equipment were found to be inappropriately labeled in the verification. Proper labeling aids in quick, accurate identification of components.

RESPONSE:

Discrepant labels will be modified.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/5

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0473

04 HED NO.: 6.1.1/V-10

CATEGORY: 3 LEVEL: C

FINDING:

The legends on some valve lights do not give the valve numbers. Most valve control switches in the control room have component numbers associated with them and this is useful information to have on the lights in that it aids in general operations and could help in proper identification under emergency conditions.

RESPONSE:

Valve numbers will be included on labels for all control switches.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/6

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0474

04 HED NO.: 6.1.1/V-11

CATEGORY: 3 LEVEL: C

FINDING:

The labels for area radiation monitors (on the 90X-2 back panel) do not contain information about which point is referred to on the multipoint recorders. Points are currently written on the rotary meters in pencil. Permanent labeling containing relevant supplemental information should be provided.

RESPONSE:

The area radiaton monitor (ARM) indicating meters on 90X-11 will be labeled to correspond to the ARM recorders (on 90X-2).

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/7

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0476

04 HED NO.: 6.1.1/V-13

CATEGORY: 3 LEVEL: C

FINDING:

At present, there is a meter labeled "radwaste building atmosphere" (on 912-5). Whether there is a difference between the reactor building or the atmosphere is not clear because neither is marked on the meter face. Labeling should clearly identify what is being displayed.

RESPONSE:

The meter will be relabeled "radwaste control room to outside dp". To ensure consistency in labels, the "radwaste building contaminated" meter will be relabeled "radwaste pump area to radwaste control room dp".

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/8

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0479

04 HED NO.: 6.1.1/V-14

CATEGORY: 3 LEVEL: C

FINDING:

The labeling on the wide range level reactor water meter (on 90X-4) makes no mention of it being different from other reactor water level meters. It is actually cold calibrated and reads normal water level at 68 inches instead of the hot calibrated 30 inches. Labeling should help to clearly identify what is being displayed.

RESPONSE:

A label will be added to the control panel which states "normal operating water level = 68 inches, cold calibrated".

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/9

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0500

04 HED NO.: 6.1.1/V-16

CATEGORY: 3 LEVEL: C

FINDING:

The listed indicator light for the turbine vacuum pump currently says "run" instead of "on" which is normally used for pump indication. Nomenclature in labeling should be consistent.

RESPONSE:

The discrepant indicator lights will be relabeled "on".

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/10

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0425

04 HED NO.: 6.1.1/VL-1

CATEGORY: 3 LEVEL: C

FINDING:

During the validation, some search time delay was observed with the instrument air system on the 912-1 panel.

RESPONSE:

Background shading and a summary label will be added to the 912-1 to ai in the identification of this system.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/03

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0336

04 HED NO.: 6.1.2.A.2-1

CATEGORY: 3 LEVEL: C

FINDING:

The guideline states that subordinate labels of a hierarchical labeling scheme are to be used to identify subsystems or functional groups. Subsystem labels are used on some parts of panel 3 and 4, but most of the control room has no hierarchical labels. Hierarchical labels should be used throughout the control room to inform the operators of groupings of controls and displays.

RESPONSE:

Summary lead labels will be added to the control panels in conjunction with background shading and demarcation of functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

4418/c/37

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0337

04 HED NO.: 6.1.2.A.3-1

CATEGORY: 3 LEVEL: C

FINDING:

Some panel elements do not have labels, or have dynotape or handwritten temporary labels.

RESPONSE:

All panel elements will be permanently labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/31

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0336, 0340, 0351

04 HED NO.: 6.2.1.B-1, 6.1.2.A-1, 6.3.7.A-1

CATEGORY: 3 LEVEL: C

FINDING:

Labels do not follow a hierarchical scheme throughout the control room. Component labels are not always located above the components to which they pertain.

RESPONSE:

Summary lead labels will be added to the control panels in conjunction with background shading and demarcation of functional groupings.

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336 = 6.1.2A2.1

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/26

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0402, 0380

04 HED NO.: 6.2.2.A-1, 6.6.1.B-1

CATEGORY: 3 LEVEL: C

FINDING:

Temporary labels and lines of demarcation are used and can be removed easily.

RESPONSE:

All temporary labels will be replaced with permanent labels. Current demarcation lines will be removed and new ones permanently painted on the control boards.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/24

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0342, 0345, 0346, 0347, 0348

04 HED NO.: 6.3.1.A-1, 6.3.2.B-1
6.3.2.C-1, 6.3.2.D-1
6.3.2.E-1

CATEGORY: 3 LEVEL: C

FINDING:

Labels are not clear, direct, and are ambiguous.

RESPONSE:

Labels cited as unclear, not direct, and ambiguous will be reworded.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/50

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0489

04 HED NO.: 6.3.8.A/V-2.

CATEGORY: 3 LEVEL: C

FINDING:

The listed controls were found in the verification to have inappropriate or missing switch positions. The availability and accuracy of nomenclature for switch positions is essential for positive identification of control functions.

RESPONSE:

Missing switch positions will be added. Inappropriate switch positions will be corrected.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/21

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0354

04 HED NO.: 6.3.9.A-1

CATEGORY: 3 LEVEL: C

FINDING:

Labels are not used to identify components within closed cabinets. For example, Panel 901-37 has a series of thumbwheels within a closed cabinet that is not labeled, and Panel 901-21 has leak detectors in a cabinet that must be opened for access, but which is not labeled.

RESPONSE:

Labels will be placed on the outside of 901-37 and 901-21 to identify components located inside the cabinet.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/27

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0355

04 HED NO.: 6.4.1.B.1-1,

CATEGORY: 3 LEVEL: C

FINDING:

The guideline states that labels will consist of dark characters on a light background. Some control room labels do not meet this guideline.

RESPONSE:

All discrepant labels will be re-engraved with black characters on a white background.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/43

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0356, 0357

04 HED NO.: 6.5.1.A-1, 6.5.1.B-1

CATEGORY: 3 LEVEL: C

FINDING:

Temporary labels are used in many areas of the control room. Dyno tape is used in conjunction with permanent labels. It is used as a substitute for permanent labels and is used for switch position indications. The guideline states that temporary labels are used only when necessary since temporary labels are subject to change or falling off.

RESPONSE:

All temporary labels will be replaced with permanent labels.

357

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/14

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0107

04 HED NO.: 6.6.3/OS-1

CATEGORY: 3 LEVEL: B

FINDING:

Operator survey results indicated that mimic flow paths would be very useful on 90X-3 and 90X-4. (Photo Log No. D-1)

RESPONSE:

Background shading and lines of demarcation will be added to 90X-3 and 90X-4. This will clarify functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/8

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0379

04 HED NO.: ~~6.6.3/OS-1~~ 6.6.3.1

CATEGORY: 3 LEVEL: C

FINDING:

Label color is not dedicated to specific functions or conditions throughout the control room. The use of color for grouping of related systems or functions enhances the operators ability to identify specific items.

RESPONSE:

A standard for the use of color in the control room has been established and implemented. This color standard will be applied to the labels where color is used to cue the operator for component or system identification.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/46

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0281

04 HED NO.: 6.6.3/OS-2

CATEGORY: 3 LEVEL: B

FINDING:

Operator survey results indicated that particular switches should have a mimic of the actual flow path, and there should be uniformity between system mimics.

RESPONSE:

Mimic colors will be changed to provide a consistent systematic approach to the panel layout.

IMPLEMENTATION:

Accept as is.

4403/c/9

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0419

04 HED NO.: 6.6.3/VL-2

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that the core spray system, the low pressure core injection (LPCI) injection mode of residual heat removal (RHR), and RHR in general do not have flowpath mimics. This lack of mimics can contribute to operational delays in the use of these systems. Proper use of mimics integrates system components into functionally oriented diagrams that reflect component relationships and thereby decrease operator decision making and search time.

RESPONSE:

Background shading and demarcation will be added to the 90X-3 panel to clarify functional groupings.

IMPLEMENTATION:

By the completion of the first refueling outage.

4404/c/61

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0376, 0377

04 HED NO.: 6.6.3.A.3-1, 6.6.3.A.2-1

CATEGORY: 3 LEVEL: C

FINDING:

There is inadequate contrast between the different color mimic lines and between mimic lines and the beige panel. Sufficient contrast can improve flow path identification.

RESPONSE:

These mimic lines will be replaced with black mimic lines.

377

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/41

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0375, 0378

04 HED NO.: 6.6.3.A.4-1, 6.6.3.A.1-1

CATEGORY: 3 LEVEL: C

FINDING:

Mimic flow paths are not color coded and mimic lines depicting the flow of the same contents are not the same color. Proper color coding of mimic lines helps to reflect functional relationships and decrease operator decision time.

RESPONSE:

Mimic lines on the electrical panel will be color coded to represent voltages. All other mimic lines throughout the control room will be coded black.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/45

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0392

04 HED NO.: 6.6.3.B.3-1

CATEGORY: 3 LEVEL: C

FINDING:

Arrows are not used to indicate flow direction on mimics.

RESPONSE:

Flow directions on mimics will be clearly identified by arrows.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/21

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0050

04 HED NO.: 7.1.8.B.1.C-1

CATEGORY: 2 LEVEL: C

FINDING:

Specific codes or addresses by which data may be called up on the computer system are not cross-indexed by system/subsystem identification. This type of cross-indexing helps in readily identifying needed information.

RESPONSE:

The index will be provided as hard copy and placed in the control room to make it available to operations personnel.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/27

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0333

04 HED NO.: 7.2.2.B.1/OS-2

CATEGORY: 2 LEVEL: C

FINDING:

Response to the operator survey indicated that on many of the reactor parameter displays on CRT's it is hard to read the numbers. More space should be allotted for the values and less for the description. It is important that the operators be able to read the information on the CRTs accurately.

RESPONSE:

More space will be allotted for the values on the CRTs.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/15

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0055

04 HED NO.: 7.2.7.H-1

CATEGORY: 2 LEVEL: C

FINDING:

Colors and types of lines used for piping and electrical lines on the color CRTs are not used consistently. Consistent use of graphic coding allows for easy recognition and interpretation of graphic displays.

RESPONSE:

The colors and types of lines to be used for piping and electrical lines will be modified to reflect a consistent approach.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/36

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0057

04 HED NO.: 7.2.7.k.1-1

CATEGORY: 2 LEVEL: C

FINDING:

Colors used on CRTs are not consistent in meaning with colors in the rest of the control room. Consistent meanings for colors allow for easy recognition and interpretation.

RESPONSE:

The CRT (by the nature of its design) uses numerous colors. Most uses of color are for lines, outlining and wording. The use of colors does not need to be consistent with the control room since it is used independently.

IMPLEMENTATION:

Accept as is.

4407/c/37

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0059

04 HED NO.: 7.2.7.L.3-1

CATEGORY: 2 LEVEL: C

FINDING:

The color yellow is used on the color CRTs for regular lettering as well as to indicate caution or warning. The color yellow as defined by the checklist should mean: hazard potentially unsafe caution attention required marginal parameter value exists. The use of yellow for the regular lettering may imply unintended significance to the letters.

RESPONSE:

Yellow provides a good contrast on the CRT and is therefore used as a status condition color. This is an appropriate use of color.

IMPLEMENTATION:

Accept as is.

4407/c/40

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0166

04 HED NO.: 8.1.1.B-2

CATEGORY: 1 LEVEL: C

FINDING:

Some controls and displays are on the vertical portion of the benchboards and are part of the pressure suppression system (on 90X-3). They are not located over, or clearly related to, the controls and displays associated with the pressure suppression system on the horizontal portion of the benchboard which are grouped. Grouping by system helps to clearly show this relationship.

RESPONSE:

Background shading and a summary label will be added to 90X-3 to clearly show pressure suppression equipment.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/50

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0166

04 HED NO.: 8.1.1.B-3

CATEGORY: 3 LEVEL: C

FINDING:

Several displays and controls are not grouped with the systems to which they belong. Grouping by system helps to clearly show this relationship.

RESPONSE:

Background shading, demarcation, and summary labeling will be used on the control boards to distinguish systems from each other and clearly show functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/19

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0307

04 HED NO.: 8.1.1.B/OS-1

CATEGORY: 1 LEVEL: A

FINDING:

Operator survey results indicated that the high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems are difficult to operate when being used to reduce reactor pressure. These systems are not laid out according to function, sequence of use, frequency of use, or other operator expectations.

RESPONSE:

Background shading, demarcation, and system labels will be implemented to enhance the HPCI and RCIC system (90X-3 and 90X-4).

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/10

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0276

04 HED NO.: 8.1.1.B/OS-7

CATEGORY: 1 LEVEL: B

FINDING:

Operator survey responses indicated that panel 90X-8, which is the electrical panel, is poorly laid out and should be redone. Currently the controls and displays on the electrical distribution panel are not arranged according to function sequence, use frequency, or other obvious logical expectation. A poorly arranged central panel can contribute to operator confusion/error in an emergency situation. (Photo Log No. D-4)

RESPONSE:

Background shading, system mimics, and summary labeling will be used on this panel.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/22

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0277

04 HED NO.: 8.1.1.B/OS-8

CATEGORY: 1 LEVEL: B

FINDING:

The operator survey indicated that the following controls/displays should be grouped together: steam flow indicators (90X-5) main steam isolation valve (MSIV) controls (90X-3); and turbine throttle pressure indicators (90X-7). The operator needs to be able to use these controls while observing these indicators, and this control function is difficult with the current configuration.

RESPONSE:

Background shading and demarcation has been added to the cited equipment on 90X-3 and 90X-5.

IMPLEMENTATION:

By the completion of the first refueling outage.

04/4405/c/16

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0208

04 HED NO.: 8.1.2.A-1

CATEGORY: 2 LEVEL: C

FINDING:

Functional groups of controls on the horizontal portion of 90X-3, 90X-4, and 912-1 are separated by only 2 inches, as opposed to the required mimimum of 2.5 inches. This detracts from clearly defining the functional groupings. Another method of functional grouping enhancement needs to be used. (Photo Log No. C-15)

RESPONSE:

Demarcation lines as well as background shading will be added to 90X-3, 90X-4, and 912-1 to clearly show functional groupings. The operators do not wear gloves when operating controls. Therefore, the operators are able to easily operate controls.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/2

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0209

04 HED NO.: 8.1.2.A-2

CATEGORY: 2 LEVEL: C

FINDING:

Functional groups of displays are not separated by a minimum width of at least one display width.

RESPONSE:

Displays will be broken into functional groupings by the use of summary labels, demarcation, and background shading.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/5

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0416

04 HED NO.: 8.2.1/VL-1

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that the controls and displays on the 90X-4 panel are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the system contained on the panel.

RESPONSE:

Summary labeling, background shading, and lines of demarcation will be used to functionally differentiate the systems on the 90X-4 panel.

IMPLEMENTATION:

By the completion of second refueling outage.

4404/c/62

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0417

04 HED NO.: 8.2.1/VL-2

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that the controls and displays in the residual heat removal (RHR) and core spray systems are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the systems.

RESPONSE:

Background shading and summary labels will be added to 90X-3 to clarify functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/01

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0418

04 HED NO.: 8.2.1/VL-3

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that the controls and displays on the 90X-8 Panels are arranged without consideration of sequence of use, frequency of use, function or other logical expectations. This can contribute to delay and/or error in the use of the systems contained on the panel.

RESPONSE:

Summary labeling, background shading, and lines of demarcation will be used to functionally highlight and differentiate the systems on 90X-8.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/02

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0274

04 HED NO.: 8.2.1.A.2/HR-1

CATEGORY: 2 LEVEL: B

FINDING:

While Unit 1 was at reduced load to take the 'C' reactor feedpump out of service, the discharge valve of the 'B' feedpump, which was operating, was inadvertently closed. On Unit 2 the respective feedpump discharge valves are located directly above the feedpumps. On Unit 1 these valves are displaced to the right of their respective feedpump control switches by one control space. This does not conform to accepted human factors principles concerning left to right, top-to-bottom sequential control relationships; and can, as in this instance (DVR 4-1-79-97), lead to inadvertent control actuation. (Photo Log No. C-12)

RESPONSE:

Mimics and background shading will be installed in the Unit 1 control room for the feedpump and feedpump discharge valve portions of the 90X-6 panel.

IMPLEMENTATION:

By the completion of second refueling outage.

4404/c/46

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0193

04 HED NO.: 8.2.1.C.1-1

CATEGORY: 1 LEVEL: B

FINDING:

It would be helpful to have reactor pressure indication over controls for the auto blowdown system (on 90X-3). Having functionally related displays and controls grouped together facilitates their usage.

RESPONSE:

The auto blowdown system will be separated from other controls by a summary label and demarcation lines.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/58

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0193

04 HED NO.: 8.2.1.C.1-2

CATEGORY: 1 LEVEL: C

FINDING:

The valve control for the suppression chamber dump (on 90X-3) is functionally related to the suppression chamber test and spray valve control and may be more appropriately located next to it.

RESPONSE:

The cited controls will be background shaded the same color to designate their functional relationship.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/59

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0284

04 HED NO.: 8.2.1.C.1/OS-4

CATEGORY: 1 LEVEL: B

FINDING:

Operator survey response indicated that having the high pressure cooling injection (HPCI) components between the residual heat removal (RHR) loops (A&B) creates interference.

RESPONSE:

System labeling and background shading will be used to highlight the RHR Loops.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/62

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0491

04 HED NO.: 8.2.1.C.1/V-9

CATEGORY: 3 LEVEL: C

FINDING:

Functionally related controls and displays are not grouped together when they are used together to perform tasks related to a specific function. The charging water flow meter is located on the 901-5 Panel along with other control rod drive meters. The common placement is a flow meter with a pressure meter immediately to its right. Many other meters follow this convention. Presently, the flow meter is to the right of the pressure meter.

RESPONSE:

There is not a control room convention in regards to the placement of pressure and flow meters. The cited meters are functionally grouped with similar equipment and will be labeled "pressure" and "flow".

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/52

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0191

04 HED NO.: 8.2.2.A-4

CATEGORY: 1 LEVEL: B

FINDING:

The organization and layout of the 90X-8 does not clearly show the hierarchy of the system from power sources down through the various busses that are fed as well as the interrelationships among the bases and sources.

RESPONSE:

The mimic lines will be coded using different colors to clearly show the hierarchy and directionality of the system. In addition, background shading and demarcation lines will be added to enhance functional groupings.

IMPLEMENTATION:

By the completion of the first refueling outage.

4418/c/31

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0214

04 HED NO.: 8.3.2.D.1-1

CATEGORY: 3 LEVEL: C

FINDING:

The axes of the full core display matrix are labeled on the right and bottom as well as the top and the left sides of the matrix (Unit 2 is not labeled across the top). The control rod select matrix is also labeled across the bottom instead of the top. Proper labeling of the matrix helps to assure label visibility and clarity of the matrix organization.

RESPONSE:

Matrix labeling will be added to the axes of the full core display and the control rod select matrices to provide labeling on the top, bottom, right, and left of the matrix.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/30

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0173

04 HED NO.: 9.2.2.D-1

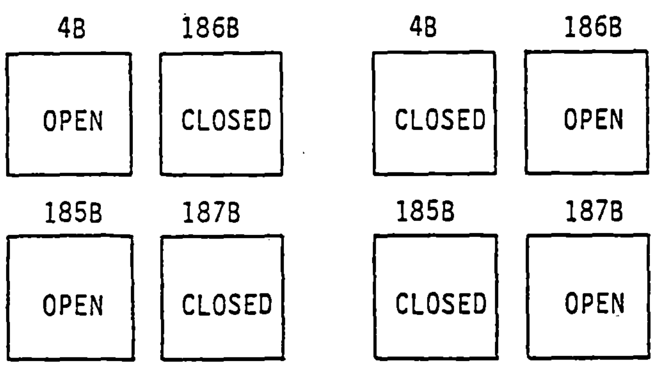
CATEGORY: 2 LEVEL: C

FINDING:

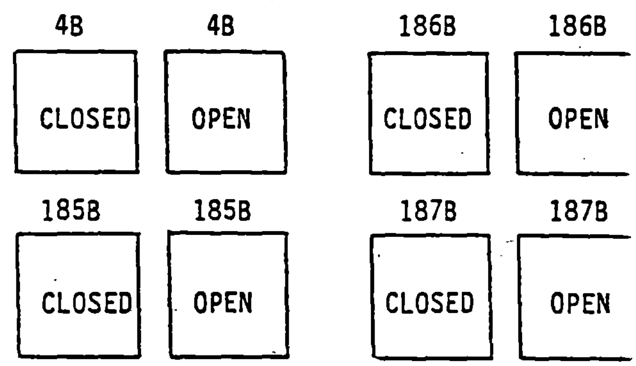
Residual heat removal (RHR) service water heat exchange valve position lights (on 90X-3) are not grouped in a fashion consistent with the rest of the control room. (Photo Log No. B-18)

RESPONSE:

The indicator lights will be rearranged so that they conform to the lighting convention employed throughout the control room.



CURRENT ARRANGEMENT



PROPOSED MODIFICATION

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/66

FINAL DRAFT 12/85

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0492

04 HED NO.: 9.3.2.B/V-1

CATEGORY: 2 LEVEL: C

FINDING:

There are several problems associated with the following recorders (on 90X-5): reactor pressure/total steam flow; turbine steam flow/reactor pressure; vessel level/total feedwater flow. The labels for reactor pressure do not indicate narrow range or wide range difference. It was also suggested that the wide range have a listed range of 0-1500 instead of $0\text{-}15 \times 10^2$. There are also functional and/or operating relationships which could be formalized by grouping these parameters differently.

RESPONSE:

The cited meters will be labeled. In addition, background shading and summary labels will be added to 90X-5 to clarify functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/65

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0176, 0406

04 HED NO.: 1.1.1/OS-2, 1.1.1.A/V-3

CATEGORY: 2 LEVEL: B

FINDING:

Operator survey results indicate the need for controls in the control room to control the control rod drive (CRD) pump discharge valves. Such control is currently done locally.

RESPONSE:

The CRD discharge valves will be made motor operated valves, and controls will be placed in the control room in proximity to the CRD pump controls.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/11

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0411

04 HED NO.: 1.1.1.A/V-8

CATEGORY: 1 LEVEL: B

FINDING:

At present, the ACAD/CAM mode switches are not physically located in the control room.

RESPONSE:

As a product of the labeling programs, the present ACAD/CAM power control switch will be relabeled to conform to the procedures. This switch is actually the mode switch and is located in the control room.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/29

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0102

04 HED NO.: 2.1.6.F-1

CATEGORY: 2 LEVEL: C

FINDING:

Control room inputs to the plant announcing system have no priority over other input. The control room input is not capable of interrupting an announcement in progress or of bypassing queued announcements. Providing an announcing system which gives priority to control room inputs will ensure quick public notification to plant personnel of control room status and will ensure immediate paging of and requests to various operating personnel during daily operations and in emergencies.

RESPONSE:

The telephone paging system will be modified to give priority to the control room.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/48

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0265

04 HED NO.: 4.1.1.B.1/OS-2

CATEGORY: 2 LEVEL: A

FINDING:

Response to the operator survey indicated that a pull-to-stop type throttle switch would be an improvement on the feedwater isolation valves (motor operated). The current feedwater regulating isolation valves throttle ability operation unduly restricts operator movement and availability to respond to other operational concerns. This restriction has the potential for contributing to operational problems.

RESPONSE:

Feedwater isolation valves will be changed so that the valves are seal in open and close. The ability to throttle the valve will be retained by installing valve controls which stop valve movement when the control handle is pulled out.

IMPLEMENTATION:

By the completion of second refueling outage.

4404/c/55

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0223

04 HED NO.: 4.4.4.B-1

CATEGORY: 1 LEVEL: C

FINDING:

The anticipated transient without scram (ATWS) manual scram turn pushbuttons have a small red knob indication to indicate if the switch is in the "armed" or "disarmed" position. The red indication is painted on the side of the control and is difficult for operators to see. Also, the "disarmed" label is displaced approximately an inch from the knob indication. Precise indication of switch position will ensure proper use of these controls as required. (Photo Log No. B-23)

RESPONSE:

A high contrasting arrow will be added to the knob and the "disarmed" and "armed" labels relocated to the proper position.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/16

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0457

04 HED NO.: 5.1.1.A.1/V-20

CATEGORY: 3 LEVEL: C

FINDING:

Visual displays provided in the control room do not give operators all of the information about system status and parameter values that is needed. At present, the computer window (number 02) on the 901-5 Panel is not functional. It should be used to visually monitor selected process computer parameters.

RESPONSE:

Computer-driven analog trend displays will be installed on both unit control panels.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/55

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0467

04 HED NO.: 5.1.1.A.1/V-23

CATEGORY: 2 LEVEL: B

FINDING:

The LED window #3 on the 901-7 panel has been used in the past to display valve status from the process computer. It is not functional at the present time. Additional operating information which can be called up at will by operators might be an aid in an emergency situation.

RESPONSE:

Computer-driven analog trend displays will be installed on the control panels for both units.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/44

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0136, 0133

04 HED NO.: 5.1.2.E.1-2, 5.1.2.E.2-2

CATEGORY: 2 LEVEL: C

FINDING:

The drum counter measuring flow is expanded by multiplying scale values by powers of ten to avoid the need for a time-consuming operator conversion. In addition, these scales are not permanently marked as to the conversion factor. (Photo Log No. A-18)

RESPONSE:

The cited drum counters are non-time dependent and non-critical. The operators can function adequately with this information. The conversion factor will be permanently labeled on the scale.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/66

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0169

04 HED NO.: 5.2.2.A.2-1

CATEGORY: 1 LEVEL: C

FINDING:

The scale values do not increase with the clockwise movement of the pointer for circular meters. The relationship between clockwise movement and the concept of "increase" is a population stereotype which, if violated, may cause confusion. The meters have a negative and a positive scale around zero but are not marked so. (Photo Log No. B-12)

RESPONSE:

The cited circular meters use zero as a center point to balance the positive and negative values. The indication used by the operator does not require positive and negative values, but relies on the pointer position relative to zero.

IMPLEMENTATION:

Accept as is.

4404/c/40

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0314

04 HED NO.: 5.2.4/OS-1

CATEGORY: 3 LEVEL: C

FINDING:

Operator survey results indicated that the display for condenser vacuum is in back pressure in the main control room, but during training it is referred to as vacuum. This can be confusing, especially to new operators.

RESPONSE:

Units for training will be made consistent with those in the main control room.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/5

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0352

04 HED NO.: 6.3.8.A-1

CATEGORY: 3 LEVEL: C

FINDING:

All discrete functional control positions are not identified.

RESPONSE:

The positions of all discrete functional controls will be clearly marked. All temporary labels will be replaced with permanent ones.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/04

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0079

04 HED NO.: 7.2.5.K.1-1

CATEGORY: 2 LEVEL: C

FINDING:

The alarm messages on the alarm CRT are not highlighted to distinguish them from other messages printed on that CRT. Highlighting of alarm messages allows for rapid distinguishability and location of the alarm messages.

RESPONSE:

Alarm messages will be highlighted by use of reverse video, color, or location to distinguish them from other messages displayed on the CRTs.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/35

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0067, 0078

04 HED NO.: 7.3.2.F.1-1, 7.3.2.F.2-1

CATEGORY: 2 LEVEL: C

FINDING:

The alarm messages do not clearly relate to the annunciator tile that is illuminated. This may result in confusion as to the annunciator being listed particularly if there are several going off at once.

RESPONSE:

The alarm messages do have the same wording as the tile but this requires that the operators know exactly where the tile is located. Printing of the panel and coordinates of the annunciator tile will be implemented to support operators.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/24

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0271

04 HED NO.: 8.1.1.B/OS-5

CATEGORY: 1 LEVEL: C

FINDING:

A number of responses to the operator survey indicated that half of the swing diesel controls are on Unit 1, but that the diesel can be operated from Unit 2. This is a poor arrangement of controls and displays and may contribute to operator error/confusion/hesitation in an emergency situation.

RESPONSE:

A voltage regulator and governor for the diesel, presently included on Unit 1, will be added to Unit 2 on Panel 902-8. The controls for the start/stop diesel will remain the same.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/21

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0190

04 HED NO.: 8.2.1.C.2-1

CATEGORY: 2 LEVEL: C

FINDING:

The listed displays and controls are not grouped with other displays and controls to which they are functionally related:

Reactor core isolation cooling (RCIC) reset pushbuttons
RCIC manual initiation
RCIC steam line break reset
Initation signal seal-in and reset
RCIC pump suction and discharge
Turbine inlet
Turbine exhaust

RESPONSE:

The RCIC displays and turbine displays will be rearranged to reflect proper grouping.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/66

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0316

04 HED NO.: 8.3.1.B/OS-1

CATEGORY: 1 LEVEL: B

FINDING:

Response to the operator survey indicated that control switches with the same shape are too close to one another though on different systems and can be inadvertently actuated. Example: closing or opening drywell sump valves and instead closing a recirculation pump discharge valve.

RESPONSE:

Where appropriate, lines of demarcation and/or background shading techniques will be used to differentiate between similar components belonging to different systems.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/08

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0317

04 HED NO.: 8.3.1.B/OS-2

CATEGORY: 1 LEVEL: B

FINDING:

Response to the operator survey indicated that the main steam isolation valve switches could be accidentally activated because of their proximity during containment valve operations.

RESPONSE:

Lines of demarcation to denote system and subsystem integration and background shading to denote system and subsystem differentiation will be implemented.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/09

Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

Quad Cities Safety Evaluation Report References

Appendix F

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 307
APPENDIX C3
HED CATEGORY 1A
FSR PAGE 199

FINDING

OPERATOR SURVEY RESULTS INDICATED THAT THE HIGH PRESSURE COOLANT INJECTION (HPCI) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEMS ARE DIFFICULT TO OPERATE WHEN BEING USED TO REDUCE REACTOR PRESSURE. THESE SYSTEMS ARE NOT LAID OUT ACCORDING TO FUNCTION, SEQUENCE OF USE, FREQUENCY OF USE, OR OTHER OPERATOR EXPECTATIONS.

RESPONSE

BACKGROUND SHADING, DEMARCATION, AND SYSTEM LABELS WILL BE IMPLEMENTED TO ENHANCE THE HPCI AND RCIC SYSTEM (90X-3 AND 90X-4).

NRC/SAIC COMMENT

The proposed corrective action only partially corrects the discrepancy. Moreover, acceptance of the proposed corrective action for this HED is dependent upon the licensee's resolution of the expressed NRC concerns over the following programs/standards:

- Color Coding
- Labeling
- Demarkation/Background Shading

CECO CLARIFICATION

Mimics are presently used to enhance the presentation of these systems on the control panel. The controls are appropriately labeled on the panels. The operators are trained to know the systems (and their operation) and the operators are trained to follow procedures prescribing the use of each control switch.

Display and control enhancement is a technique that allows operators to sort out the immediately relevant from the irrelevant stimuli. Effective enhancement permits timely acquisition of meaningful information, facilitates correct identification of relevant control options, and allows the operator to maintain effective awareness over system status.

Effective surface enhancement techniques include Demarcation and Mimic Lines, Color Shading, and Labeling. Color enhancement is used in nuclear power plant control rooms to help clarify component identification and functional relationships among various components. Many problems, such as large matrices of undifferentiated components, physically displaced controls and their associated displays, can be remedied with color shading.

Background shading also improves the efficiency of information transfer to the operator and assists his decision making process by organizing panel elements, minimizing existing visual clutter, optimizing desired associations among panel elements, and standardizing information presentation. Color enhancements also facilitate learning and retention of where components and controls are located, especially for new operators. Components having a common color also are seen as forming a group.

Because the goal of shading is to provide operator aids, the operator must agree with or approve the enhancement, or it probably will not be successful. Operator participation is a requirement throughout the color shading process and was integral during the selection of color enhancements at Quad Cities station that has taken place to date.

SAIC recommends that the number of colors used for coding should not exceed eleven (11) and should be kept to the minimum needed to provide sufficient information (as identified on page 6.5-11 in NUREG-0700). Quad Cities uses only six (6) colors for coding purposes and has established a standard to this effect. Moreover, because Quad Cities is a Red/Green board plant, the instances of the use of color for coding purposes is minimal. Color shading on the other hand does not represent system status or state, but is merely a perceptual aid designed to facilitate system identification. There is no meaning assigned to the shading and the shading should not be interpreted as coding.

Another factor in determining the utility of background shading is the area of the surface to which we are applying background shading. A control room the size of Quad Cities' can afford to use a greater number of color enhancements than control rooms with less area, provided it has been systematically applied using sound human engineering and operating principles. Several industry documents recognize the utility of using a number of background shading colors. One EPRI document advocated and provided an example which included eight (8) colors for one sample panel. In addition, there are precedents set throughout the industry which clearly demonstrate the effectiveness of using over twenty (20) colors for enhancement to support system identification.

Less than twenty (20) colors have been chosen for background shading for the main control boards at Quad Cities. Principles for color use (outlined in sections 6.5 and 6.6 of NUREG-0700) guided the selection of colors to be used on the control panels. Colors were selected from a pool of high contrast and matte finish shades used at other stations, applied against a "Kewanee Beige" board color. As an engineered retrofit, their application extends from a total-board design evaluation that followed a system-by-system approach.

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On the whole, the selection and use of background shading is designed to work in concert with other perceptual aids and the placement design of instruments. The total-board design evaluation will hold in check the potential overuse of one or more perceptual aids. Thus, where background shading will be applied, its use will be conservative, necessary, and meaningful for operator performance.

In addition, lines of demarcation will be used, where possible, to enhance system grouping. Demarcation will be used between closely-spaced but functionally distinct systems that do not have individual components placed within other system groupings. The use of demarcation instead of background shading, in these instances, will prevent the overuse of color. The proposed demarcations consist of circumscribing functional or selected groups with a contrasting line in areas where physical space or panel edges do not visually set apart the related components.

Due to the integration and coordination necessary for the successful implementation of these enhancement programs throughout the control room, the HEDAT feels an implementation date of the second refueling outage to be reasonable.

IMPLEMENTATION
2ND REFUELING OUTAGE

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 171
APPENDIX C6
HED CATEGORY 1C
FSR PAGE 129

FINDING

NO METHOD IS PROVIDED FOR DETERMINING LAMP FAILURE IN INDICATING LIGHTS, EXCEPT BY VISUAL INSPECTION.

RESPONSE

THE LEGEND LIGHTS CITED IN THIS HED ARE PART OF THE TURBINE CONTROL PANEL (90X-7). THESE LIGHTS ARE PROVIDED WITH A LAMP TEST.

NRC/SAIC COMMENT

The HED cites lack of provision for determining failure in indicator lights. It is not clear from CECo's response whether there are any other lights in the control room that suffer from the same difficiency aside from those on the turbine control panel. Additional information concerning the scope of the HED and its resolution is needed to provide assurance that the HED is satisfactorily resolved.

CECO CLARIFICATION

The Quad Cities HEDAT has recently become aware of a long life indicator light bulb developed by Pennsylvania Power and Light for their Susquehanna plant. The bulb is supposed to have a service life of 11 years and be compatable with GE type sockets. Elements within Commonwealth Edison Company are investigating the possibility of utilizing these bulbs at our facilities. If use of the Susquehanna light bulbs is feasible CECo will attempt to implement them at the Quad Cities station by the end of the second refueling outage. In the interim our shift turnover panel walk down surveillance program will be used to identify instances of bulb failure for replacement.

IMPLEMENTATION

2ND REFUELING OUTAGE

QUAD CITIES STATION

REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

APPENDIX C5

The following HEDs were identified and grouped as posing the same general concern to the reviewers in the TER attached to the SER. The same grouping is employed here which precludes the presentation of the HEDs' Findings.

HED#	HED CAT	FSR PG#	HED#	HED CAT	FSR PG#
0148,0149	1B	42	0277	1B	201
0030	2C	84	0416	1B	205
0071	2C	85	0417	1B	206
0336	3C	155	0418	1B	207
0336,0340,0351	3C	160	0274	2B	208
0107	3B	179	0193	1C	210
0166	3C	198	0284	1B	211

NRC/SAIC COMMENT
Acceptance of the proposed corrective action for this HED is dependent upon the licensee's resolution of the expressed NRC concerns over the following programs/standards:

- Color Coding
- Labeling
- Demarcation/Background Shading

CECO CLARIFICATION
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[NOTE: (1) HED number 418 was misnumbered in the TER attached to the SER. In the TER on page C-6 it was numbered 148. (2) HED number 277's FSR page number was incorrectly printed in the SER/TER as 210.]

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 417
APPENDIX C4
HED CATEGORY 1B
FSR PAGE 206

FINDING

DURING THE VALIDATION IT WAS OBSERVED THAT THE CONTROLS AND DISPLAYS IN THE RESIDUAL HEAT REMOVAL (RHR) AND CORE SPRAY SYSTEMS ARE ARRANGED WITHOUT CONSIDERATION OF SEQUENCE OF USE, FREQUENCY OF USE, FUNCTION, OR OTHER LOGICAL EXPECTATIONS. THIS CAN CONTRIBUTE TO DELAY AND/OR ERROR IN THE USE OF THE SYSTEMS.

RESPONSE

BACKGROUND SHADING AND SUMMARY LABELS WILL BE ADDED TO 90X-3 TO CLARIFY FUNCTIONAL GROUPINGS.

NRC/SAIC COMMENT

Proposed implementation dates should be reevaluated for implementation by the completion of the first refueling outage, or further justification should be provided for implementation as proposed.

CECO CLARIFICATION

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Another factor in determining the utility of background shading is the area of the surface to which we are applying background shading. A control room the size of Quad Cities' can afford to use a greater number of color enhancements than control rooms with less area, provided it has been systematically applied using sound human engineering and operating principles. Several industry documents recognize the utility of using a number of background shading colors. One EPRI document advocated and provided an example which included eight (8) colors for one sample panel. In addition, there are precedents set throughout the industry which clearly demonstrate the effectiveness of using over twenty (20) colors for enhancement to support system identification.

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Background shading will be applied to systems nested among others. In the few cases where this technique will be applied, a high-contrast background shade applied to the centrally positioned group will enhance the separation of adjacent systems.

On the whole, the selection and use of background shading is designed to work in concert with other perceptual aids and the placement design of instruments. The total-board design evaluation will hold in check the potential overuse of one or more perceptual aids. Thus, where background shading will be applied, its use will be conservative, necessary, and meaningful for operator performance.

In addition, lines of demarcation will be used, where possible, to enhance system grouping. Demarcation will be used between closely-spaced but functionally distinct systems that do not have individual components placed within other system groupings. The use of demarcation instead of background shading, in these instances, will prevent the overuse of color. The proposed demarcations consist of circumscribing functional or selected groups with a contrasting line in areas where physical space or panel edges do not visually set apart the related components.

IMPLEMENTATION
?ND REFUELING OUTAGE

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 418
APPENDIX C4
HED CATEGORY 1B
FSR PAGE 207

FINDING

DURING THE VALIDATION IT WAS OBSERVED THAT THE CONTROLS AND DISPLAYS ON THE 90X-8 PANELS ARE ARRANGED WITHOUT CONSIDERATION OF SEQUENCE OF USE, FREQUENCY OF USE, FUNCTION OR OTHER LOGICAL EXPECTATIONS. THIS CAN CONTRIBUTE TO DELAY AND/OR ERROR IN THE USE OF THE SYSTEMS CONTAINED ON THE PANEL.

RESPONSE

SUMMARY LABELING, BACKGROUND SHADING, AND LINES OF DEMARCATION WILL BE USED TO FUNCTIONALLY HIGHLIGHT AND DIFFERENTIATE THE SYSTEMS ON 90X-8.

NRC/SAIC COMMENT

Proposed implementation dates should be reevaluated for implementation by the completion of the first refueling outage, or further justification should be provided for implementation as proposed.

CECO CLARIFICATION

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[NOTE: This HED was misnumbered in the TER attached to the SER. In the TER on page C-6 it was numbered 0148.]

IMPLEMENTATION
2ND REFUELING OUTAGE

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 284
APPENDIX C4
HED CATEGORY 1B
FSR PAGE 211

FINDING

OPERATOR SURVEY RESPONSE INDICATED THAT HAVING THE HIGH PRESSURE COOLING INJECTION (HPCI) COMPONENTS BETWEEN THE RESIDUAL HEAT REMOVAL (RHR) LOOPS (A&B) CREATES INTERFERENCE.

RESPONSE

SYSTEM LABELING AND BACKGROUND SHADING WILL BE USED TO HIGHLIGHT THE RHR LOOPS.

NRC/SAIC COMMENT

Proposed implementation dates should be reevaluated for implementation by the completion of the first refueling outage, or further justification should be provided for implementation as proposed.

CECO CLARIFICATION

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IMPLEMENTATION
2ND REFUELING OUTAGE

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 416
APPENDIX C4
HED CATEGORY 1B
FSR PAGE 205

FINDING

DURING THE VALIDATION IT WAS OBSERVED THAT THE CONTROLS AND DISPLAYS ON THE 90X-4 PANEL ARE ARRANGED WITHOUT CONSIDERATION OF SEQUENCE OF USE, FREQUENCY OF USE, FUNCTION, OR OTHER LOGICAL EXPECTATIONS. THIS CAN CONTRIBUTE TO DELAY AND/OR ERROR IN THE USE OF THE SYSTEM CONTAINED ON THE PANEL.

RESPONSE

SUMMARY LABELING, BACKGROUND SHADING, AND LINES OF DEMARCATION WILL BE USED TO FUNCTIONALLY DIFFERENTIATE THE SYSTEMS ON THE 90X-4 PANEL.

NRC/SAIC COMMENT

Proposed implementation dates should be reevaluated for implementation by the completion of the first refueling outage, or further justification should be provided for implementation as proposed.

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Less than twenty (20) colors have been chosen for background shading for the main control boards at Quad Cities. Principles for color use (outlined in sections 6.5 and 6.6 of NUREG-0700) guided the selection of colors to be used on the control panels. Colors were selected from a pool of high contrast and matte finish shades used at other stations, applied against a "Kewanee Beige" board color. As an engineered retrofit, their application extends from a total-board design evaluation that followed a system-by-system approach.

The use of colors, particularly in conjunction with background shading at Quad Cities has been reexamined with operating personnel (SME's). As a result the enhancement of the Quad Cities control boards will be very similar to that accomplished at Byron/Braidwood. We have had a very positive response from the operators at Byron/Braidwood and are sure we will have the same response at Quad Cities.

In general, controls and displays at Quad Cities were found to be grouped by function with few "extraneous" or "maverick" components. In these cases, background shading affords a means to functionally group these extraneous components. Both the main component group and their maverick components in a system will be colored identically.

Background shading will be applied to systems nested among others. In the few cases where this technique will be applied, a high-contrast background shade applied to the centrally positioned group will enhance the separation of adjacent systems.

On the whole, the selection and use of background shading is designed to work in concert with other perceptual aids and the placement design of instruments. The total-board design evaluation will hold in check the potential overuse of one or more perceptual aids. Thus, where background shading will be applied, its use will be conservative, necessary, and meaningful for operator performance.

In addition, lines of demarcation will be used, where possible, to enhance system grouping. Demarcation will be used between closely-spaced but functionally distinct systems that do not have individual components placed within other system groupings. The use of demarcation instead of background shading, in these instances, will prevent the overuse of color. The proposed demarcations consist of circumscribing functional or selected groups with a contrasting line in areas where physical space or panel edges do not visually set apart the related components.

IMPLEMENTATION
:ND REFUELING OUTAGE

Commonwealth Edison Company

Dresden Station Unit 2

Human Factors Engineering

Corrective Action Schedule Change Request

HED Category 1B Open Items

Appendix G

12/15/88

Dresden Station Unit 2

1B Open Items

DCRDR HEDS

Index No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
346	343	1.3.1.E.1 1	2nd RF	3rd RF	1B
347	343	1.3.1.E.3 2	2nd RF	3rd RF	1B

Index No.: 346
HED Guideline No.: 1.3.1.E.1-1
Category / Level: 1B
FSR Page No.: 343
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 9-3-88

Unit 2 Proposed Implementation Date: 3rd Refueling Outage, 9-3-90

Unit 3 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 11-20-89

FINDING

The operator does not have control over the amount, format or complexity of information displayed. This capability allows the operator to request only the required information to perform his duties.

Justification For the Delay

Engineering conceptual design and component procurement problems precluded the implementation of 2/3 Diesel Generator (DG) modification by the original commitment date. Commonwealth Edison Company has petitioned the Nuclear Regulatory Commission and received relief on the implementation of this modification for Quad Cities Units 1 and 2, and Dresden Unit 2.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in implementing the 2.3 Diesel Generator modification as minimal. Current procedures and training adequately address 2.3 DG operation so as to minimize potential for operator error on the system. In addition, Background Shading is being added to the 902-8 panel to provide clear differentiation between ESF and Non ESF Busses which will minimize operator search time for appropriate bus controls/displays.

DRESDEN STATION 1B HEDs IN NEED OF RELIEF

Index No.: 347
HED Guideline No.: 1.3.1.E.3-2
Category / Level: 1B
FSR Page No.: 343
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 9-3-88

Unit 2 Proposed Implementation Date: 3rd Refueling Outage, 9-3-90

Unit 3 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 11-20-89

FINDING

The operator does not have control over the amount, format or complexity of information displayed. This capability allows the operator to request only the required information to perform his duties.

Justification For the Delay

Engineering conceptual design and component procurement problems precluded the implementation of 2/3 Diesel Generator modification by the original commitment date. Commonwealth Edison Company has petitioned the Nuclear Regulatory Commission and received relief on the implementation of this modification for Dresden Units 1 and 2.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in implementing the 2.3 Diesel Generator modification as minimal. Current procedures and training adequately address 2.3 DG operation so as to minimize potential for operator error on the system. In addition, Background Shading has been added to the 902-8 panel providing clear differentiation between ESF and Non ESF Busses to minimize operator search time for appropriate bus controls/displays.

Commonwealth Edison Company

Dresden Station Unit 2

Human Factors Engineering

Corrective Action Schedule Change Request

HED Category Non 1A/1B Open Items

Appendix H

12/15/88

Dresden Station Unit 2

Non 1A/1B Open Items

DCRDR HEDS

Index No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
107	358	2.2.1.C.2 4	2nd RF	3rd RF	2C
231	90	2.2.1.B 1	2nd RF	3rd RF	2C
232	358	2.2.1.C.2 3	2nd RF	3rd RF	2C
233	92	2.2.2.A 1	2nd RF	3rd RF	2C
281	103	3.1.5.A 1	2nd RF	3rd RF	2C
343	100	3.1.2.C.3 7	2nd RF	3rd RF	2B
354	107	3.3.2.B 1	2nd RF	3rd RF	2C
367	19	3.1.2.A.1 OS 1	2nd RF	3rd RF	2B
468	17	2.2.5.A 1	2nd RF	3rd RF	2C
469	18	2.2.5.B 3	2nd RF	3rd RF	2C
470	93	2.2.6.C 1	2nd RF	3rd RF	2C
514	150	5.0 V 1	2nd RF	3rd RF	2B
606	150	5.2.3.A 1	2nd RF	3rd RF	2B
609	150	5.1.5.C 5	2nd RF	3rd RF	2B
618	150	5.1.4.A.1 2	2nd RF	3rd RF	2B

Commonwealth Edison Company

Dresden Station

Human Factors Engineering

Corrective Action Schedule Change Request

SPDS HEDs

Appendix I

Dresden Station

SPDS HEDS

Index No.	HED No.	Previous Implementation	Proposed Implementation
22	6.1.4.C	2nd RF	6-30-89
22	6.2.2.A	2nd RF	6-30-89
32	6.1.4.E.1	2nd RF	6-30-89
32	5.1.4.1.A 1	2nd RF	6-30-89
32	7.2.4.A	2nd RF	6-30-89

Commonwealth Edison Company

Dresden Station

Human Factors Engineering

Corrective Action Schedule Change Request

Final Summary Report References

Appendix J

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0468

12 HED NO.: 2.2.5.A-1

CATEGORY: 2 LEVEL: C

FINDING:

The frequencies of the auditory signals for the annunciator system and the computer alarm are not between 200 and 5000Hz. Having the frequencies between 200 and 5000Hz can ensure that they are heard clearly.

RESPONSE:

The frequencies of auditory signals will be adjusted to a level betweeen 200 and 5000Hz.

IMPLEMENTATION:

By the completion of the second refueling outage.

4425/c/5

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0469

12 HED NO.: 2.2.5.B-3

CATEGORY: 2 LEVEL: C

FINDING:

The bandwidth of the auditory signals for the annunciator system and the computer are much larger than 200Hz.

RESPONSE:

Bandwidths for auditory signals will be adjusted to a level less than 200Hz.

IMPLEMENTATION:

By the completion of the second refueling outage.

4425/c/6

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0367

12 HED NO.: 3.1.2.A.1/OS-1

CATEGORY: 2 LEVEL: B

FINDING:

Response from the operator survey indicated that during abnormal situations such as a unit scram the computer's alarm and its frequent need for acknowledgement takes the operator from his primary duties and generally poses a distraction.

RESPONSE:

The computer alarm will be redesigned to be automatically disabled for a short period of time immediately preceeding a reactor scram.

IMPLEMENTATION:

By the completion of tne second refueling outage.

4421/c/11

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0231

12 HED NO.: 2.2.1.B-1

CATEGORY: 2 LEVEL: C

FINDING:

There are three auditory horns used for the annunciator warning system on the main control panels. One is shared by panels 902-3 and 902-4, another for panel 902-5, and the third is shared between panels 902-6, 902-7, and 902-8. This does not provide localization cues to those work stations where operator attention is required.

RESPONSE:

Multiple coding techniques are used for control room annunciators. Sound localization and visual cues provide feedback and cue the operators to the relative location of the problem.

IMPLEMENTATION:

Accept as is.

4425/c/7

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0233, 0108, 0237, 0191

12 HED NO.: 2.2.2.A-1, 2.2.3.A-1,
2.2.2.A-2, 2.2.3.A-2

CATEGORY: 2 LEVEL: C

FINDING:

There are auditory horns on the main control panels and the common panels which could apply to more than one panel and are not coded. There is one horn located on the 902-3 panel which can mean a problem on either panel 902-3 or 902-4. Another horn located on the 902-7 panel can mean a problem on panels 902-6, 902-7 or 902-8. The common panel 923-1 annunciator horn is shared with panel 923-5.

RESPONSE:

Multiple coding techniques are used for control room annunciators. Sound localization and visual cues provide feedback and cue the operators to the relative location of the problem.

IMPLEMENTATION:

Accept as is.

4381/c/4

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0470

12 HED NO.: 2.2.6.C-1

CATEGORY: 2 LEVEL: C

FINDING:

The auditory signal for the annunciator system on panel 902-56 has an intensity which may be startling to the operator.

RESPONSE:

The volume of the annunciator horn will be dampened to a level 10 dB(A) above ambient noise levels and not perceived as startling.

IMPLEMENTATION:

By the completion of the second refueling outage.

4380/c/3

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0343

12 HED NO.: 3.1.2.C.3-7

CATEGORY: 2 LEVEL: B

FINDING:

For alarms with inputs from more than one parameter, a reflash capability is not provided which allows subsequent alarms to activate the auditory alert. Subsequent alarms cannot activate the auditory alarms until the current alarm has cleared.

RESPONSE:

On further investigation, it was found that the multi-input alarms that could affect plant safety have other control room indication. In all cases, annunciators are referenced in the annunciator procedures. The operators look up multi-input alarms in the procedure books when necessary.

IMPLEMENTATION:

Accept as is.

4421/c/19

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0281

12 HED NO.: 3.1.5.A-1

CATEGORY: 2 LEVEL: C

FINDING:

There is no auditory or visual signal which indicates that an alarm has cleared. At present, the operator has to periodically activate the reset control to find out which alarms have cleared.

RESPONSE:

A visual signal will be provided to indicate cleared alarms where necessary. The audible signal is not needed since the visual signal will be provided.

IMPLEMENTATION:

By the completion of the second refueling outage.

4397/c/45

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0354

12 HED NO.: 3.3.2.B.1

CATEGORY: 2 LEVEL: C

FINDING:

The flash rate for annunciator alarms on panels 902-3, 902-4, 902-5, 902-6, 902-7, and 902-8 is approximately 1.5 flashes per second, and on panels 902-54, 902-55, and 902-56 is approximately 1 flash per second.

RESPONSE:

The flash rates will be adjusted to 3-5 flashes per second to conform with the checklist guidelines.

IMPLEMENTATION:

By the completion of the second refueling outage.

4380/c/1

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0514, 0606, 0609, 0618

12 HED NO.: 5.0/V-1, 5.2.3.A-1, 5.1.5.C-5, 5.1.4.A.1-2

CATEGORY: 2 LEVEL: B

FINDING:

The following discrepancies were noted on the CRD flow control (on 90X-5):

1. The parameter gpm is not listed on the EM (response).
2. Divisions are "2" instead of "1".
3. The valve position demand does not have % valve opening listed.
4. The thumbwheel tape (setpoint tape) does not have gpm on it.
5. The deviation meter has no units and is not zone banded.

RESPONSE:

Units and parameters will be added to the response, demand, and deviation meters. It is not appropriate to label the setpoint tape since it has different values at different modes of operation. A job performance aid describing the use of this controller will be permanently engraved and appended to the panel.

IMPLEMENTATION:

By the completion of the second refueling outage.

4397/c/38

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0346, 0347

12 HED NO.: 1.3.1.E.1-1, 1.3.1.E.3-2

CATEGORY: 1 LEVEL: B

FINDING:

In situations when Unit 3 must rely on the 2/3 diesel generator, the control of the 2/3 diesel generator by Unit 2 can affect the control of Unit 3. In addition, operator survey responses indicated that there are operational problems with the 2/3 diesel in that there are some displays on Unit 3 but, all the controls and many of the displays are on Unit 2.

RESPONSE:

Appropriate bus voltage indication will be installed in Unit 3.

IMPLEMENTATION:

By the completion of the first refueling outage.

4421/c/29

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0232, 0107

12 HED NO.: 2.2.1.C.2-3, 2.2.1.C.2-4

CATEGORY: 2 LEVEL: C

FINDING:

The intensity of the auditory alarms is such that when they are activated, it is very difficult to hear other sounds in the control room and to communicate with other personnel in the control room.

RESPONSE:

The intensity of the auditory signals will be decreased, while maintaining them sufficiently above ambient background noise levels.

IMPLEMENTATION:

By the completion of the second refueling outage.

4380/c/5

December 20, 1988

Messrs: J. S. Abel
R. L. Bax
H. E. Bliss
E. E. Eenigenburg
G. P. Wagner

Subject: Commonwealth Edison Company's (CECo) response to the NRC's Memmorandum (Ref a) documenting a November 16, 1988 Human Engineering Descrepancy (HED) corrective actions status meeting for Dresden and Quad Cities Stations. NRC Docket Nos. 50-237, 50-299, 50-259 & 50-265 (TAC Nos. 56118, 56119, 56156 and 56157)

References:

a) Memorandum for D. R. Muller from B. L. Siegel and T. M. Ross dated 11/23/88 summarizing a 11/16/88 Dresden & Quad Cities Stations HED status meeting.

b) Letter from I. M. Johnson to T. E. Murley dated August 25, 1987 transmitting "Dresden Station Detailed Control Room Design Review, Supplement 2", August 1987.

c) Letter from I. M. Johnson to T. E. Murley dated August 25, 1987 transmitting "Quad Cities Station Detailed Control Room Design Review, Supplement 2", August 1987.

Dear Sirs:

Enclosed is CECo's response to the NRC staff's request (Ref a) for a formal submittal of our request for a change in the HED corrective action implementation schedule for some of the Dresden and Quad Cities Stations HEDs. That NRC memorandum documents a November 16, 1988 meeting between the NRC staff and CECo's Dresden and Quad Cities Station personnel, Engineering personnel and Human Factors Engineering personnel. The purpose of that meeting was to discuss the progress, and present status, in implementing corrective actions designed to resolve the HEDs at those two stations. In that meeting the need to change the implementation schedule for some of the HEDs, applicable to those two stations, was also discussed.

As indicated in the meeting decisions to go beyond the original commitments during the implementation phases of the corrective actions, resulted in the need for most of the changes in the schedule.

For those HEDs requiring a schedule change, the NRC staff stated in the memorandum mentioned above (Ref a) that:

- o CECo should submit a letter describing all Category 1A or 1B HEDs in detail. This description should also include the original commitment date for completion, the new completion date, the justification for the schedular slippage, and why this schedular change is not safety significant.

- o For all remaining HEDs that will not be completed on schedule, CECo should identify these HEDs in their letter (including the original completion schedule and proposed new completion dates).

The appendices to this letter list the HEDs, and above requested information, according to Category 1A, 1B and "all remaining HEDs" for Dresden Unit 2 and Quad Cities Units 1 and 2.

If you have any questions regarding this matter, please contact Kathleen Hesse (ext. 3458), or myself (ext. 8831).

Sincerely yours,

Robert E. Howard

Robert E. Howard
Human Factors Engineering Coordinator
Production Services Department
Commonwealth Edison Company

cc: K.P. Beverly
J.C. Blomgren
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Commonwealth Edison Company

Quad Cities and Dresden Stations

Human Factors Engineering

Corrective Action Schedule Change Request

December 20, 1988

Commonweatlth Edison Company

Quad Cities and Dresden Stations

Human Factors Engineering

Corrective Action Schedule Change Request

HED Open Item Index

DRESDEN STATION OUTAGE START DATES

	UNIT 2	UNIT 3
1st RF Outage	December 1986	March 1988
2nd RF Outage	October 1988	November 1989
3rd RF Outage	September 1990	March 1991

QUAD CITIES STATION OUTAGE START DATES

	UNIT 1	UNIT 2
1st RF Outage	November 1987	November 1986
2nd RF Outage	September 1989	May 1988
3rd RF Outage	October 1990	February 1990

Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

HED Category 1A/1B Open Items

Appendicies A & B

Quad Cities Station Units 1 & 2

1A/1B Open Items

DCRDR HEDS

Index No.	Unit No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
102	1,2	30	1.1.1.B OS 7	1st RF	2nd RF	1A
148	2	42	1.3.2.A 1	2nd RF	7-1-89	1B
149	2	42	1.3.2.B 1	2nd RF	6-1-89	1B
180	1,2	47	1.5.3.F 1	2nd RF	8-1-89	1B
191	1,2	214	8.2.2.A 4	2nd RF	6-1-89	1B
193	2	209	8.2.1.C.1 1	2nd RF	6-1-89	1B
258	1,2	47	1.5.3.F OS 2	2nd RF	8-1-89	1B
259	1,2	47	1.5.3.F OS 3	2nd RF	8-1-89	1B
262	1,2	47	1.5.3.F OS 4	2nd RF	8-1-89	1B
276	2	200	8.1.1.B OS 7	2nd RF	6-1-89	1B
277	1,2	201	8.1.1.B OS 8	2nd RF	6-1-89	1B
284	2	211	8.2.1.C.1 OS 4	2nd RF	6-1-89	1B
307	2	199	8.1.1.2.S 1	2nd RF	6-1-89	1A
316	2	356	8.3.1.B OS 1	2nd RF	6-1-89	1B
317	2	357	8.3.1.B OS 2	2nd RF	6-1-89	1B
360	1,2	116	5.1.2 OS 1	1st RF	6-1-89	1B
389	1,2	47	1.5.3.E.1 1	2nd RF	8-1-89	1B
390	1,2	47	1.5.3.E.2 1	2nd RF	8-1-89	1B
411	1,2	222	6.6.3 VL 1	2nd RF	6-1-89	1B
416	2	205	8.2.1 VL 1	2nd RF	6-1-89	1B
417	2	206	8.2.1 VL 2	2nd RF	6-1-89	1B
418	2	207	8.2.1 VL 3	2nd RF	6-1-89	1B
419	1,2	182	6.6.3 VL 2	2nd RF	6-1-89	1B
445	1,2	30	1.1.1.A VL 7	1st RF	2nd RF	1A
448	1,2	47	1.5.3.F V 5	2nd RF	8-1-89	1B
465	2	106	5.1.2.A V 2	2nd RF	8-1-89	1B

QUAD CITIES STATION 1A HEDs IN NEED OF RELIEF

Index No.: 102
HED Guideline No.: 1.1.1.B/OS-7
Category / Level: 1A
FSR Page No.: 30
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 1st Refueling Outage, 10-1-86

Unit 2 Proposed Implementation Date: 3rd Refueling Outage, 2-3-90

Unit 1 Original Implementation Date: 1st Refueling Outage, 9-1-87

Unit 1 Proposed Implementation Date: 2nd Refueling Outage, 9-9-89

FINDING

During validation, when the water level was beyond the range of the narrow range GEMAC and YARWAY instruments and the feedwater system was being used to maintain water level, it was observed that operators had to frequently traverse between 90X-4 and 90X-5 to monitor water level. In addition, response to the operator survey indicated that better level indication is needed on the 90X-3 panel where the emergency core cooling system is located. Reactor level indicators are on 90X-5, and it would be useful to have a redundant water level indicator on 90X-4.

Justification For the Delay

Engineering design and space constraints imposed by seismic support structures prevent the implementation of digital displays for Reactor Water Level on the 90X-3, 4, 5 and 7 panels from being acceptable from a Human Factors perspective.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the nonacceptability of the additional digital indicators on which Reactor Water Level can be displayed on the NSSS and 7 panels as minimal. The displays' nonacceptability is predicated upon its excessive protrusion from the panel and lack of point ID labeling. Otherwise, the indicators are acceptable and do provide the operator with potential locations from which to display Reactor Water Level.

QUAD CITIES STATION 1A HEDs IN NEED OF RELIEF

Index No.: 307
HED Guideline No.: 8.1.1.B/OS-1
Category / Level: 1A
FSR Page No.: 199
SER Response Page No: C3-4

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Operator survey results indicated that the High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) Systems are difficult to operate when bieng used to reduce reactor presure. These systems are not laid out according to function, sequence of use, frequency of use, or other operator expectations.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for HPCI and RCIC as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the HPCI and RCIC systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1A HEDs IN NEED OF RELIEF

Index No.: 445
HED Guideline No.: 1.1.1.A/VL-7
Category / Level: 1A
FSR Page No.: 30
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 1st Refueling Outage, 10-1-86

Unit 2 Proposed Implementation Date: 3rd Refueling Outage, 2-3-90

Unit 1 Original Implementation Date: 1st Refueling Outage, 9-1-87

Unit 1 Proposed Implementation Date: 2nd Refueling Outage, 9-9-89

FINDING

During validation, when the water level was beyond the range of the narrow range GEMAC and YARWAY instruments and the feedwater system was being used to maintain water level, it was observed that operators had to frequently traverse between 90X-4 and 90X-5 to monitor water level. In addition, response to the operator survey indicated that better level indication is needed on the 90X-3 panel where the emergency core cooling system is located. Reactor level indicators are on 90X-5, and it would be useful to have a redundant water level indicator on 90X-4.

Justification For the Delay

Engineering design and space constraints imposed by seismic support structures prevent the implementation of digital displays for Reactor Water Level on the 90X-3, 4, 5 and 7 panels from being acceptable from a Human Factors perspective.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the nonacceptability of the additional digital indicators on which Reactor Water Level can be displayed on the NSSS and 7 panels as minimal. The displays' nonacceptability is predicated upon its excessive protrusion from the panel and lack of point ID labeling. Otherwise, the indicators are acceptable and do provide the operator with potential locations from which to display Reactor Water Level.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 148
HED Guideline No.: 1.3.2.A-1
Category / Level: 1B
FSR Page No.: 42
SER Response Page No.: C5-1

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Dedicated crews are not used on the mirror imaged units or the center desk.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for as minimal. Most importantly, the Background Shading was ocmpleted prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems, particularly the Emergency Core Cooling ones. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

Index No.: 149
HED Guideline No.: 1.3.2.B-1
Category / Level: 1B
FSR Page No.: 42
SER Response Page No.: C5-1

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Dedicated crews are not used on the mirror imaged units or the center desk.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems, particularly the Emergency Core Cooling ones. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 191
HED Guideline No.: 8.2.2.A-4
Category / Level: 1B
FSR Page No.: 214
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 1st Refueling Outage, 10-1-86

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Original Implementation Date: 1st Refueling Outage, 9-1-87

Unit 1 Proposed Implementation Date: 2nd Refueling Outage 9-9-89

FINDING

The organization and layout of the 90X-8 does not clearly show the hierarchy and directionality of the system. In addition, background shading and demarcation lines will be added to enhance functional groupings.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the 90X-8 Electrical Distribution panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems, particularly the Diesel Generator and non ESF Busses. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 193
HED Guideline No.: 8.2.1.C.1-1
Category / Level: 1B
FSR Page No.: 209
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

It would be helpful to have reactor pressure indication over controls for the auto blowdown system (on 90X-3). Having functionally related displays and controls grouped together facilitates their usage.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the Auto Blowdown system and the other systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

Index No.: 276
HED Guideline No.: 8.1.1.B/OS-7
Category / Level: 1B
FSR Page No.: 200
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Operator survey responses indicated that panel 90X-8, which is the electrical panel, is poorly laid out and should be redone. Currently the controls and displays on the electrical distribution panel are not arranged according to the function sequence, use frequency, or other obvious logical expectation. A poorly arranged central panel can contribute to operator confusion/error in an emergency situation. (Photo Log No. D-4)

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the 90X-8 Electrical Distribution panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 277
HED Guideline No.: 8.1.1.B/OS-8
Category / Level: 1B
FSR Page No.: 201
SER Response Page No.: C5-1

Unit 2 Original Implementation Date: 1st Refueling Outage, 10-1-86

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Original Implementation Date: 1st Refueling Outage, 9-1-87

Unit 1 Proposed Implementation Date: 2nd Refueling Outage, 9-9-89

FINDING

The operator survey indicated that the following controls/displays should be grouped together: steam flow indicators (90X-5) Main Steam Isolation Valve (MSIV) controls (90X-3); and Turbine Throttle pressure indicators (90X-7). The operator needs to be able to use these controls while observing these indicators, and this control function is difficult with the current configuration.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems on the 90X-3, 5, 7 panels. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

Index No.: 284
HED Guideline No.: 8.2.1.C.1/OS-4
Category / Level: 1B
FSR Page No.: 211
SER Response Page No.: C4-19

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Operator survey response indicated that having the High Pressure Cooling Injection (HPCI) components between the Residual Heat Removal (RHR) Loops (A & B) creates interference.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for HPCI and RHR as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the HPCI and RHR systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 316
HED Guideline No.: 8.3.1.B/OS-1
Category / Level: 1B
FSR Page No.: 356
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Response to the operator survey indicated that control switches with the same shape are too close to one another though on different systems and can be inadvertently actuated. Example: closing or opening drywell sump valves and instead closing a recirculation pump discharge valve.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 317
HED Guideline No.: 8.3.1.B/OS-2
Category / Level: 1B
FSR Page No.: 357
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Response to the operator survey indicated that the main steam isolation valve switches could accidentally activated because of their proximity during containment valve operations.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 360
HED Guideline No.: 5.1.2/OS-1
Category / Level: 1B
FSR Page No.: 116
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 1st Refueling Outage, 10-1-86

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Original Implementation Date: 1st Refueling Outage, 9-1-87

Unit 1 Proposed Implementation Date: 2nd Refueling Outage, 9-9-89

FINDING

Operator survey results have indicated that the contaminated containment storage tank level on 90X-6 should read in gallons.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme. The devemopment of a label to present the conversion factor for converting the Contaminated Containment Storage Tank (CCST) level from Feet to Gallons is a function of the development of the panel enhancement package which includes the new hierarchical labeling program.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in relabeling the display as minimal. Current procedures, training and Technical Specification references are all consistent in referring to CCST level in Feet. Procedures have been revised to include the conversion factor and it is covered in training. In addition, a temporary label has been installed for the display. Background Shading has been added to the 902-6 panel providing clear differentiation between systems on the panel. Therefore, the potential for confusion and/or error in utilizing the display is minimized.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 411
HED Guideline No.: 1.1.1.A/V-8
Category / Level: 1B
FSR Page No.: 222
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

NOTE: In its evaluations the Hedat determined that the HED description was erroneous and that the ACAD/CAM switch was in fact present in the control room but not appropriately labeled. Hence, a labeling corrective action was proposed for this HED.

FINDING

At present, the ACAD/CAM mode switches are not physically located in the control room.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the ACAD/CAM panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

Index No.: 416
HED Guideline No.: 8.2.1./VL-1
Category / Level: 1B
FSR Page No.: 205
SER Response Page No.: C4-10

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

During the validation it was observed that the controls and displays on the 90X-4 panel are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the system contained on the panel.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the 90X-4 panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 417
HED Guideline No.: 8.2.1./VL-2
Category / Level: 1B
FSR Page No.: 206
SER Response Page No.: C4-13

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

During the validation it was observed that the controls and displays on the 90X-4 panel are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the system contained on the panel.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package between the RHR and the Core Spray systems as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the RHR and Core Spray systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 418
HED Guideline No.: 8.2.1./VL-3
Category / Level: 1B
FSR Page No.: 207
SER Response Page No.: C4-16

Unit 2 Original Implementation Date: 2nd Refueling Outage, 4-9-88

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 6-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

During the validation it was observed that the controls and displays on the 90X-4 panel are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the system contained on the panel.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package on the 90X-8 Electrical Distribution panel as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between systems, particularly the Diesel Generator and non ESF Busses. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 419
HED Guideline No.: 6.6.3/VL-2
Category / Level: 1B
FSR Page No.: 182
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	1st Refueling Outage, 10-1-86
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Original Implementation Date:	1st Refueling Outage, 9-1-87
Unit 1 Proposed Implementation Date:	2nd Refueling Outage, 9-9-89

FINDING

During the validation it was observed that the Core Spray System, the Low Pressure Core Injection (LPCI) injection mode of Residual Heat Removal (RHR), and RHR in general do not have flowpath mimics. This lack of mimics can contribute to operational delays in the use of these systems. Proper use of mimics integrates system components into functionally oriented diagrams that reflect component relationships and thereby decrease operator decision making and search time.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package for the RHR and the Core Spray systems as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is clear and distinct differentiation between the RHR and the Core Spray systems. Further, any temporary labels have been replaced with "temporary" permanent labels so that all components are clearly labeled. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 180
HED Guideline No.: 1.5.3.F-1
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 8-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 258
HED Guideline No.: 1.5.3.F/OS-2
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 259
HED Guideline No.: 1.5.3.F/OS-3
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 262
HED Guideline No.: 1.5.3.F/OS-4
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89

Unit 2 Proposed Implementation Date: Before the 3rd Refueling Outage, 8-1-89

Unit 1 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 389
HED Guideline No.: 1.5.3.E.1-1
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 390
HED Guideline No.: 1.5.3.E.2-1
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 448
HED Guideline No.: 1.5.3.F/V-5
Category / Level: 1B
FSR Page No.: 47
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage of the latest Unit to undergo the Outage, Unit 1, 9-9-89
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 8-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

Justification For the Delay

After analyzing these discrepancies it was decided to completely rebuild the control room ceiling. Since the two Units are in a "common" control room, these lighting and acoustic improvements in the new ceiling will resolve these HEDs for both units simultaneously. Engineering design and construction necessary to allow continued operation of the units while this Modification was taking place has required a change in schedule.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the "delay" in installing the lighting and acoustic enhancement package as minimal. Indicator zone banding has been applied as necessary to mitigate adverse effects of glare and precautions have been utilized in the implementation of the modification package to ensure that operator and Unit safety are maintained.

QUAD CITIES STATION 1B HEDs IN NEED OF RELIEF

Index No.: 465
HED Guideline No.: 5.1.2.A/V-2
Category / Level: 1B
FSR Page No.: 106
SER Response Page No.: N/A

Unit 2 Original Implementation Date:	2nd Refueling Outage, 4-9-88
Unit 2 Proposed Implementation Date:	Before the 3rd Refueling Outage, 6-1-89
Unit 1 Proposed Implementation Date:	On Schedule, 2nd Refueling Outage, 9-9-89

FINDING

At present, the following recorders (on 90X-7) read in backpressure: Single and dual pen recorders for "condenser vacuum 1A, 1B, 1C". The range is 0-30 and units are in "inches of Hg" in divisions of .5. Procedures and tech specs as well as training aids etc., always refer to vacuum. A multipoint recorder was suggested as well as keeping the existing recorders.

Justification For the Delay

Installation of Background Shading, Lines of Demarcation, Mimic Lines and New Labels was conceived of as a process that required coordination and integration among the various phases. This implies that a significant change in any one phase will have a corresponding effect on the other phases. This in effect occurred early in the outage when the Station decided to enlarge and enhance its commitment by implementing a hierarchical labeling scheme.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in installing the panel enhancement package as minimal. Most importantly, the Background Shading was completed prior to the end of Unit 2's outage so that there is a clear and distinct differentiation between systems, particularly the Emergency Core Cooling ones. Further, any temporary labels and "erroneous" labels such as those for condenser vacuum have been replaced with "temporary" permanent labels so that all components are clearly labeled and identified. The new hierarchical labels are being engraved and verified, and the new mimics have been devised and are ready for engraving.

Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

HED Category Non 1A/1B Open Items

Appendix C

12/15/88

Quad Cities Station Units 1 & 2

Non 1A/1B Open Items

DCRDR HEDS

Index No.	Unit No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
12	1,2	64	3.1.2.C.2 1	2nd RF	3rd RF	2B
13	1,2	65	3.1.2.C.3 1	2nd RF	3rd RF	2B
15	1,2	68	3.1.5.A 1	2nd RF	3rd RF	2C
16	1,2	68	3.1.5.B.1 1	2nd RF	3rd RF	2C
17	1,2	71	3.2.1.F 1	2nd RF	3rd RF	2B
18	1,2	72	3.3.1.A 1	2nd RF	3rd RF	2B
20	1,2	74	3.3.2.B 1	2nd RF	3rd RF	2C
24	2	78	3.3.3.C.1 2	2nd RF	6-1-89	3C
27	1,2	62	3.3.4.C 1,2,3	2nd RF	3rd RF	1C
32	1,2	80	3.3.4.A 1	2nd RF	3rd RF	2A
50	2	187	7.1.8.B.1.C 1	2nd RF	6-1-89	2C
55	2	189	7.2.7.H 1	2nd RF	7-1-89	2C
57	2	190	7.2.7.K.1 1	2nd RF	7-1-89	2C
59	2	193	7.2.7.L.3 1	2nd RF	7-1-89	2C
67	2	346	7.3.2.F.1 1	2nd RF	3rd RF	2C
74	1,2	62	3.1.2.C.1 1	2nd RF	3rd RF	1C
78	2	346	7.3.2.F.2 1	2nd RF	3rd RF	2C
79	2	339	7.2.5.K.1 1	2nd RF	7-1-89	2C
102	2	250	2.1.6.F 1	2nd RF	Jan 89	2C
107	2	179	6.6.3 OS 1	2nd RF	6-1-89	3B
109	1,2	54	2.2.1.B 1	2nd RF	3rd RF	2B
110	1,2	54	2.2.1.C.2 1	2nd RF	3rd RF	2B
111	1,2	54	2.2.2.A 1	2nd RF	3rd RF	2C
117	2	50	2.1.7.B 1	2nd RF	12-31-89	2C
118	2	136	5.4.1.A 1	2nd RF	3rd RF	1C
119	2	136	5.4.1.B 1	2nd RF	3rd RF	1C
121	2	138	5.4.1.K 1	2nd RF	6-1-89	3C
122	2	137	5.4.2.A.1 1	2nd RF	3rd RF	3C
124	2	136	5.4.2.B.3 1	2nd RF	3rd RF	1C
125	1,2	121	5.1.5.C 1	2nd RF	3rd RF	1C
129	2	119	5.1.4.A.1 3	2nd RF	6-1-89	3C
130	2	119	5.1.4.A.1 2	2nd RF	6-1-89	3C
131	2	119	5.1.4.A.1 1	2nd RF	6-1-89	3C
133	2	292	5.1.2.E.2 2	2nd RF	6-1-89	2C
136	2	292	5.1.2.E.1 2	2nd RF	6-1-89	2C
140	2	115	5.1.2.E.2 3	2nd RF	6-1-89	3C
151	2	125	5.2.1.B 1	2nd RF	Complete	1C
159	2	141	6.1.1 1	12-31-87	6-1-89	3C
159	2	142	6.1.1 2	12-31-87	6-1-89	3C

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Quad Cities Station Units 1 & 2

Non 1A/1B Open Items

DCRDR HEDS

Index No.	Unit No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
162	1,2	131	5.3.2.A.1 1	1st RF	6-1-89	3C
163	2	133	5.3.3.A.2 1	2nd RF	3rd RF	1C
164	2	133	5.3.3.A.3 1	2nd RF	3rd RF	1C
166	2	197	8.1.1.B 2	2nd RF	6-1-89	1C
166	2	198	8.1.1.B 3	2nd RF	6-1-89	3C
171	2	129	5.3.1.A.1 1	2nd RF	Pending	1C
172	2	130	5.3.1.A.3 1	2nd RF	Pending	1C
176	2	220	1.1.1 OS 2	2nd RF	3rd RF	2B
186	2	135	5.3.3.C 1	2nd RF	6-1-89	2B
187	1,2	142	6.1.1 3	12-31-87	6-1-89	3C
190	1	354	8.2.1.C.2 1	2nd RF	3rd RF	2C
193	2	210	8.2.1.C.1 2	2nd RF	6-1-89	1C
208	2	203	8.1.2.A 1	2nd RF	6-1-89	2C
209	2	204	8.1.2.A 2	2nd RF	6-1-89	2C
214	2	215	8.3.2.D.1 1	2nd RF	6-1-89	3C
216	2	91	4.2.2.F.1 1	2nd RF	6-1-89	3C
223	2	269	4.4.4.B 1	2nd RF	6-1-89	1C
260	1,2	118	5.1.3.D.2 1	12-31-88	6-1-89	3C
264	2	117	5.1.3.A 1	12-31-88	6-1-89	3C
265	2	261	4.1.1.B.1 OS 2	2nd RF	3rd RF	2A
271	1,2	350	8.1.1.B OS 5	2nd RF	3rd RF	1C
274	2	208	8.2.1.A.2 H 1	2nd RF	6-1-89	2B
281	2	181	6.6.3 OS 2	2nd RF	6-1-89	3B
288	2	145	6.1.1 H 5	2nd RF	3rd RF	3C
314	2	299	5.2.4 OS 1	2nd RF	12-31-89	3C
323	1,2	71	3.2.1.F OS 2	2nd RF	3rd RF	2C
333	2	188	7.2.2.B.1 OS 2	2nd RF	7-1-89	2C
336	2	155	6.1.2.A.2 1	2nd RF	6-1-89	3C
336	1,2	160	6.2.1.B 1	2nd RF	6-1-89	3C
337	2	156	6.1.2.A.3 1	2nd RF	6-1-89	3C
340	2	160	6.1.2.A 1	2nd RF	6-1-89	3C
342	2	164	6.3.1.A 1	2nd RF	6-1-89	3C
345	2	164	6.3.2.B 1	2nd RF	6-1-89	3C
346	2	164	6.3.2.C 1	2nd RF	6-1-89	3C
347	2	164	6.3.2.D 1	2nd RF	6-1-89	3C
348	2	164	6.3.2.E 1	2nd RF	6-1-89	3C
351	2	160	6.3.7.A 1	2nd RF	6-1-89	3C
352	2	310	6.3.8.A 1	2nd RF	6-1-89	3C

Quad Cities Station Units 1 & 2

Non 1A/1B Open Items

DCRDR HEDS

Index No.	Unit No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
354	2	172	6.3.9.A 1	2nd RF	6-1-89	3C
355	2	175	6.4.1.B.1 1	2nd RF	6-1-89	3C
356	2	177	6.5.1.A 1	2nd RF	6-1-89	3C
357	2	177	6.5.1.B 1	2nd RF	6-1-89	3C
374	2	132	5.3.3.A.1 1	2nd RF	3rd RF	1C
375	2	184	6.6.3.A.4 1	2nd RF	6-1-89	3C
376	2	183	6.6.3.A.3 1	2nd RF	6-1-89	3C
377	2	183	6.6.3.A.2 1	2nd RF	6-1-89	3C
378	2	184	6.6.3.A.1 1	2nd RF	6-1-89	3C
379	2	180	6.6.2 1	2nd RF	6-1-89	3C
380	2	161	6.6.1.B 1	2nd RF	6-1-89	3C
387	2	137	5.4.1.C 1	2nd RF	3rd RF	3C
392	2	185	6.6.3.B.3 1	2nd RF	6-1-89	3C
398	1,2	56	2.2.5.B 1	2nd RF	3rd RF	2B
399	1,2	55	2.2.5.A 1	2nd RF	3rd RF	2B
400	1,2	57	2.2.6.A 1	2nd RF	3rd RF	2B
401	1,2	58	2.2.6.C 1	2nd RF	3rd RF	2B
402	2	161	6.2.2.A 1	2nd RF	6-1-89	3C
404	1,2	69	3.2.1.D 1	2nd RF	3rd RF	2B
406	2	220	1.1.1.A V 3	2nd RF	3rd RF	2B
418	1,2	25	1.1.1.A V 15	2nd RF	3rd RF	1C
425	2	154	6.1.1 VL 1	2nd RF	6-1-89	3C
451	2	79	3.3.3.C.1 V3	2nd RF	6-1-89	3C
457	2	285	5.1.1.A.1 V 20	2nd RF	3rd RF	3C
460	1,2	105	5.1.2.A V 1	12-31-87	3rd RF	3C
464	2	111	5.1.2.D.1 V 4	2nd RF	3rd RF	3C
467	2	286	5.1.1.A.1 V 23	2nd RF	3rd RF	2B
471	2	147	6.1.1 V 8	2nd RF	6-1-89	3C
472	2	148	6.1.1 V 9	2nd RF	6-1-89	3C
473	2	149	6.1.1 V 10	2nd RF	6-1-89	3C
474	2	150	6.1.1 V 11	2nd RF	6-1-89	3C
476	2	151	6.1.1 V 13	2nd RF	6-1-89	3C
479	1,2	152	6.1.1 V 14	2nd RF	6-1-89	3C
489	2	171	6.3.8.A V 2	2nd RF	6-1-89	3C
491	2	212	8.2.1.C.1 V 9	2nd RF	6-1-89	3C
492	2	219	9.3.2.B V 1	2nd RF	6-1-89	2C
494	2	112	5.1.2.D.1 V 6	2nd RF	3rd RF	3C
500	2	153	6.1.1 V 16	2nd RF	3rd RF	3C

Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

SPDS HEDs

Appendix D

12/15/88

Quad Cities Station

SPDS HEDS

Index No.	HED No.	Previous Implementation	Proposed Implementation
32	6.1.4.E.1	1st RF	7-1-89
32	5.1.4.1.A.1	1st RF	7-1-89
32	7.2.4.A	1st RF	7-1-89
33	7.2.4.P.1	1st RF	7-1-89
34	6.2.3.1.B	1st RF	7-1-89
34	7.2.7.D.3	1st RF	7-1-89
34	7.2.7.K.1	1st RF	7-1-89
34	7.2.7.L.3	1st RF	7-1-89

Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

Quad Cities Final Summary Report References

Appendix E

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0412, 0266

04 HED NO.: 1.1.1.B/VL-3, 8.2.1.C.1/OS-2

CATEGORY: 1 LEVEL: B

FINDING:

During the validation, it was noted that HPCI turbine vibration must be monitored when operating the HPCI turbine on the 90X-3 panel. However, the recorder which displays that information is on the 90X-7. Moreover, only the last 3 points on that multipoint recorder measure HPCI turbine vibration and the operator must wait for those points to cycle through before he can obtain a current reading. It is desirable to have functionally related controls and displays grouped together and these factors of location and information accessibility could adversely affect operations in an emergency event.

RESPONSE:

The HPCI turbine vibration instruments are required for testing HPCI during non-emergency conditions. The operator has adequate time to monitor the turbine vibration during the slow roll start-up procedure. There is no requirement to monitor turbine vibration during an automatic initiation when the controls will accelerate the turbine to full flow as fast as possible. A higher speed recorder has been installed on both units.

IMPLEMENTATION:

Completed.

4416/c/58

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0418

04 HED NO.: 1.1.1.A/V-15

CATEGORY: 1 LEVEL: C

FINDING:

There is presently no diesel generator cooling water pump control or indicating lights in the control room. An equipment attendant is sent to the respective diesel generator to start the cooling pump unless it started automatically. It would have to be stopped locally. The 1 or 2 diesel cooling water pumps supply cooling water to the respective units ECCS room coolers. The 1/2 can be valved into the supply room coolers. Indication that the pump has started is of primary importance. The ability to start and stop it from the control room is secondary.

RESPONSE:

The respective diesel generator cooling water pump indicating lights will be installed on the 90X-8 panels. The pump starts automatically when the diesel starts. Therefore, a control is unnecessary; there is only a need for an indication of whether it has started.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/34

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0445, 0102

04 HED NO.: 1.1.1.A/VL-7, 1.1.1.B/OS-7

CATEGORY: 1 LEVEL: A

FINDING:

During validation, when the water level was beyond the range of the narrow range GEMAC and YARWAY instruments and the feedwater system was being used to maintain water level, it was observed that operators had to frequently traverse between 90X-4 and 90X-5 to monitor water level. In addition, response to the operator survey indicated that better level indication is needed on the 90X-3 panel where the emergency core cooling system is located. Reactor level indicators are on 90X-5, and it would be useful to have a redundant water level indicator on 90X-4.

RESPONSE:

Digital displays indicating water level will be installed on 90X-3, 90X-4, and 90X-5.

IMPLEMENTATION:

By the completion of the first refueling outage.

4415/c/40

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0406

04 HED NO.: 1.1.4/VL-1

CATEGORY: 1 LEVEL: B

FINDING:
It was observed during the validation that some procedure statements were unclear, ambiguous, or incomplete. Specifically noted were:

Procedure	Step	Discrepancy
QGP 1-1	D3A	Potential confusion and error could be avoided if the procedure step specifically identified the "A" pressure regulator as the controlling one.
QOP 1300-1	F4	The procedure could be written more clearly. This step directs the operator to verify valve position but does not tell which one.
QGP 2-3	D3D	Procedure clarity could be enhanced, as well as consistency with labeling, if the word "suppression" was inserted before "pool".
QGP 2-3	D3D	The procedure step should reference the appropriate procedures for reactor pressure.
QOP 2300-1	F7	No annunciators should be up; therefore this step should be deleted.
QOP 2300-3	F11	This step is unnecessary and should be deleted.
QGP 2-3	D3 A&B	Step B is redundant to Step A and should be incorporated into Step A as a reference on how to accomplish the first part of the step.
QGP 2-3	D3C	There should be a procedure reference for RHR suppression pool cooling.
QOA 1600-3 (QOA 201-2)	N/A (D1)	Procedure QOP 1000-09 should be referenced directly from QOA 201-2 at step 01.

RESPONSE:
The cited ambiguous procedure statements will be corrected.

IMPLEMENTATION:
By the completion of first refueling outage.

4404/c/56

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0407

04 HED NO.: 1.1.4/VL-2

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that in some procedures the procedural steps were out of sequence. Proper procedural step sequencing minimizes the probability of error and reduces operational confusion. Specifically the following were noted:

Procedure	Step	Discrepancy
QGP 1-1	D3H5 & 6	Step D3H5 should follow step D3H2 and step D3H6 should follow step D3H4 because respectively steps H2 and H5 concern the opening of HPCI valve MO 2301-4 and steps H4 and H6 concern the opening of RCIC valve MO 1301-16.
QOP 2300-1	F8	This step is in the wrong sequence in the procedure which checks instruments as they are layed out on the panel not as they are functionally used. In this instance the 4 and 5 valves must be reset before they can be opened.
QOP 1000-4	5 & 6	Step 5 and 6 should be reversed. Step 6 should preceed step 5.

RESPONSE:

The cited discrepancies will be corrected.

IMPLEMENTATION:

By the completion of first refueling outage.

4404/c/58

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0085

04 HED NO.: 1.1.4.D-1

CATEGORY: 3 LEVEL: C

FINDING:

Although documents are protected by binders, the pages are loose and torn. The potential for information to become lost or destroyed increases each time the procedures are used. (Photo Log No. A-6)

RESPONSE:

The discrepant documents will be repaired and replaced. The control room procedures will be reviewed periodically by the personnel assigned to the operating department communication center and replaced as necessary to maintain them in a quality condition.

IMPLEMENTATION:

By the completion of the first refueling outage.

4407/c/62

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0148, 0149

04 HED NO.: 1.3.2.A-1, 1.3.2.B-1

CATEGORY: 1 LEVEL: B

FINDING:

Dedicated crews are not used on the mirror imaged units or the center desk.

RESPONSE:

The major systems are mirror imaged on their respective panels, but the controls and instrumentation within the major systems are arranged in the same left to right order. Therefore, when an operator is operating equipment within major systems, all equipment is in the same relative position on both units.

The station has not encountered problems during its operating life with the control panel arrangements. The operators rotate through the three control room positions (Unit 1, Unit 2, and common service) on a daily basis which keeps them current on the panel differences.

Enhancements (background shading, demarcation) as well as summary level labels will be added to the control panels. Labels will include system names and panel numbers (including unit designator). This will aid the operators in rapid identification of panels.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/30

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0389, 0390, 0180, 0258, 0259, 0262, 0448

04 HED NO.: 1.5.3.E.1-1, 1.5.3.E.2-1, 1.5.3.F-1, 1.5.3.F/OS-2, 1.5.3.F/OS-3, 1.5.3.F/OS-4, 1.5.3.F/V-5

CATEGORY: 1 LEVEL: B

FINDING:

Ambient illumination is not provided via indirect or diffuse lighting. Presently, the light source is direct and is causing a glare problem. The fluorescent light tubes in the control room run parallel to the 6, 7, and 8 panels and as a result cause a glare problem for the edgewise meters located on the vertical portion of the boards. Equipment is shadowed within the primary operating area.

RESPONSE:

The lighting in the control room will be modified to a level of 20-50 footcandles and the glare minimized. Alternatives considered include configuration of louvers, different size louvers, modifying light configuration, and changing wattage of light bulbs.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/35

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0117

04 HED NO.: 2.1.7.B-1

CATEGORY: 2 LEVEL: C

FINDING:

When control room personnel are wearing protective masks they cannot sufficiently communicate information over the present communication equipment. Voice communication is distorted in reception and transmission. This may result in operators unable to perform duties as required.

RESPONSE:

Protective masks, capable of allowing operators to communicate, will be provided.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/74

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0109, 0110

04 HED NO.: 2.2.1.B-1, 2.2.1.C.2-1

CATEGORY: 2 LEVEL: B

FINDING:

Auditory signals do not provide localization cues that direct operators to those control room work stations where their attention is required. Auditory signals in the control room are not coded. Several panels will share one alarm. Alarms on Unit 1 are not easily distinguished from alarms on Unit 2 or the common panels. Telephone bells on the center desk and the SCRE's desk are not easily distinguishable.

RESPONSE:

Auditory coding will be used to provide localization cues to those control room work stations where the operators' attention is required. In addition, bells on the telephone on the center desk will be modified.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/48

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0399

04 HED NO.: 2.2.5.A-1

CATEGORY: 2 LEVEL: B

FINDING:

The frequencies of the auditory signals for the annunciator system are not between 200 and 5000 Hz.

ALARM LOCATION	FREQUENCY (Hz)
901-3	125-4000
901-7	500-16000
901-54	250-16000
901-56	500-8000
902-3	250-8000
902-6	500-8000
902-55	250-16000
902-56	250-16000
912-1	2000-16000
912-2	2500-4000
912-7	1000-16000
912-8	250-16000

The 912-1, 902-55, 902-56 alarms have tape on them to reduce the intensity. Tape was removed for frequency evaluation.

Alarms with frequencies between 200 and 5000 Hz will ensure that the alarms will be heard clearly.

RESPONSE:

The alarms will be replaced with alarms of frequencies between 200 and 5000 Hz.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/11

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0398

04 HED NO.: 2.2.5.B-1

CATEGORY: 2 LEVEL: B

FINDING:

The bandwidth of the auditory alarms for the annunciator system are greater than 200 Hz.

Alarm Location	Frequency (Hz)
901-3	125-4000
901-7	500-16000
901-54	250-16000
901-56	500-8000
902-3	250-8000
902-6	500-8000
902-55	250-16000
902-56	250-16000
912-1	2000-16000
912-2	2500-4000
912-7	1000-16000
912-8	250-16000

Alarms with narrower bandwidths provide much clearer signals at lower intensities and allow operators to easily differentiate between alarms.

RESPONSE:

The alarms will be replaced with alarms with bandwidths of less than 200 Hz.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/12

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0400

04 HED NO.: 2.2.6.A-1

CATEGORY: 2 LEVEL: B

FINDING:

The sound levels of annunciator signals at workstations 901-55, 902-54, 902-3 and 912-2 do not have a signal to noise ratio of at least 10 dB(A). Depending on the background noise characteristic, it could be difficult to detect the annunciator signal.

RESPONSE:

Discrepant auditory signals will be modified to provide an intensity of at least 10 dB(A) above ambient noise level.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/13

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0401

04 HED NO.: 2.2.6.C-1

CATEGORY: 2 LEVEL: B

FINDING:

Some auditory signal intensities are startling to the operators.

RESPONSE:

The discrepant auditory signals will be modified to provide an intensity (singular and additive) of 10 dB(A) over ambient noise to prevent startling.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/14

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0074, 0027

04 HED NO.: 3.1.2.C.1-1, 3.3.4.C-1, 3.3.4.C-2, 3.3.4.C-3, 3.3.4.C-4

CATEGORY: 1 LEVEL: C

FINDING:

There are several annunciators with inputs from more than one plant parameter. These include "High-Low", "A/B", and non-specific "trouble" alarms.

RESPONSE:

The operators have control panel or local panel instrumentation available to determine the specific "trouble". In all cases, annunciators are referenced in the annunciator procedures. The operators are trained to look up multi-input alarms in the procedure book when necessary.

IMPLEMENTATION:

Accept as is.

4403/c/38

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0012

04 HED NO.: 3.1.2.C.2-1

CATEGORY: 2 LEVEL: B

FINDING:

An alarm printout capability is not provided for all multi-input annunciators. Printing the specific alarm of all multi-input alarms would allow for ready clarification of the nature of the alarms.

RESPONSE:

The operators have control panel or local panel instrumentation available to determine the specific "trouble". In all cases, annunciators are referenced in the annunciator procedures. The operators are trained to look up multi-input alarms in the procedure book when necessary.

IMPLEMENTATION:

Accept as is.

4403/c/68

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0013

04 HED NO.: 3.1.2.C.3-1

CATEGORY: 2 LEVEL: B

FINDING:

For alarms with inputs from more than one parameter, a reflash capability is not provided which allows subsequent alarms to activate the auditory alert mechanism and reflash the visual tile even though the first alarm has not cleared.

RESPONSE:

The "trouble" alarms are critical to plant safety. The multi-input alarms that could affect plant safety have other control room indications.

IMPLEMENTATION:

Accept as is.

4403/c/67

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0016, 0015

04 HED NO.: 3.1.5.B.1-1-1, 3.1.5.A-1

CATEGORY: 2 LEVEL: C

FINDING:

There is no visual signal which indicates that an alarm has cleared. Also, there is no dedicated distinctive audible signal to indicate cleared alarms. At present, the operator must periodically activate the annunciator reset control to find out which alarms have cleared.

RESPONSE:

A visual signal will be provided to indicate cleared alarms. The audible signal is not needed since the visual signal will be provided.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/63

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0404

04 HED NO.: 3.2.1.D-1

CATEGORY: 2 LEVEL: B

FINDING:

The individual annunciators are not within ± 2.5 dB of 90.2 dB(A), which is the combined sound level of all the annunciators.

RESPONSE:

The annunciators will be adjusted to a level of ±2.5 dB(A) of the average of all annunciator auditory signals.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/15

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0017, 0323

04 HED NO.: 3.2.1.F-1, 3.2.1.F/OS-2

CATEGORY: 2 LEVEL: B

FINDING:

Individual work stations do not have separate distinct auditory alarms. At present, each unit (901 and 902) has two separate alarms. Individual distinct alarms at each panel would aid the operator by allowing a quicker response to the problem. This is particularly true for reactor scrams where it is difficult for the operators to determine which station (3, 4 or 5) has the problem.

RESPONSE:

Separate distinct auditory alarms will be provided for individual work stations.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/4

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0018

04 HED NO.: 3.3.1.A-1

CATEGORY: 2 LEVEL: B

FINDING:

There are visual alarm tiles which are not located above related controls and displays required for corrective or diagnostic action in response to the alarm. This may cause a delay in performing the actions needed to respond to the alarm.

RESPONSE:

The cited annunciators are located as close as possible to their related controls and displays. In all cases, annunciators are referenced in the annunciator procedures. The operators are trained to look up multi-input alarms in the procedure book as necessary.

IMPLEMENTATION:

Accept as is.

4403/c/64

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0020

04 HED NO.: 3.3.2.B-1

CATEGORY: 2 LEVEL: C

FINDING:

The alarm flash rate does not meet the 3 to 5 flashes per second criterion. The existing flash rate is approximately 2 flashes per second.

RESPONSE:

The alarm flash rate will be increased to 3 to 5 flashes per second.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/33

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0024

04 HED NO.: 3.3.3.C.1-2 /

CATEGORY: 3 LEVEL: C

FINDING:

The vertical and horizontal axes of the following annunciator panels are not labeled: 902-55, 902-56, 901-55 and 912-7. The axes labeling on 901-56 is white adhesive lettering attached to the metal surrounding the annunciator tiles.

RESPONSE:

The axes of the discrepant annunciator panels will be relabeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/37

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0451

04 HED NO.: 3.3.3.C.1/V-3

CATEGORY: 3 LEVEL: C

FINDING:

At present, the vertical and horizontal axes of the annunciator panel on the 901-56 panel are not labeled. Labeled axes aid in ready coordinate designation of a particular visual tile.

RESPONSE:

The axes of the 901-56 annunciator panel will be labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/18

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0032

04 HED NO.: 3.3.4.A-1

CATEGORY: 2 LEVEL: A

FINDING:

There are some visual tile legends which are ambiguous and non-specific. They alert the operator to system "Trouble" and fail to elaborate on the specific trouble. The operators are provided with little or no indication as to what the trouble is and have no other means to investigate the problem further (other than sending EAs and EOs out to identify the specific trouble).

RESPONSE:

The operators have control panel or local panel instrumentation available to determine the specific "trouble". In all cases, annunciators are referenced in the annunciator procedures. The operators are trained to look up multi-input alarms in the procedure book when necessary.

IMPLEMENTATION:

~~By the completion of the second refueling outage.~~ e

4418/c/24

accept as is.

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0216

04 HED NO.: 4.2.2.F.1-1

CATEGORY: 3 LEVEL: C

FINDING:

The color coding of the J-handle controls do not follow the recommendations of the guideline.

RESPONSE:

The red J-handles will be repainted orange to insure consistent use of color. In addition, color coding of J-handles has been added to the color coding standards.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/42

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0460

04 HED NO.: 5.1.2.A/V-1

CATEGORY: 3 LEVEL: C

FINDING:

Scale units on displays are not consistent with the degree of precision and accuracy needed by the operator to perform tasks during emergency operations. Displays are discrepant in the following ways: units are not labeled on the display, units are incorrect and/or labeling appears on the display face and not on the display itself.

RESPONSE:

The cited scales will be relabeled correctly.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/59

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0465

04 HED NO.: 5.1.2.A/V-2

CATEGORY: 2 LEVEL: B

FINDING:

At present, the following recorders (on 90X-7) read in backpressure: Single and dual pen recorders for "condenser vacuum 1A, 1B, 1C". The range is 0-30 and units are in "inches of Hg" in divisions of .5. Procedures and tech specs as well as training aids etc., always refer to vacuum. A multipoint recorder was suggested as well as keeping the existing recorders.

RESPONSE:

The cited recorders will be relabeled to indicate backpressure.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/49

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0466

04 HED NO.: 5.1.2.A/V-3

CATEGORY: 2 LEVEL: C

FINDING:

Presently, the following meters show direction of flow to either the north or south: "west branch cw dp" and "east branch cw dp". The ranges are "south +30 to 0 to +30 north" the fact that one is actually looking at "dp" is not stated on the meter.

RESPONSE:

"dp" will be added to the meter faces for the cited meters.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/48

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0464

04 HED NO.: 5.1.2.D.1/V-4

CATEGORY: 3 LEVEL: C

FINDING:

Scales are not selected to span the expected range of operational parameters. At present, the wide range reactor level (cold calibration) meters have a range of -243 to +57 inches in divisions of 6. Major tic marks and numerical notation are listed on the meter from 57 to -273 every 30 inches. These are difficult to read. The total range of 300 inches may be appropriate to monitor reactor level after an accident.

RESPONSE:

Control room reactor level scales will be modified to insure that all contain consistent scales.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/61

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0494

04 HED NO.: 5.1.2.D.1/V-6

CATEGORY: 3 LEVEL: C

FINDING:

Meter 6 for Unit 1 and meters 5 and 9 on Unit 2 are not consistent with similar bypass valve meters (on 90X-7).

RESPONSE:

The discrepant meter scales will be modified to insure consistency between similar meters.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/62

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0140 -

04 HED NO.: 5.1.2.E.2 3

CATEGORY: 3 LEVEL: C

FINDING:

Scale ranges for lift pump amps meters (on 90X-7) are expanded by multiplying indicated scale values by five. Unit 1 meter is not labeled to indicate this. Unit 2 meter is labeled with dynotape (not permanently engraved). (Photo Log No. A-22)

RESPONSE:

The cited meters will be permanently labeled with the conversion factor.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/67

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0360

04 HED NO.: 5.1.2/OS-1

CATEGORY: 1 LEVEL: B

FINDING:

Operator survey results have indicated that the contaminated containment storage tank level on 90X-6 should read in gallons.

RESPONSE:

The indicator will be permanently labeled with the conversion factor.

IMPLEMENTATION:

By the completion of the first refueling outage.

4403/c/3

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0264

04 HED NO.: 5.1.3.A-1

CATEGORY: 3 LEVEL: C

FINDING:

The guideline states that the character height on displays should subtend a visual angle of 15 minutes. This means that at a viewing distance of 30 inches (the depth of the benchboards), the character height must be at least .132 inches. Listed are examples of displays that are not in accordance with the guideline. This guideline is stated to ensure that lettering on displays is legible.

Label	Comment
reactor water level	Required Char Ht .132 Measured Char Ht .090
containment pressure	Required Char Ht .132 Measured Char Ht .080
bypass valve-1	Required Char Ht .132 Measured Char Ht .075

RESPONSE:

The deviation in character height for the cited displays presents no problems in readability to the operators. The 5th percentile operators can lean slightly across the benchboard. Guardrails will be added to the front of each benchboard to prevent inadvertent actuation of the controls.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/8

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0260, 0257

04 HED NO.: 5.1.3.D.2-1, 5.1.3.D.3-1

CATEGORY: 3 LEVEL: C

FINDING:

The guideline states that display letter characters and numerics are to have a width-to-height ratio of 1.00-.60 and .60, respectively. Several displays are not in accordance with the guideline. This guideline is stated to ensure that displays are legible and somewhat consistent.

RESPONSE:

The discrepant ratios range from .33 to .53. This is an insignificant deviation and results in no difficulty in readability for the operators.

IMPLEMENTATION:

Accept as is.

4407/c/46

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0129, 0131, 0130

04 HED NO.: 5.1.4.A.1-3, 1-1, 1-2

CATEGORY: 3 LEVEL: C

FINDING:

Scales do not have labels or required information to use the scales. In some instances, the information is inappropriately located.

RESPONSE:

Discrepant scales will be permanently labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/17

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0127

04 HED NO.: 5.1.5.A.1-1

CATEGORY: 1 LEVEL: C

FINDING:

More than 9 graduations are used between major numerals on displays. Having more than 9 graduations can make accurate reading of the display difficult. (Photo Log No. A-27)

RESPONSE:

All meters are easy to read and provide several redundant measures of identification. The scale units and parameter measured are provided on the scales as well as a label appended to the instrument for identification. These various items add to a rapid identification of measurement. In addition, color banding will be added to the meters to provide critical ranges.

IMPLEMENTATION:

By completion of the second refueling outage.

4404/c/36

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0125

04 HED NO.: 5.1.5.C-1

CATEGORY: 1 LEVEL: C

FINDING:

Successive values indicated by unit graduations are not multiples of 1, 2 or 5, or those values multiplied by some power of 10. These values are quickly and easily interpretable, which leads to less chance for error in their reading. (Photo Log No. A-29)

RESPONSE:

Zone banding will be added to the meters to insure that the operators will be able to identify critical ranges. In addition, consistent graduations will be marked on all reactor level instrumentation.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/37

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0497

04 HED NO.: 5.1.6.D.1/V-3

CATEGORY: 2 LEVEL: B

FINDING:

The meaning assigned to particular colors is not consistent across all applications within the control room. At present, lights are all a yellowish faded white. This includes the "in" light, the "out" light and the "channel selected" light.

RESPONSE:

The cited lights will be replaced with white lights.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/24

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0151

04 HED NO.: 5.2.1.B-1

CATEGORY: 1 LEVEL: C

FINDING:

Vertical straight scale values do not increase with upward movement of the pointer. Some of the vertical meters have a negative and positive scale around zero but are not marked so. (Photo Log No. B-10)

RESPONSE:

Scales on discrepant vertical meters will be labeled with plus (+) and minus (-) signs to indicate the true values on the scale.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/39

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0426

04 HED NO.: 5.2.3/VL-1

CATEGORY: 2 LEVEL: B

FINDING:

During the validation some indicators were observed with red grease pencil hash marks on the meter's face to indicate upper operating limits. This is a form of "zone banding" which when applied properly and consistently can enhance and facilitate operations. Specifically observed were the 1, 2 and 1/2 diesel generator AC kilowatt indicators and the TR 18 and 19 amp meters.

RESPONSE:

Zone banding techniques will be applied to the 1, 2, and 1/2 diesel generator AC kilowatt meters and the TR/18 and 19 amp meters.

IMPLEMENTATION:

By the completion of second refueling outage.

4404/c/59

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0171

04 HED NO.: 5.3.1.A.1-1

CATEGORY: 1 LEVEL: C

FINDING:

No method is provided for determining lamp failure in indicating lights, except by visual inspection.

RESPONSE:

The legend lights cited in this HED are part of the turbine control panel (90X-7). These lights are provided with a lamp test.

IMPLEMENTATION:

Accept as is.

4407/c/11

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0172

04 HED NO.: 5.3.1.A.3-1

CATEGORY: 1 LEVEL: C

FINDING:

Burned out bulbs in indicator lights are not always easily replaced. The sockets are aging and they have a tendency to fall apart when removing or installing new bulbs. Due to the heat generated by the lamps, the plastic lamp covers are melting to one another (typical of lights side-by-side), making it impossible to replace bulbs.

RESPONSE:

The legend lights cited in this HED are part of the turbine control panel (90X-7). These lights are provided with a lamp test.

IMPLEMENTATION:

Accept as is.

4407/c/12

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0162

04 HED NO.: 5.3.2.A.1-1

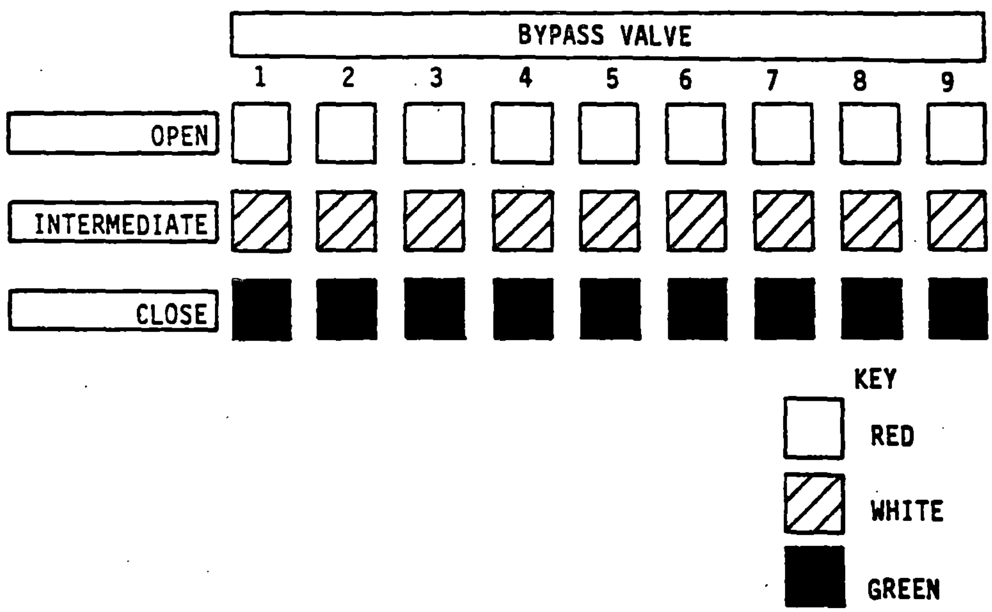
CATEGORY: 3 LEVEL: C

FINDING:

For a number of non-legend light indicators, there is no labeling, or labels are temporary. (Photo Log No. B-2)

RESPONSE:

All temporary labels will be replaced with permanent labeling. Matrix labeling will be added to the bypass valve matrix of lights on 90X-7 to adequately identify the meaning of each light.



IMPLEMENTATION:

By the completion of the first refueling outage.

4404/c/29

FINAL DRAFT 12/85

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0374

04 HED NO.: 5.3.3.A.1-1

CATEGORY: 1 LEVEL: C

FINDING:

The standard square legend indicating lights used throughout the control room do not meet the criteria of being 10% brighter than the surrounding panel. This is always true of the blue and yellow lights, sometimes true of the white, green, and red lights and never true for the amber lights. The legend lights on the turbine panel also have this problem.

RESPONSE:

The standard square legend indicating lights which have faded from age will be replaced.

IMPLEMENTATION:

By the completion of the second refueling outage.

4418/c/18

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0163, 0164

04 HED NO.: 5.3.3.A.2-1, 5.3.3.A.3-1

CATEGORY: 1 LEVEL: C

FINDING:

The legend lettering does not contrast well with legend background for legend lights. The legends are difficult to read under ambient lighting when the indicator light is extinguished. (Photo Log No. B-1 and A-34)

RESPONSE:

The legend lights which have faded from age will be replaced.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/38

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0186

04 HED NO.: 5.3.3.C-1

CATEGORY: 2 LEVEL: B

FINDING:

Some legend lights are not distinguishable from legend pushbuttons.

RESPONSE:

Demarcation will be added to pushbuttons to ensure that they are distinguishable from legend lights.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/12

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0118, 0119, 0124

04 HED NO.: 5.4.1.A-1, 5.4.1.B-1, 5.4.2.B.3-1

CATEGORY: 1 LEVEL: C

FINDING:

There are recorders in which pens, ink and paper do not provide clear and distinct markings. The ink is bleeding, making discrete recordings difficult. Blue grids on paper make it difficult to read light blue markings. Dark green grids make it difficult to read light markings. Dual pen recorders typically have one color marking over another color. Some markings are recorded on the border of the grid. For multipoint recorders, multiple points are not readable. Points are being recorded on top of one another, and ink is too light or is bleeding, making several points appear as a large smudge. Grid-to-marking contrast typically is poor. Some recorders have paper that does not match the scale on the recorder. (Photo Log No. A-7, A-10, A-8)

RESPONSE:

All discrepant recorders will be corrected.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/3

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0387, 0122

04 HED NO.: 5.4.1.C-1, 5.4.2.A.1-1

CATEGORY: 3 LEVEL: C

FINDING:

Recorder scales are not marked and numbered according to the specified guidelines. Some of the recorders have been cited for inappropriate graduation marking and numbering, others have been cited for a lack of labeling to identify parameter being recorded.

RESPONSE:

Recorder scales will be modified to implement the appropriate change for each recorder.

IMPLEMENTATION:

By the completion of the second refueling outage.

4418/c/26

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0121

04 HED NO.: 5.4.1.K-1

CATEGORY: 3 LEVEL: C

FINDING:

Not all data is visible through the window of the following recorders: (Photo Log No. A-9)

conductivity reactor demin (90X-4)
adsorber vessel temperatures (90X-54)
expansion and metal temperature (90X-7)
eccentricity and vibration (90X-7)

RESPONSE:

Labels (and job placement aids) for the cited recorders will be relocated to insure that recorder data is visible to the operators.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/4

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0414

04 HED NO.: 5.4.2.B.4/VL-2

CATEGORY: 1 LEVEL: C

FINDING:

During the validation it was observed that specific points, such as suppression pool temperatures and drywell temperatures on multipoint recorders, must be monitored, but the operator has no means of selecting a point to be printed. He must wait for the recorder to cycle through to the point. This causes unnecessary delay, which could have negative impact on operation, particularly in a time critical situation.

RESPONSE:

Suppression pool temperature and drywell temperature indications will be added to the control panel and will provide the necessary monitoring. The delay for waiting until the completion of the cycle is minimal. In addition, all points are trended.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/44

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0159

04 HED NO.: 6.1.1-1

CATEGORY: 3 LEVEL: C

FINDING:

Equipment is not properly labeled.

RESPONSE:

All control room equipment will be permanently labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/22

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0159, 0187

04 HED NO.: 6.1.1-2, 6.1.1-3

CATEGORY: 3 LEVEL: C

FINDING:

Controls have improperly labeled switch positions, related displays and controls do not have corresponding labels. (Photo Log No. B-15)

RESPONSE:

The switch positions on the cited controls will be relabeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/18

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0288

04 HED NO.: 6.1.1.H-5

CATEGORY: 3   LEVEL: C

FINDING:

On the A recirculation controller, the manual/auto deviation meter is not labeled, the speed demand meter has labels "open" and "closed," which are meaningless for a pump, and both scales display no parameters. These factors lead the operator to use the wrong meter.

RESPONSE:

The meters will be labeled "% speed demand" and the "close" and "open" labels will be removed.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/19

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0471

04 HED NO.: 6.1.1/V-8

CATEGORY: 3 LEVEL: C

FINDING:

Controls, displays, and other equipment items are not appropriately and clearly labeled. The items have: Labels in dynotape, no label, or labels are penciled or inked in. Also, items are mislabeled.

RESPONSE:

All control room instrumentation will be permanently labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/4

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0472

04 HED NO.: 6.1.1/V-9

CATEGORY: 3 LEVEL: C

FINDING:

Some pieces of equipment were found to be inappropriately labeled in the verification. Proper labeling aids in quick, accurate identification of components.

RESPONSE:

Discrepant labels will be modified.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/5

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0473

04 HED NO.: 6.1.1/V-10

CATEGORY: 3 LEVEL: C

FINDING:

The legends on some valve lights do not give the valve numbers. Most valve control switches in the control room have component numbers associated with them and this is useful information to have on the lights in that it aids in general operations and could help in proper identification under emergency conditions.

RESPONSE:

Valve numbers will be included on labels for all control switches.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/6

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0474

04 HED NO.: 6.1.1/V-11

CATEGORY: 3 LEVEL: C

FINDING:

The labels for area radiation monitors (on the 90X-2 back panel) do not contain information about which point is referred to on the multipoint recorders. Points are currently written on the rotary meters in pencil. Permanent labeling containing relevant supplemental information should be provided.

RESPONSE:

The area radiaton monitor (ARM) indicating meters on 90X-11 will be labeled to correspond to the ARM recorders (on 90X-2).

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/7

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0476

04 HED NO.: 6.1.1/V-13

CATEGORY: 3 LEVEL: C

FINDING:

At present, there is a meter labeled "radwaste building atmosphere" (on 912-5). Whether there is a difference between the reactor building or the atmosphere is not clear because neither is marked on the meter face. Labeling should clearly identify what is being displayed.

RESPONSE:

The meter will be relabeled "radwaste control room to outside dp". To ensure consistency in labels, the "radwaste building contaminated" meter will be relabeled "radwaste pump area to radwaste control room dp".

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/8

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0479

04 HED NO.: 6.1.1/V-14

CATEGORY: 3 LEVEL: C

FINDING:

The labeling on the wide range level reactor water meter (on 90X-4) makes no mention of it being different from other reactor water level meters. It is actually cold calibrated and reads normal water level at 68 inches instead of the hot calibrated 30 inches. Labeling should help to clearly identify what is being displayed.

RESPONSE:

A label will be added to the control panel which states "normal operating water level = 68 inches, cold calibrated".

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/9

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0500

04 HED NO.: 6.1.1/V-16

CATEGORY: 3 LEVEL: C

FINDING:

The listed indicator light for the turbine vacuum pump currently says "run" instead of "on" which is normally used for pump indication. Nomenclature in labeling should be consistent.

RESPONSE:

The discrepant indicator lights will be relabeled "on".

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/10

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0425

04 HED NO.: 6.1.1/VL-1

CATEGORY: 3 LEVEL: C

FINDING:

During the validation, some search time delay was observed with the instrument air system on the 912-1 panel.

RESPONSE:

Background shading and a summary label will be added to the 912-1 to ai in the identification of this system.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/03

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0336

04 HED NO.: 6.1.2.A.2-1

CATEGORY: 3 LEVEL: C

FINDING:

The guideline states that subordinate labels of a hierarchical labeling scheme are to be used to identify subsystems or functional groups. Subsystem labels are used on some parts of panel 3 and 4, but most of the control room has no hierarchical labels. Hierarchical labels should be used throughout the control room to inform the operators of groupings of controls and displays.

RESPONSE:

Summary lead labels will be added to the control panels in conjunction with background shading and demarcation of functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

4418/c/37

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0337

04 HED NO.: 6.1.2.A.3-1

CATEGORY: 3 LEVEL: C

FINDING:

Some panel elements do not have labels, or have dynotape or handwritten temporary labels.

RESPONSE:

All panel elements will be permanently labeled.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/31

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0336, 0340, 0351

04 HED NO.: 6.2.1.B-1, 6.1.2.A-1, 6.3.7.A-1

CATEGORY: 3 LEVEL: C

FINDING:

Labels do not follow a hierarchical scheme throughout the control room. Component labels are not always located above the components to which they pertain.

RESPONSE:

Summary lead labels will be added to the control panels in conjunction with background shading and demarcation of functional groupings.

160

INDEX

336 = 3.1.2.A2.1

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/26

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0402, 0380

04 HED NO.: 6.2.2.A-1, 6.6.1.B-1

CATEGORY: 3 LEVEL: C

FINDING:

Temporary labels and lines of demarcation are used and can be removed easily.

RESPONSE:

All temporary labels will be replaced with permanent labels. Current demarcation lines will be removed and new ones permanently painted on the control boards.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/24

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0342, 0345, 0346, 0347, 0348

04 HED NO.: 6.3.1.A-1, 6.3.2.B-1
6.3.2.C-1, 6.3.2.D-1
6.3.2.E-1

CATEGORY: 3 LEVEL: C

FINDING:

Labels are not clear, direct, and are ambiguous.

RESPONSE:

Labels cited as unclear, not direct, and ambiguous will be reworded.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/50

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0489

04 HED NO.: 6.3.8.A/V-2.

CATEGORY: 3 LEVEL: C

FINDING:

The listed controls were found in the verification to have inappropriate or missing switch positions. The availability and accuracy of nomenclature for switch positions is essential for positive identification of control functions.

RESPONSE:

Missing switch positions will be added. Inappropriate switch positions will be corrected.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/21

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0354

04 HED NO.: 6.3.9.A-1

CATEGORY: 3 LEVEL: C

FINDING:

Labels are not used to identify components within closed cabinets. For example, Panel 901-37 has a series of thumbwheels within a closed cabinet that is not labeled, and Panel 901-21 has leak detectors in a cabinet that must be opened for access, but which is not labeled.

RESPONSE:

Labels will be placed on the outside of 901-37 and 901-21 to identify components located inside the cabinet.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/27

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0355

04 HED NO.: 6.4.1.B.1-1,

CATEGORY: 3 LEVEL: C

FINDING:

The guideline states that labels will consist of dark characters on a light background. Some control room labels do not meet this guideline.

RESPONSE:

All discrepant labels will be re-engraved with black characters on a white background.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/43

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0356, 0357

04 HED NO.: 6.5.1.A-1, 6.5.1.B-1

CATEGORY: 3 LEVEL: C

FINDING:

Temporary labels are used in many areas of the control room. Dyno tape is used in conjunction with permanent labels. It is used as a substitute for permanent labels and is used for switch position indications. The guideline states that temporary labels are used only when necessary since temporary labels are subject to change or falling off.

RESPONSE:

All temporary labels will be replaced with permanent labels.

357

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/14

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0107

04 HED NO.: 6.6.3/OS-1

CATEGORY: 3 LEVEL: B

FINDING:

Operator survey results indicated that mimic flow paths would be very useful on 90X-3 and 90X-4. (Photo Log No. D-1)

RESPONSE:

Background shading and lines of demarcation will be added to 90X-3 and 90X-4. This will clarify functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/8

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0379

04 HED NO.: ~~6.6.3/OS-1~~ 6.6.3.1

CATEGORY: 3 LEVEL: C

FINDING:

Label color is not dedicated to specific functions or conditions throughout the control room. The use of color for grouping of related systems or functions enhances the operators ability to identify specific items.

RESPONSE:

A standard for the use of color in the control room has been established and implemented. This color standard will be applied to the labels where color is used to cue the operator for component or system identification.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/46

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0281

04 HED NO.: 6.6.3/OS-2

CATEGORY: 3 LEVEL: B

FINDING:

Operator survey results indicated that particular switches should have a mimic of the actual flow path, and there should be uniformity between system mimics.

RESPONSE:

Mimic colors will be changed to provide a consistent systematic approach to the panel layout.

IMPLEMENTATION:

Accept as is.

4403/c/9

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0419

04 HED NO.: 6.6.3/VL-2

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that the core spray system, the low pressure core injection (LPCI) injection mode of residual heat removal (RHR), and RHR in general do not have flowpath mimics. This lack of mimics can contribute to operational delays in the use of these systems. Proper use of mimics integrates system components into functionally oriented diagrams that reflect component relationships and thereby decrease operator decision making and search time.

RESPONSE:

Background shading and demarcation will be added to the 90X-3 panel to clarify functional groupings.

IMPLEMENTATION:

By the completion of the first refueling outage.

4404/c/61

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0376, 0377

04 HED NO.: 6.6.3.A.3-1, 6.6.3.A.2-1

CATEGORY: 3 LEVEL: C

FINDING:

There is inadequate contrast between the different color mimic lines and between mimic lines and the beige panel. Sufficient contrast can improve flow path identification.

RESPONSE:

These mimic lines will be replaced with black mimic lines.

377

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/41

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0375, 0378

04 HED NO.: 6.6.3.A.4-1, 6.6.3.A.1-1

CATEGORY: 3 LEVEL: C

FINDING:

Mimic flow paths are not color coded and mimic lines depicting the flow of the same contents are not the same color. Proper color coding of mimic lines helps to reflect functional relationships and decrease operator decision time.

RESPONSE:

Mimic lines on the electrical panel will be color coded to represent voltages. All other mimic lines throughout the control room will be coded black.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/45

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0392

04 HED NO.: 6.6.3.B.3-1

CATEGORY: 3 LEVEL: C

FINDING:

Arrows are not used to indicate flow direction on mimics.

RESPONSE:

Flow directions on mimics will be clearly identified by arrows.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/21

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0050

04 HED NO.: 7.1.8.B.1.C-1

CATEGORY: 2 LEVEL: C

FINDING:

Specific codes or addresses by which data may be called up on the computer system are not cross-indexed by system/subsystem identification. This type of cross-indexing helps in readily identifying needed information.

RESPONSE:

The index will be provided as hard copy and placed in the control room to make it available to operations personnel.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/27

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0333

04 HED NO.: 7.2.2.B.1/OS-2

CATEGORY: 2 LEVEL: C

FINDING:

Response to the operator survey indicated that on many of the reactor parameter displays on CRT's it is hard to read the numbers. More space should be allotted for the values and less for the description. It is important that the operators be able to read the information on the CRTs accurately.

RESPONSE:

More space will be allotted for the values on the CRTs.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/15

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0055

04 HED NO.: 7.2.7.H-1

CATEGORY: 2 LEVEL: C

FINDING:

Colors and types of lines used for piping and electrical lines on the color CRTs are not used consistently. Consistent use of graphic coding allows for easy recognition and interpretation of graphic displays.

RESPONSE:

The colors and types of lines to be used for piping and electrical lines will be modified to reflect a consistent approach.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/36

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0057

04 HED NO.: 7.2.7.k.1-1

CATEGORY: 2 LEVEL: C

FINDING:

Colors used on CRTs are not consistent in meaning with colors in the rest of the control room. Consistent meanings for colors allow for easy recognition and interpretation.

RESPONSE:

The CRT (by the nature of its design) uses numerous colors. Most uses of color are for lines, outlining and wording. The use of colors does not need to be consistent with the control room since it is used independently.

IMPLEMENTATION:

Accept as is.

4407/c/37

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0059

04 HED NO.: 7.2.7.L.3-1

CATEGORY: 2 LEVEL: C

FINDING:

The color yellow is used on the color CRTs for regular lettering as well as to indicate caution or warning. The color yellow as defined by the checklist should mean: hazard potentially unsafe caution attention required marginal parameter value exists. The use of yellow for the regular lettering may imply unintended significance to the letters.

RESPONSE:

Yellow provides a good contrast on the CRT and is therefore used as a status condition color. This is an appropriate use of color.

IMPLEMENTATION:

Accept as is.

4407/c/40

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0166

04 HED NO.: 8.1.1.B-2

CATEGORY: 1 LEVEL: C

FINDING:

Some controls and displays are on the vertical portion of the benchboards and are part of the pressure suppression system (on 90X-3). They are not located over, or clearly related to, the controls and displays associated with the pressure suppression system on the horizontal portion of the benchboard which are grouped. Grouping by system helps to clearly show this relationship.

RESPONSE:

Background shading and a summary label will be added to 90X-3 to clearly show pressure suppression equipment.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/50

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0166

04 HED NO.: 8.1.1.B-3

CATEGORY: 3 LEVEL: C

FINDING:

Several displays and controls are not grouped with the systems to which they belong. Grouping by system helps to clearly show this relationship.

RESPONSE:

Background shading, demarcation, and summary labeling will be used on the control boards to distinguish systems from each other and clearly show functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/19

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0307

04 HED NO.: 8.1.1.B/OS-1

CATEGORY: 1 LEVEL: A

FINDING:

Operator survey results indicated that the high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems are difficult to operate when being used to reduce reactor pressure. These systems are not laid out according to function, sequence of use, frequency of use, or other operator expectations.

RESPONSE:

Background shading, demarcation, and system labels will be implemented to enhance the HPCI and RCIC system (90X-3 and 90X-4).

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/10

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0276

04 HED NO.: 8.1.1.B/OS-7

CATEGORY: 1 LEVEL: B

FINDING:

Operator survey responses indicated that panel 90X-8, which is the electrical panel, is poorly laid out and should be redone. Currently the controls and displays on the electrical distribution panel are not arranged according to function sequence, use frequency, or other obvious logical expectation. A poorly arranged central panel can contribute to operator confusion/error in an emergency situation. (Photo Log No. D-4)

RESPONSE:

Background shading, system mimics, and summary labeling will be used on this panel.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/22

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0277

04 HED NO.: 8.1.1.B/OS-8

CATEGORY: 1 LEVEL: B

FINDING:

The operator survey indicated that the following controls/displays should be grouped together: steam flow indicators (90X-5) main steam isolation valve (MSIV) controls (90X-3); and turbine throttle pressure indicators (90X-7). The operator needs to be able to use these controls while observing these indicators, and this control function is difficult with the current configuration.

RESPONSE:

Background shading and demarcation has been added to the cited equipment on 90X-3 and 90X-5.

IMPLEMENTATION:

By the completion of the first refueling outage.

04/4405/c/16

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0208

04 HED NO.: 8.1.2.A-1

CATEGORY: 2 LEVEL: C

FINDING:

Functional groups of controls on the horizontal portion of 90X-3, 90X-4, and 912-1 are separated by only 2 inches, as opposed to the required mimimum of 2.5 inches. This detracts from clearly defining the functional groupings. Another method of functional grouping enhancement needs to be used. (Photo Log No. C-15)

RESPONSE:

Demarcation lines as well as background shading will be added to 90X-3, 90X-4, and 912-1 to clearly show functional groupings. The operators do not wear gloves when operating controls. Therefore, the operators are able to easily operate controls.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/2

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0209

04 HED NO.: 8.1.2.A-2

CATEGORY: 2 LEVEL: C

FINDING:

Functional groups of displays are not separated by a minimum width of at least one display width.

RESPONSE:

Displays will be broken into functional groupings by the use of summary labels, demarcation, and background shading.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/5

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0416

04 HED NO.: 8.2.1/VL-1

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that the controls and displays on the 90X-4 panel are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the system contained on the panel.

RESPONSE:

Summary labeling, background shading, and lines of demarcation will be used to functionally differentiate the systems on the 90X-4 panel.

IMPLEMENTATION:

By the completion of second refueling outage.

4404/c/62

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0417

04 HED NO.: 8.2.1/VL-2

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that the controls and displays in the residual heat removal (RHR) and core spray systems are arranged without consideration of sequence of use, frequency of use, function, or other logical expectations. This can contribute to delay and/or error in the use of the systems.

RESPONSE:

Background shading and summary labels will be added to 90X-3 to clarify functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/01

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0418

04 HED NO.: 8.2.1/VL-3

CATEGORY: 1 LEVEL: B

FINDING:

During the validation it was observed that the controls and displays on the 90X-8 Panels are arranged without consideration of sequence of use, frequency of use, function or other logical expectations. This can contribute to delay and/or error in the use of the systems contained on the panel.

RESPONSE:

Summary labeling, background shading, and lines of demarcation will be used to functionally highlight and differentiate the systems on 90X-8.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/02

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0274

04 HED NO.: 8.2.1.A.2/HR-1

CATEGORY: 2 LEVEL: B

FINDING:

While Unit 1 was at reduced load to take the 'C' reactor feedpump out of service, the discharge valve of the 'B' feedpump, which was operating, was inadvertently closed. On Unit 2 the respective feedpump discharge valves are located directly above the feedpumps. On Unit 1 these valves are displaced to the right of their respective feedpump control switches by one control space. This does not conform to accepted human factors principles concerning left to right, top-to-bottom sequential control relationships; and can, as in this instance (DVR 4-1-79-97), lead to inadvertent control actuation. (Photo Log No. C-12)

RESPONSE:

Mimics and background shading will be installed in the Unit 1 control room for the feedpump and feedpump discharge valve portions of the 90X-6 panel.

IMPLEMENTATION:

By the completion of second refueling outage.

4404/c/46

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0193

04 HED NO.: 8.2.1.c.1-1

CATEGORY: 1 LEVEL: B

FINDING:

It would be helpful to have reactor pressure indication over controls for the auto blowdown system (on 90X-3). Having functionally related displays and controls grouped together facilitates their usage.

RESPONSE:

The auto blowdown system will be separated from other controls by a summary label and demarcation lines.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/58

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0193

04 HED NO.: 8.2.1.C.1-2

CATEGORY: 1 LEVEL: C

FINDING:

The valve control for the suppression chamber dump (on 90X-3) is functionally related to the suppression chamber test and spray valve control and may be more appropriately located next to it.

RESPONSE:

The cited controls will be background shaded the same color to designate their functional relationship.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/59

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0284

04 HED NO.: 8.2.1.C.1/OS-4

CATEGORY: 1 LEVEL: B

FINDING:

Operator survey response indicated that having the high pressure cooling injection (HPCI) components between the residual heat removal (RHR) loops (A&B) creates interference.

RESPONSE:

System labeling and background shading will be used to highlight the RHR Loops.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/62

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0491

04 HED NO.: 8.2.1.C.1/V-9

CATEGORY: 3 LEVEL: C

FINDING:

Functionally related controls and displays are not grouped together when they are used together to perform tasks related to a specific function. The charging water flow meter is located on the 901-5 Panel along with other control rod drive meters. The common placement is a flow meter with a pressure meter immediately to its right. Many other meters follow this convention. Presently, the flow meter is to the right of the pressure meter.

RESPONSE:

There is not a control room convention in regards to the placement of pressure and flow meters. The cited meters are functionally grouped with similar equipment and will be labeled "pressure" and "flow".

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/52

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0191

04 HED NO.: 8.2.2.A-4

CATEGORY: 1 LEVEL: B

FINDING:

The organization and layout of the 90X-8 does not clearly show the hierarchy of the system from power sources down through the various busses that are fed as well as the interrelationships among the bases and sources.

RESPONSE:

The mimic lines will be coded using different colors to clearly show the hierarchy and directionality of the system. In addition, background shading and demarcation lines will be added to enhance functional groupings.

IMPLEMENTATION:

By the completion of the first refueling outage.

4418/c/31

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0214

04 HED NO.: 8.3.2.D.1-1

CATEGORY: 3 LEVEL: C

FINDING:

The axes of the full core display matrix are labeled on the right and bottom as well as the top and the left sides of the matrix (Unit 2 is not labeled across the top). The control rod select matrix is also labeled across the bottom instead of the top. Proper labeling of the matrix helps to assure label visibility and clarity of the matrix organization.

RESPONSE:

Matrix labeling will be added to the axes of the full core display and the control rod select matrices to provide labeling on the top, bottom, right, and left of the matrix.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/30

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0173

04 HED NO.: 9.2.2.D-1

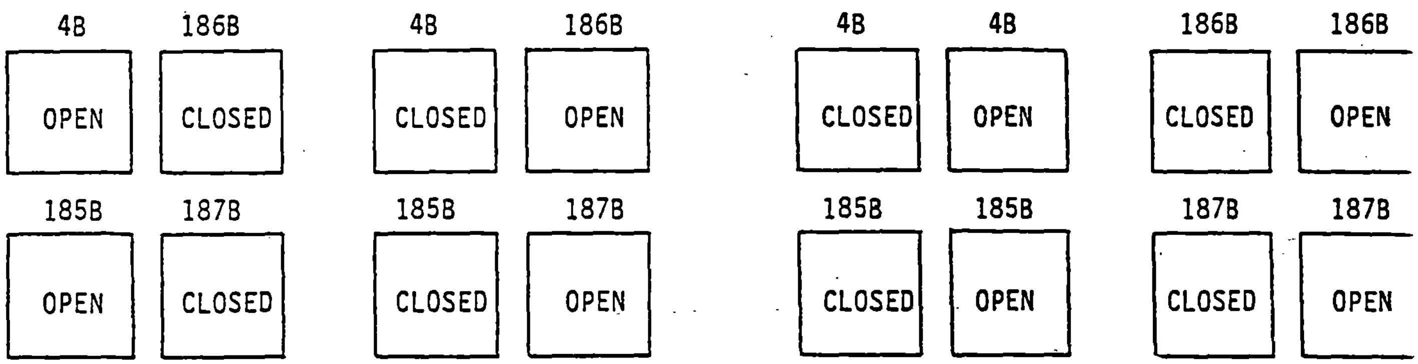
CATEGORY: 2 LEVEL: C

FINDING:

Residual heat removal (RHR) service water heat exchange valve position lights (on 90X-3) are not grouped in a fashion consistent with the rest of the control room. (Photo Log No. B-18)

RESPONSE:

The indicator lights will be rearranged so that they conform to the lighting convention employed throughout the control room.



CURRENT ARRANGEMENT PROPOSED MODIFICATION

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/66

FINAL DRAFT 12/85

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0492

04 HED NO.: 9.3.2.B/V-1

CATEGORY: 2 LEVEL: C

FINDING:

There are several problems associated with the following recorders (on 90X-5): reactor pressure/total steam flow; turbine steam flow/reactor pressure; vessel level/total feedwater flow. The labels for reactor pressure do not indicate narrow range or wide range difference. It was also suggested that the wide range have a listed range of 0-1500 instead of $0\text{-}15 \times 10^2$. There are also functional and/or operating relationships which could be formalized by grouping these parameters differently.

RESPONSE:

The cited meters will be labeled. In addition, background shading and summary labels will be added to 90X-5 to clarify functional groupings.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/65

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0176, 0406

04 HED NO.: 1.1.1/OS-2, 1.1.1.A/V-3

CATEGORY: 2 LEVEL: B

FINDING:

Operator survey results indicate the need for controls in the control room to control the control rod drive (CRD) pump discharge valves. Such control is currently done locally.

RESPONSE:

The CRD discharge valves will be made motor operated valves, and controls will be placed in the control room in proximity to the CRD pump controls.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/11

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0411

04 HED NO.: 1.1.1.A/V-8

CATEGORY: 1 LEVEL: B

FINDING:

At present, the ACAD/CAM mode switches are not physically located in the control room.

RESPONSE:

As a product of the labeling programs, the present ACAD/CAM power control switch will be relabeled to conform to the procedures. This switch is actually the mode switch and is located in the control room.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/29

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0102

04 HED NO.: 2.1.6.F-1

CATEGORY: 2 LEVEL: C

FINDING:

Control room inputs to the plant announcing system have no priority over other input. The control room input is not capable of interrupting an announcement in progress or of bypassing queued announcements. Providing an announcing system which gives priority to control room inputs will ensure quick public notification to plant personnel of control room status and will ensure immediate paging of and requests to various operating personnel during daily operations and in emergencies.

RESPONSE:

The telephone paging system will be modified to give priority to the control room.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/48

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0265

04 HED NO.: 4.1.1.B.1/OS-2

CATEGORY: 2 LEVEL: A

FINDING:

Response to the operator survey indicated that a pull-to-stop type throttle switch would be an improvement on the feedwater isolation valves (motor operated). The current feedwater regulating isolation valves throttle ability operation unduly restricts operator movement and availability to respond to other operational concerns. This restriction has the potential for contributing to operational problems.

RESPONSE:

Feedwater isolation valves will be changed so that the valves are seal in open and close. The ability to throttle the valve will be retained by installing valve controls which stop valve movement when the control handle is pulled out.

IMPLEMENTATION:

By the completion of second refueling outage.

4404/c/55

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0223

04 HED NO.: 4.4.4.B-1

CATEGORY: 1 LEVEL: C

FINDING:

The anticipated transient without scram (ATWS) manual scram turn pushbuttons have a small red knob indication to indicate if the switch is in the "armed" or "disarmed" position. The red indication is painted on the side of the control and is difficult for operators to see. Also, the "disarmed" label is displaced approximately an inch from the knob indication. Precise indication of switch position will ensure proper use of these controls as required. (Photo Log No. B-23)

RESPONSE:

A high contrasting arrow will be added to the knob and the "disarmed" and "armed" labels relocated to the proper position.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/16

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0457

04 HED NO.: 5.1.1.A.1/V-20

CATEGORY: 3 LEVEL: C

FINDING:

Visual displays provided in the control room do not give operators all of the information about system status and parameter values that is needed. At present, the computer window (number 02) on the 901-5 Panel is not functional. It should be used to visually monitor selected process computer parameters.

RESPONSE:

Computer-driven analog trend displays will be installed on both unit control panels.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/55

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0467

04 HED NO.: 5.1.1.A.1/V-23

CATEGORY: 2 LEVEL: B

FINDING:

The LED window #3 on the 901-7 panel has been used in the past to display valve status from the process computer. It is not functional at the present time. Additional operating information which can be called up at will by operators might be an aid in an emergency situation.

RESPONSE:

Computer-driven analog trend displays will be installed on the control panels for both units.

IMPLEMENTATION:

By the completion of the second refueling outage.

4415/c/44

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0136, 0133

04 HED NO.: 5.1.2.E.1-2, 5.1.2.E.2-2

CATEGORY: 2 LEVEL: C

FINDING:

The drum counter measuring flow is expanded by multiplying scale values by powers of ten to avoid the need for a time-consuming operator conversion. In addition, these scales are not permanently marked as to the conversion factor. (Photo Log No. A-18)

RESPONSE:

The cited drum counters are non-time dependent and non-critical. The operators can function adequately with this information. The conversion factor will be permanently labeled on the scale.

IMPLEMENTATION:

By the completion of the second refueling outage.

4404/c/66

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0169

04 HED NO.: 5.2.2.A.2-1

CATEGORY: 1 LEVEL: C

FINDING:

The scale values do not increase with the clockwise movement of the pointer for circular meters. The relationship between clockwise movement and the concept of "increase" is a population stereotype which, if violated, may cause confusion. The meters have a negative and a positive scale around zero but are not marked so. (Photo Log No. B-12)

RESPONSE:

The cited circular meters use zero as a center point to balance the positive and negative values. The indication used by the operator does not require positive and negative values, but relies on the pointer position relative to zero.

IMPLEMENTATION:

Accept as is.

4404/c/40

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0314

04 HED NO.: 5.2.4/OS-1

CATEGORY: 3 LEVEL: C

FINDING:

Operator survey results indicated that the display for condenser vacuum is in back pressure in the main control room, but during training it is referred to as vacuum. This can be confusing, especially to new operators.

RESPONSE:

Units for training will be made consistent with those in the main control room.

IMPLEMENTATION:

By the completion of the second refueling outage.

4403/c/5

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0352

04 HED NO.: 6.3.8.A-1

CATEGORY: 3 LEVEL: C

FINDING:

All discrete functional control positions are not identified.

RESPONSE:

The positions of all discrete functional controls will be clearly marked. All temporary labels will be replaced with permanent ones.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/04

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0079

04 HED NO.: 7.2.5.K.1-1

CATEGORY: 2 LEVEL: C

FINDING:

The alarm messages on the alarm CRT are not highlighted to distinguish them from other messages printed on that CRT. Highlighting of alarm messages allows for rapid distinguishability and location of the alarm messages.

RESPONSE:

Alarm messages will be highlighted by use of reverse video, color, or location to distinguish them from other messages displayed on the CRTs.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/35

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0067, 0078

04 HED NO.: 7.3.2.F.1-1, 7.3.2.F.2-1

CATEGORY: 2 LEVEL: C

FINDING:

The alarm messages do not clearly relate to the annunciator tile that is illuminated. This may result in confusion as to the annunciator being listed particularly if there are several going off at once.

RESPONSE:

The alarm messages do have the same wording as the tile but this requires that the operators know exactly where the tile is located. Printing of the panel and coordinates of the annunciator tile will be implemented to support operators.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/24

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0271

04 HED NO.: 8.1.1.B/OS-5

CATEGORY: 1 LEVEL: C

FINDING:

A number of responses to the operator survey indicated that half of the swing diesel controls are on Unit 1, but that the diesel can be operated from Unit 2. This is a poor arrangement of controls and displays and may contribute to operator error/confusion/hesitation in an emergency situation.

RESPONSE:

A voltage regulator and governor for the diesel, presently included on Unit 1, will be added to Unit 2 on Panel 902-8. The controls for the start/stop diesel will remain the same.

IMPLEMENTATION:

By the completion of the second refueling outage.

04/4405/c/21

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0190

04 HED NO.: 8.2.1.C.2-1

CATEGORY: 2 LEVEL: C

FINDING:

The listed displays and controls are not grouped with other displays and controls to which they are functionally related:

Reactor core isolation cooling (RCIC) reset pushbuttons
RCIC manual initiation
RCIC steam line break reset
Initation signal seal-in and reset
RCIC pump suction and discharge
Turbine inlet
Turbine exhaust

RESPONSE:

The RCIC displays and turbine displays will be rearranged to reflect proper grouping.

IMPLEMENTATION:

By the completion of the second refueling outage.

4407/c/66

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0316

04 HED NO.: 8.3.1.B/OS-1

CATEGORY: 1 LEVEL: B

FINDING:

Response to the operator survey indicated that control switches with the same shape are too close to one another though on different systems and can be inadvertently actuated. Example: closing or opening drywell sump valves and instead closing a recirculation pump discharge valve.

RESPONSE:

Where appropriate, lines of demarcation and/or background shading techniques will be used to differentiate between similar components belonging to different systems.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/08

QUAD CITIES STATION CORRECTIVE ACTIONS

INDEX NO.: 0317

04 HED NO.: 8.3.1.B/OS-2

CATEGORY: 1 LEVEL: B

FINDING:

Response to the operator survey indicated that the main steam isolation valve switches could be accidentally activated because of their proximity during containment valve operations.

RESPONSE:

Lines of demarcation to denote system and subsystem integration and background shading to denote system and subsystem differentiation will be implemented.

IMPLEMENTATION:

By the completion of the second refueling outage.

4416/c/09

Commonwealth Edison Company

Quad Cities Station Units 1 & 2

Human Factors Engineering

Corrective Action Schedule Change Request

Quad Cities Safety Evaluation Report References

Appendix F

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 307
APPENDIX C3
HED CATEGORY 1A
FSR PAGE 199

FINDING

OPERATOR SURVEY RESULTS INDICATED THAT THE HIGH PRESSURE COOLANT INJECTION (HPCI) AND REACTOR CORE ISOLATION COOLING (RCIC) SYSTEMS ARE DIFFICULT TO OPERATE WHEN BEING USED TO REDUCE REACTOR PRESSURE. THESE SYSTEMS ARE NOT LAID OUT ACCORDING TO FUNCTION, SEQUENCE OF USE, FREQUENCY OF USE, OR OTHER OPERATOR EXPECTATIONS.

RESPONSE

BACKGROUND SHADING, DEMARCATION, AND SYSTEM LABELS WILL BE IMPLEMENTED TO ENHANCE THE HPCI AND RCIC SYSTEM (90X-3 AND 90X-4).

NRC/SAIC COMMENT

The proposed corrective action only partially corrects the discrepancy. Moreover, acceptance of the proposed corrective action for this HED is dependent upon the licensee's resolution of the expressed NRC concerns over the following programs/standards:

- o Color Coding
- o Labeling
- o Demarkation/Background Shading

CECO CLARIFICATION

Mimics are presently used to enhance the presentation of these systems on the control panel. The controls are appropriately labeled on the panels. The operators are trained to know the systems (and their operation) and the operators are trained to follow procedures prescribing the use of each control switch.

Display and control enhancement is a technique that allows operators to sort out the immediately relevant from the irrelevant stimuli. Effective enhancement permits timely acquisition of meaningful information, facilitates correct identification of relevant control options, and allows the operator to maintain effective awareness over system status.

Effective surface enhancement techniques include Demarcation and Mimic Lines, Color Shading, and Labeling. Color enhancement is used in nuclear power plant control rooms to help clarify component identification and functional relationships among various components. Many problems, such as large matrices of undifferentiated components, physically displaced controls and their associated displays, can be remedied with color shading.

Background shading also improves the efficiency of information transfer to the operator and assists his decision making process by organizing panel elements, minimizing existing visual clutter, optimizing desired associations among panel elements, and standardizing information presentation. Color enhancements also facilitate learning and retention of where components and controls are located, especially for new operators. Components having a common color also are seen as forming a group.

Because the goal of shading is to provide operator aids, the operator must agree with or approve the enhancement, or it probably will not be successful. Operator participation is a requirement throughout the color shading process and was integral during the selection of color enhancements at Quad Cities station that has taken place to date.

SAIC recommends that the number of colors used for coding should not exceed eleven (11) and should be kept to the minimum needed to provide sufficient information (as identified on page 6.5-11 in NUREG-0700). Quad Cities uses only six (6) colors for coding purposes and has established a standard to this effect. Moreover, because Quad Cities is a Red/Green board plant, the instances of the use of color for coding purposes is minimal. Color shading on the other hand does not represent system status or state, but is merely a perceptual aid designed to facilitate system identification. There is no meaning assigned to the shading and the shading should not be interpreted as coding.

Another factor in determining the utility of background shading is the area of the surface to which we are applying background shading. A control room the size of Quad Cities' can afford to use a greater number of color enhancements than control rooms with less area, provided it has been systematically applied using sound human engineering and operating principles. Several industry documents recognize the utility of using a number of background shading colors. One EPRI document advocated and provided an example which included eight (8) colors for one sample panel. In addition, there are precedents set throughout the industry which clearly demonstrate the effectiveness of using over twenty (20) colors for enhancement to support system identification.

Less than twenty (20) colors have been chosen for background shading for the main control boards at Quad Cities. Principles for color use (outlined in sections 6.5 and 6.6 of NUREG-0700) guided the selection of colors to be used on the control panels. Colors were selected from a pool of high contrast and matte finish shades used at other stations, applied against a "Kewanee Beige" board color. As an engineered retrofit, their application extends from a total-board design evaluation that followed a system-by-system approach.

The use of colors, particularly in conjunction with background shading at Quad Cities has been reexamined with operating personnel (SME's). As a result the enhancement of the Quad Cities control boards will be very similar to that accomplished at Byron/Braidwood. We have had a very positive response from the operators at Byron/Braidwood and are sure we will have the same response at Quad Cities.

In general, controls and displays at Quad Cities were found to be grouped by function with few "extraneous" or "maverick" components. In these cases, background shading affords a means to functionally group these extraneous components. Both the main component group and their maverick components in a system will be colored identically.

Background shading will be applied to systems nested among others. In the few cases where this technique will be applied, a high-contrast background shade applied to the centrally positioned group will enhance the separation of adjacent systems.

On the whole, the selection and use of background shading is designed to work in concert with other perceptual aids and the placement design of instruments. The total-board design evaluation will hold in check the potential overuse of one or more perceptual aids. Thus, where background shading will be applied, its use will be conservative, necessary, and meaningful for operator performance.

In addition, lines of demarcation will be used, where possible, to enhance system grouping. Demarcation will be used between closely-spaced but functionally distinct systems that do not have individual components placed within other system groupings. The use of demarcation instead of background shading, in these instances, will prevent the overuse of color. The proposed demarcations consist of circumscribing functional or selected groups with a contrasting line in areas where physical space or panel edges do not visually set apart the related components.

Due to the integration and coordination necessary for the successful implementation of these enhancement programs throughout the control room, the HEDAT feels an implementation date of the second refueling outage to be reasonable.

IMPLEMENTATION
2ND REFUELING OUTAGE

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 171
APPENDIX C6
HED CATEGORY 1C
FSR PAGE 129

FINDING

NO METHOD IS PROVIDED FOR DETERMINING LAMP FAILURE IN INDICATING LIGHTS, EXCEPT BY VISUAL INSPECTION.

RESPONSE

THE LEGEND LIGHTS CITED IN THIS HED ARE PART OF THE TURBINE CONTROL PANEL (90X-7). THESE LIGHTS ARE PROVIDED WITH A LAMP TEST.

NRC/SAIC COMMENT

The HED cites lack of provision for determining failure in indicator lights. It is not clear from CECo's response whether there are any other lights in the control room that suffer from the same difficiency aside from those on the turbine control panel. Additional information concerning the scope of the HED and its resolution is needed to provide assurance that the HED is satisfactorily resolved.

CECO CLARIFICATION

The Quad Cities HEDAT has recently become aware of a long life indicator light bulb developed by Pennsylvania Power and Light for their Susquehanna plant. The bulb is supposed to have a service life of 11 years and be compatable with GE type sockets. Elements within Commonwealth Edison Company are investigating the possibility of utilizing these bulbs at our facilities. If use of the Susquehanna light bulbs is feasible CECo will attempt to implement them at the Quad Cities station by the end of the second refueling outage. In the interim our shift turnover panel walk down surveillance program will be used to identify instances of bulb failure for replacement.

IMPLEMENTATION

2ND REFUELING OUTAGE

QUAD CITIES STATION

REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

APPENDIX C5

The following HEDs were identified and grouped as posing the same general concern to the reviewers in the TER attached to the SER. The same grouping is employed here which precludes the presentation of the HEDs' Findings.

HED#	HED CAT	FSR PG#	HED#	HED CAT	FSR PG#
0148,0149	1B	42	0277	1B	201
0030	2C	84	0416	1B	205
0071	2C	85	0417	1B	206
0336	3C	155	0418	1B	207
0336,0340,0351	3C	160	0274	2B	208
0107	3B	179	0193	1C	210
0166	3C	198	0284	1B	211

NRC/SAIC COMMENT
Acceptance of the proposed corrective action for this HED is dependent upon the licensee's resolution of the expressed NRC concerns over the following programs/standards:

- Color Coding
- Labeling
- Demarcation/Background Shading

CECO CLARIFICATION
Display and control enhancement is a technique that allows operators to sort out the immediately relevant from the irrelevant stimuli. Effective enhancement permits timely acquisition of meaningful information, facilitates correct identification of relevant control options, and allows the operator to maintain effective awareness over system status.

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Another factor in determining the utility of background shading is the area of the surface to which we are applying background shading. A control room the size of Quad Cities' can afford to use a greater number of color enhancements than control rooms with less area, provided it has been systematically applied using sound human engineering and operating principles. Several industry documents recognize the utility of using a number of background shading colors. One EPRI document advocated and provided an example which included eight (8) colors for one sample panel. In addition, there are precedents set throughout the industry which clearly demonstrate the effectiveness of using over twenty (20) colors for enhancement to support system identification.

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In addition, lines of demarcation will be used, where possible, to enhance system grouping. Demarcation will be used between closely-spaced but functionally distinct systems that do not have individual components placed within other system groupings. The use of demarcation instead of background shading, in these instances, will prevent the overuse of color. The proposed demarcations consist of circumscribing functional or selected groups with a contrasting line in areas where physical space or panel edges do not visually set apart the related components.

[NOTE: (1) HED number 418 was misnumbered in the TER attached to the SER. In the TER on page C-6 it was numbered 148. (2) HED number 277's FSR page number was incorrectly printed in the SER/TER as 210.]

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 417
APPENDIX C4
HED CATEGORY 1B
FSR PAGE 206

FINDING

DURING THE VALIDATION IT WAS OBSERVED THAT THE CONTROLS AND DISPLAYS IN THE RESIDUAL HEAT REMOVAL (RHR) AND CORE SPRAY SYSTEMS ARE ARRANGED WITHOUT CONSIDERATION OF SEQUENCE OF USE, FREQUENCY OF USE, FUNCTION, OR OTHER LOGICAL EXPECTATIONS. THIS CAN CONTRIBUTE TO DELAY AND/OR ERROR IN THE USE OF THE SYSTEMS.

RESPONSE

BACKGROUND SHADING AND SUMMARY LABELS WILL BE ADDED TO 90X-3 TO CLARIFY FUNCTIONAL GROUPINGS.

NRC/SAIC COMMENT

Proposed implementation dates should be reevaluated for implementation by the completion of the first refueling outage, or further justification should be provided for implementation as proposed.

CECO CLARIFICATION

Display and control enhancement is a technique that allows operators to sort out the immediately relevant from the irrelevant stimuli. Effective enhancement permits timely acquisition of meaningful information, facilitates correct identification of relevant control options, and allows the operator to maintain effective awareness over system status.

Effective surface enhancement techniques include Demarcation and Mimic Lines, Color Shading, and Labeling. Color enhancement is used in nuclear power plant control rooms to help clarify component identification and functional relationships among various components. Many problems, such as large matrices of undifferentiated components, physically displaced controls and their associated displays, can be remedied with color shading.

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Because the goal of shading is to provide operator aids, the operator must agree with or approve the enhancement, or it probably will not be successful. Operator participation is a requirement throughout the color shading process and was integral during the selection of color enhancements at Quad Cities station that has taken place to date.

SAIC recommends that the number of colors used for coding should not exceed eleven (11) and should be kept to the minimum needed to provide sufficient information (as identified on page 6.5-11 in NUREG-0700). Quad Cities uses only six (6) colors for coding purposes and has established a standard to this effect. Moreover, because Quad Cities is a Red/Green board plant, the instances of the use of color for coding purposes is minimal. Color shading on the other hand does not represent system status or state, but is merely a perceptual aid designed to facilitate system identification. There is no meaning assigned to the shading and the shading should not be interpreted as coding.

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IMPLEMENTATION
?ND REFUELING OUTAGE

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 418
APPENDIX C4
HED CATEGORY 1B
FSR PAGE 207

FINDING

DURING THE VALIDATION IT WAS OBSERVED THAT THE CONTROLS AND DISPLAYS ON THE 90X-8 PANELS ARE ARRANGED WITHOUT CONSIDERATION OF SEQUENCE OF USE, FREQUENCY OF USE, FUNCTION OR OTHER LOGICAL EXPECTATIONS. THIS CAN CONTRIBUTE TO DELAY AND/OR ERROR IN THE USE OF THE SYSTEMS CONTAINED ON THE PANEL.

RESPONSE

SUMMARY LABELING, BACKGROUND SHADING, AND LINES OF DEMARCATION WILL BE USED TO FUNCTIONALLY HIGHLIGHT AND DIFFERENTIATE THE SYSTEMS ON 90X-8.

NRC/SAIC COMMENT

Proposed implementation dates should be reevaluated for implementation by the completion of the first refueling outage, or further justification should be provided for implementation as proposed.

CECO CLARIFICATION

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Effective surface enhancement techniques include Demarcation and Mimic Lines, Color Shading, and Labeling. Color enhancement is used in nuclear power plant control rooms to help clarify component identification and functional relationships among various components. Many problems, such as large matrices of undifferentiated components, physically displaced controls and their associated displays, can be remedied with color shading.

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Because the goal of shading is to provide operator aids, the operator must agree with or approve the enhancement, or it probably will not be successful. Operator participation is a requirement throughout the color shading process and was integral during the selection of color enhancements at Quad Cities station that has taken place to date.

SAIC recommends that the number of colors used for coding should not exceed eleven (11) and should be kept to the minimum needed to provide sufficient information (as identified on page 6.5-11 in NUREG-0700). Quad Cities uses only six (6) colors for coding purposes and has established a standard to this effect. Moreover, because Quad Cities is a Red/Green board plant, the instances of the use of color for coding purposes is minimal. Color shading on the other hand does not represent system status or state, but is merely a perceptual aid designed to facilitate system identification. There is no meaning assigned to the shading and the shading should not be interpreted as coding.

Another factor in determining the utility of background shading is the area of the surface to which we are applying background shading. A control room the size of Quad Cities' can afford to use a greater number of color enhancements than control rooms with less area, provided it has been systematically applied using sound human engineering and operating principles. Several industry documents recognize the utility of using a number of background shading colors. One EPRI document advocated and provided an example which included eight (8) colors for one sample panel. In addition, there are precedents set throughout the industry which clearly demonstrate the effectiveness of using over twenty (20) colors for enhancement to support system identification.

Less than twenty (20) colors have been chosen for background shading for the main control boards at Quad Cities. Principles for color use (outlined in sections 6.5 and 6.6 of NUREG-0700) guided the selection of colors to be used on the control panels. Colors were selected from a pool of high contrast and matte finish shades used at other stations, applied against a "Kewanee Beige" board color. As an engineered retrofit, their application extends from a total-board design evaluation that followed a system-by-system approach.

The use of colors, particularly in conjunction with background shading at Quad Cities has been reexamined with operating personnel (SME's). As a result the enhancement of the Quad Cities control boards will be very similar to that accomplished at Byron/Braidwood. We have had a very positive response from the operators at Byron/Braidwood and are sure we will have the same response at Quad Cities.

In general, controls and displays at Quad Cities were found to be grouped by function with few "extraneous" or "maverick" components. In these cases, background shading affords a means to functionally group these extraneous components. Both the main component group and their maverick components in a system will be colored identically.

Background shading will be applied to systems nested among others. In the few cases where this technique will be applied, a high-contrast background shade applied to the centrally positioned group will enhance the separation of adjacent systems.

On the whole, the selection and use of background shading is designed to work in concert with other perceptual aids and the placement design of instruments. The total-board design evaluation will hold in check the potential overuse of one or more perceptual aids. Thus, where background shading will be applied, its use will be conservative, necessary, and meaningful for operator performance.

In addition, lines of demarcation will be used, where possible, to enhance system grouping. Demarcation will be used between closely-spaced but functionally distinct systems that do not have individual components placed within other system groupings. The use of demarcation instead of background shading, in these instances, will prevent the overuse of color. The proposed demarcations consist of circumscribing functional or selected groups with a contrasting line in areas where physical space or panel edges do not visually set apart the related components.

[NOTE: This HED was misnumbered in the TER attached to the SER. In the TER on page C-6 it was numbered 0148.]

IMPLEMENTATION
2ND REFUELING OUTAGE

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO
IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 284
APPENDIX C4
HED CATEGORY 1B
FSR PAGE 211

FINDING

OPERATOR SURVEY RESPONSE INDICATED THAT HAVING THE HIGH PRESSURE COOLING INJECTION (HPCI) COMPONENTS BETWEEN THE RESIDUAL HEAT REMOVAL (RHR) LOOPS (A&B) CREATES INTERFERENCE.

RESPONSE

SYSTEM LABELING AND BACKGROUND SHADING WILL BE USED TO HIGHLIGHT THE RHR LOOPS.

NRC/SAIC COMMENT

Proposed implementation dates should be reevaluated for implementation by the completion of the first refueling outage, or further justification should be provided for implementation as proposed.

CECO CLARIFICATION

Display and control enhancement is a technique that allows operators to sort out the immediately relevant from the irrelevant stimuli. Effective enhancement permits timely acquisition of meaningful information, facilitates correct identification of relevant control options, and allows the operator to maintain effective awareness over system status.

Effective surface enhancement techniques include Demarcation and Mimic Lines, Color Shading, and Labeling. Color enhancement is used in nuclear power plant control rooms to help clarify component identification and functional relationships among various components. Many problems, such as large matrices of undifferentiated components, physically displaced controls and their associated displays, can be remedied with color shading.

Background shading also improves the efficiency of information transfer to the operator and assists his decision making process by organizing panel elements, minimizing existing visual clutter, optimizing desired associations among panel elements, and standardizing information presentation. Color enhancements also facilitate learning and retention of where components and controls are located, especially for new operators. Components having a common color also are seen as forming a group.

Because the goal of shading is to provide operator aids, the operator must agree with or approve the enhancement, or it probably will not be successful. Operator participation is a requirement throughout the color shading process and was integral during the selection of color enhancements at Quad Cities station that has taken place to date.

SAIC recommends that the number of colors used for coding should not exceed eleven (11) and should be kept to the minimum needed to provide sufficient information (as identified on page 6.5-11 in NUREG-0700). Quad Cities uses only six (6) colors for coding purposes and has established a standard to this effect. Moreover, because Quad Cities is a Red/Green board plant, the instances of the use of color for coding purposes is minimal. Color shading on the other hand does not represent system status or state, but is merely a perceptual aid designed to facilitate system identification. There is no meaning assigned to the shading and the shading should not be interpreted as coding.

Another factor in determining the utility of background shading is the area of the surface to which we are applying background shading. A control room the size of Quad Cities' can afford to use a greater number of color enhancements than control rooms with less area, provided it has been systematically applied using sound human engineering and operating principles. Several industry documents recognize the utility of using a number of background shading colors. One EPRI document advocated and provided an example which included eight (8) colors for one sample panel. In addition, there are precedents set throughout the industry which clearly demonstrate the effectiveness of using over twenty (20) colors for enhancement to support system identification.

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Background shading will be applied to systems nested among others. In the few cases where this technique will be applied, a high-contrast background shade applied to the centrally positioned group will enhance the separation of adjacent systems.

On the whole, the selection and use of background shading is designed to work in concert with other perceptual aids and the placement design of instruments. The total-board design evaluation will hold in check the potential overuse of one or more perceptual aids. Thus, where background shading will be applied, its use will be conservative, necessary, and meaningful for operator performance.

In addition, lines of demarcation will be used, where possible, to enhance system grouping. Demarcation will be used between closely-spaced but functionally distinct systems that do not have individual components placed within other system groupings. The use of demarcation instead of background shading, in these instances, will prevent the overuse of color. The proposed demarcations consist of circumscribing functional or selected groups with a contrasting line in areas where physical space or panel edges do not visually set apart the related components.

IMPLEMENTATION
2ND REFUELING OUTAGE

QUAD CITIES STATION
REVISED RESPONSE/CLARIFICATION TO HEDS REFERRED TO IN THE NRC'S SAFETY EVALUATION (SE) OF THE DCRDR.

HED # 416
APPENDIX C4
HED CATEGORY 1B
FSR PAGE 205

FINDING

DURING THE VALIDATION IT WAS OBSERVED THAT THE CONTROLS AND DISPLAYS ON THE 90X-4 PANEL ARE ARRANGED WITHOUT CONSIDERATION OF SEQUENCE OF USE, FREQUENCY OF USE, FUNCTION, OR OTHER LOGICAL EXPECTATIONS. THIS CAN CONTRIBUTE TO DELAY AND/OR ERROR IN THE USE OF THE SYSTEM CONTAINED ON THE PANEL.

RESPONSE

SUMMARY LABELING, BACKGROUND SHADING, AND LINES OF DEMARCATION WILL BE USED TO FUNCTIONALLY DIFFERENTIATE THE SYSTEMS ON THE 90X-4 PANEL.

NRC/SAIC COMMENT

Proposed implementation dates should be reevaluated for implementation by the completion of the first refueling outage, or further justification should be provided for implementation as proposed.

CECO CLARIFICATION

Display and control enhancement is a technique that allows operators to sort out the immediately relevant from the irrelevant stimuli. Effective enhancement permits timely acquisition of meaningful information, facilitates correct identification of relevant control options, and allows the operator to maintain effective awareness over system status.

Effective surface enhancement techniques include Demarcation and Mimic Lines, Color Shading, and Labeling. Color enhancement is used in nuclear power plant control rooms to help clarify component identification and functional relationships among various components. Many problems, such as large matrices of undifferentiated components, physically displaced controls and their associated displays, can be remedied with color shading.

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IMPLEMENTATION
:ND REFUELING OUTAGE

Commonwealth Edison Company

Dresden Station Unit 2

Human Factors Engineering

Corrective Action Schedule Change Request

HED Category 1B Open Items

Appendix G

12/15/88

Dresden Station Unit 2

1B Open Items

DCRDR HEDS

Index No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
346	343	1.3.1.E.1 1	2nd RF	3rd RF	1B
347	343	1.3.1.E.3 2	2nd RF	3rd RF	1B

DRESDEN STATION 1B HEDs IN NEED OF RELIEF

Index No.: 346
HED Guideline No.: 1.3.1.E.1-1
Category / Level: 1B
FSR Page No.: 343
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 9-3-88

Unit 2 Proposed Implementation Date: 3rd Refueling Outage, 9-3-90

Unit 3 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 11-20-89

FINDING

The operator does not have control over the amount, format or complexity of information displayed. This capability allows the operator to request only the required information to perform his duties.

Justification For the Delay

Engineering conceptual design and component procurement problems precluded the implementation of 2/3 Diesel Generator (DG) modification by the original commitment date. Commonwealth Edison Company has petitioned the Nuclear Regulatory Commission and received relief on the implementation of this modification for Quad Cities Units 1 and 2, and Dresden Unit 2.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in implementing the 2.3 Diesel Generator modification as minimal. Current procedures and training adequately address 2.3 DG operation so as to minimize potential for operator error on the system. In addition, Background Shading is being added to the 902-8 panel to provide clear differentiation between ESF and Non ESF Busses which will minimize operator search time for appropriate bus controls/displays.

Index No.: 347
HED Guideline No.: 1.3.1.E.3-2
Category / Level: 1B
FSR Page No.: 343
SER Response Page No.: N/A

Unit 2 Original Implementation Date: 2nd Refueling Outage, 9-3-88

Unit 2 Proposed Implementation Date: 3rd Refueling Outage, 9-3-90

Unit 3 Proposed Implementation Date: On Schedule, 2nd Refueling Outage, 11-20-89

FINDING

The operator does not have control over the amount, format or complexity of information displayed. This capability allows the operator to request only the required information to perform his duties.

Justification For the Delay

Engineering conceptual design and component procurement problems precluded the implementation of 2/3 Diesel Generator modification by the original commitment date. Commonwealth Edison Company has petitioned the Nuclear Regulatory Commission and received relief on the implementation of this modification for Dresden Units 1 and 2.

Safety Impact of the Delay

The HEDAT has evaluated the safety impact of the delay in implementing the 2.3 Diesel Generator modification as minimal. Current procedures and training adequately address 2.3 DG operation so as to minimize potential for operator error on the system. In addition, Background Shading has been added to the 902-8 panel providing clear differentiation between ESF and Non ESF Busses to minimize operator search time for appropriate bus controls/displays.

Commonwealth Edison Company

Dresden Station Unit 2

Human Factors Engineering

Corrective Action Schedule Change Request

HED Category Non 1A/1B Open Items

Appendix H

12/15/88

Dresden Station Unit 2

Non 1A/1B Open Items

DCRDR HEDS

Index No.	FSR Page	HED No.	Previous Implementation	Proposed Implementation	HED Category
107	358	2.2.1.C.2 4	2nd RF	3rd RF	2C
231	90	2.2.1.B 1	2nd RF	3rd RF	2C
232	358	2.2.1.C.2 3	2nd RF	3rd RF	2C
233	92	2.2.2.A 1	2nd RF	3rd RF	2C
281	103	3.1.5.A 1	2nd RF	3rd RF	2C
343	100	3.1.2.C.3 7	2nd RF	3rd RF	2B
354	107	3.3.2.B 1	2nd RF	3rd RF	2C
367	19	3.1.2.A.1 OS 1	2nd RF	3rd RF	2B
468	17	2.2.5.A 1	2nd RF	3rd RF	2C
469	18	2.2.5.B 3	2nd RF	3rd RF	2C
470	93	2.2.6.C 1	2nd RF	3rd RF	2C
514	150	5.0 V 1	2nd RF	3rd RF	2B
606	150	5.2.3.A 1	2nd RF	3rd RF	2B
609	150	5.1.5.C 5	2nd RF	3rd RF	2B
618	150	5.1.4.A.1 2	2nd RF	3rd RF	2B

Commonwealth Edison Company

Dresden Station

Human Factors Engineering

Corrective Action Schedule Change Request

SPDS HEDs

Appendix I

12/15/88

Dresden Station

SPDS HEDS

Index No.	HED No.	Previous Implementation	Proposed Implementation
22	6.1.4.C	2nd RF	6-30-89
22	6.2.2.A	2nd RF	6-30-89
32	6.1.4.E.1	2nd RF	6-30-89
32	5.1.4.1.A 1	2nd RF	6-30-89
32	7.2.4.A	2nd RF	6-30-89

Commonwealth Edison Company

Dresden Station

Human Factors Engineering

Corrective Action Schedule Change Request

Final Summary Report References

Appendix J

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0468

12 HED NO.: 2.2.5.A-1

CATEGORY: 2 LEVEL: C

FINDING:

The frequencies of the auditory signals for the annunciator system and the computer alarm are not between 200 and 5000Hz. Having the frequencies between 200 and 5000Hz can ensure that they are heard clearly.

RESPONSE:

The frequencies of auditory signals will be adjusted to a level betweeen 200 and 5000Hz.

IMPLEMENTATION:

By the completion of the second refueling outage.

4425/c/5

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0469

12 HED NO.: 2.2.5.B-3

CATEGORY: 2 LEVEL: C

FINDING:

The bandwidth of the auditory signals for the annunciator system and the computer are much larger than 200Hz.

RESPONSE:

Bandwidths for auditory signals will be adjusted to a level less than 200Hz.

IMPLEMENTATION:

By the completion of the second refueling outage.

4425/c/6

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0367

12 HED NO.: 3.1.2.A.1/OS-1

CATEGORY: 2 LEVEL: B

FINDING:

Response from the operator survey indicated that during abnormal situations such as a unit scram the computer's alarm and its frequent need for acknowledgement takes the operator from his primary duties and generally poses a distraction.

RESPONSE:

The computer alarm will be redesigned to be automatically disabled for a short period of time immediately preceeding a reactor scram.

IMPLEMENTATION:

By the completion of tne second refueling outage.

4421/c/11

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0231

12 HED NO.: 2.2.1.B-1

CATEGORY: 2 LEVEL: C

FINDING:

There are three auditory horns used for the annunciator warning system on the main control panels. One is shared by panels 902-3 and 902-4, another for panel 902-5, and the third is shared between panels 902-6, 902-7, and 902-8. This does not provide localization cues to those work stations where operator attention is required.

RESPONSE:

Multiple coding techniques are used for control room annunciators. Sound localization and visual cues provide feedback and cue the operators to the relative location of the problem.

IMPLEMENTATION:

Accept as is.

4425/c/7

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0233, 0108, 0237, 0191

12 HED NO.: 2.2.2.A-1, 2.2.3.A-1,
2.2.2.A-2, 2.2.3.A-2

CATEGORY: 2 LEVEL: C

FINDING:

There are auditory horns on the main control panels and the common panels which could apply to more than one panel and are not coded. There is one horn located on the 902-3 panel which can mean a problem on either panel 902-3 or 902-4. Another horn located on the 902-7 panel can mean a problem on panels 902-6, 902-7 or 902-8. The common panel 923-1 annunciator horn is shared with panel 923-5.

RESPONSE:

Multiple coding techniques are used for control room annunciators. Sound localization and visual cues provide feedback and cue the operators to the relative location of the problem.

IMPLEMENTATION:

Accept as is.

4381/c/4

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0470

12 HED NO.: 2.2.6.C-1

CATEGORY: 2 LEVEL: C

FINDING:

The auditory signal for the annunciator system on panel 902-56 has an intensity which may be startling to the operator.

RESPONSE:

The volume of the annunciator horn will be dampened to a level 10 dB(A) above ambient noise levels and not perceived as startling.

IMPLEMENTATION:

By the completion of the second refueling outage.

4380/c/3

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0343

12 HED NO.: 3.1.2.C.3-7

CATEGORY: 2 LEVEL: B

FINDING:

For alarms with inputs from more than one parameter, a reflash capability is not provided which allows subsequent alarms to activate the auditory alert. Subsequent alarms cannot activate the auditory alarms until the current alarm has cleared.

RESPONSE:

On further investigation, it was found that the multi-input alarms that could affect plant safety have other control room indication. In all cases, annunciators are referenced in the annunciator procedures. The operators look up multi-input alarms in the procedure books when necessary.

IMPLEMENTATION:

Accept as is.

4421/c/19

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0281

12 HED NO.: 3.1.5.A-1

CATEGORY: 2 LEVEL: C

FINDING:

There is no auditory or visual signal which indicates that an alarm has cleared. At present, the operator has to periodically activate the reset control to find out which alarms have cleared.

RESPONSE:

A visual signal will be provided to indicate cleared alarms where necessary. The audible signal is not needed since the visual signal will be provided.

IMPLEMENTATION:

By the completion of the second refueling outage.

4397/c/45

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0354

12 HED NO.: 3.3.2.B.1

CATEGORY: 2 LEVEL: C

FINDING:

The flash rate for annunciator alarms on panels 902-3, 902-4, 902-5, 902-6, 902-7, and 902-8 is approximately 1.5 flashes per second, and on panels 902-54, 902-55, and 902-56 is approximately 1 flash per second.

RESPONSE:

The flash rates will be adjusted to 3-5 flashes per second to conform with the checklist guidelines.

IMPLEMENTATION:

By the completion of the second refueling outage.

4380/c/1

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0346, 0347

12 HED NO.: 1.3.1.E.1-1, 1.3.1.E.3-2

CATEGORY: 1 LEVEL: B

FINDING:

In situations when Unit 3 must rely on the 2/3 diesel generator, the control of the 2/3 diesel generator by Unit 2 can affect the control of Unit 3. In addition, operator survey responses indicated that there are operational problems with the 2/3 diesel in that there are some displays on Unit 3 but, all the controls and many of the displays are on Unit 2.

RESPONSE:

Appropriate bus voltage indication will be installed in Unit 3.

IMPLEMENTATION:

By the completion of the first refueling outage.

4421/c/29

DRESDEN CORRECTIVE ACTIONS

INDEX NO.: 0232, 0107

12 HED NO.: 2.2.1.C.2-3, 2.2.1.C.2-4

CATEGORY: 2 LEVEL: C

FINDING:

The intensity of the auditory alarms is such that when they are activated, it is very difficult to hear other sounds in the control room and to communicate with other personnel in the control room.

RESPONSE:

The intensity of the auditory signals will be decreased, while maintaining them sufficiently above ambient background noise levels.

IMPLEMENTATION:

By the completion of the second refueling outage.

4380/c/5

INSERVICE TESTING PROGRAM

FOR ASME CLASS 1, 2 & 3

PUMPS AND VALVES

INCLUDING AUGMENTED NRC TESTING

REVISION 2

NRC SUBMITTAL

DRESDEN NUCLEAR STATION

UNITS 2 & 3

APRIL 15, 1988

COMMONWEALTH EDISON COMPANY

IST PROGRAM INDEX

DRESDEN NUCLEAR STATION UNITS 2 & 3

NRC SUBMITTAL

DESCRIPTION

1. Introduction

1.1. This Inservice Testing (IST) Program document, Revision 2 dated April 15, 1988 has been prepared to describe the IST Program requirements for the 2nd Ten Year Inspection Interval (from March 1, 1982 to February 28, 1992) of Dresden Nuclear Station Units 2 and 3. Numerous items, modifications, and corrections have been made since the Revision 1 IST Program dated December 10, 1982. The Revision 2 IST Program replaces in its entirety the Revision 1 IST Program.

2. Basis of Inservice Testing Program

2.1. This program of inservice testing details the pumps and valves that are tested during the 2nd Ten Year Inspection Interval of March 1, 1982 to February 28, 1992 of plant operation in accordance with Dresden Nuclear Station Technical Specification Section, 3.6.F. and the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI "Rules for Inservice Inspection of Nuclear Power Plant Components", 1977 Edition through Summer 1979 Addenda, except where specific written relief from testing, determined to be impractical, has been granted by the NRC pursuant to 10 CFR 50.55a (g)(6)(i). Known relief requests from ASME Section XI requirements are included in the Inservice Testing Program.

2.2. When a specific ASME Code testing requirement has been determined to be impractical during actual inservice testing, relief requests will be submitted for approval to the NRC. Subsequently, all approved relief requests will be included in the Dresden Nuclear Stations Inservice Testing Program.

2.3. The commercial service dates for Dresden 2 and 3 are June 9, 1972 and November 16, 1971, respectively. The NRC has granted permission for establishment of November 1, 1978 as the common implementation for ISI/IST for both units [1]. The November 1, 1978 implementation date began the 3rd Inspection Period of the 1st Inspection Interval.

2.4. The Second Inspection Interval for both units is from March 1, 1982 through March 1, 1992.

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[1]Letter from V. Stello, NRC, to C. Reed, CECo, dated May 5, 1978.

9.9. TAB 10 AND 11 - LISTING OF IST VALVES - This is a list of all the valves that have been determined to require inservice testing. This includes all applicable ASME Class 1, 2 and 3 valves, and any Augmented NRC testing of valves.

9.10. TAB 12 - DRESDEN ADDITIONAL INFORMATION/METHODOLOGY - VALVES - This section contains Dresden Additional Information and Methodology (DAIM) relating to aspects of the IST Program that may be necessary to provide a better understanding of the implementation of the IST ASME Section XI requirements. Included here is a cross reference to previously submitted relief requests for valves.

9.11. TAB 13 - RELIEF REQUESTS - VALVES - This section contains requests for relief from the inservice testing requirements of ASME Section XI, when such requirements have been determined to be impractical.

LIST OF SYSTEMS AND P&ID'S FOR THE IST PROGRAM

System/Title	System No.	Unit 2 P&ID Numbers[1]	Unit 3 P&ID Numbers[1]
Atmospheric Containment Atmosphere Dilution (ACAD) System	2500	707-1	707-2
Containment Atmosphere Monitor (CAM) System	2400	706-1	706-2
Control Rod Drive (CRD) Hydraulic Piping	300	34	365
Core Spray Piping	1400	27	358
Diesel Start-up Air Piping Units 2 & 3	6600	173	173
H.P. Coolant Injection (HPCI) Piping	2300	51	374
High Radiation Sampling System Unit 2 & 3 Liquid Sampling	8900	1234-1	1239-1
High Radiation Sampling System Unit 3 Containment Air Sampling (CAS) System	8900	N/A	1240
Instrument Air Piping	4700	37-2	367-2
Isolation Condenser Piping	1300	28	359
L.P. Coolant Injection (LPCI) Piping	1500	29-1&2	360-1&2
Main Steam Piping	3000	12-1&2	345-1&2
Nuclear Boiler & Reactor Recirculating Piping	200	26-1&2	357-1&2
Off-Gas Piping	5400	43-1	371-1
Control Room HVAC Units 2 & 3	9400	3121	3121
Pressure Supression Piping	1600	25	356
Reactor Building Cooling Water Piping	3700	20	353

[1] P&ID Numbers are prefix by "M-". When applicable, sheet numbers follow the Hypen "-".

LIST OF SYSTEMS AND P&ID'S FOR THE IST PROGRAM

System/Title	System No.	Unit 2 P&ID Numbers[1]	Unit 3 P&ID Numbers[1]
Reactor Building Equipment Drains	4800	39	369
Reactor Building Ventilation	5700	269	529
Reactor Feed Water Piping	3200	14	347
Reactor Water Clean-up Piping	1200	30-1	361-1
Reactor Shutdown Cooling Piping	1000	32	363
Standby Gas Treatment System (SBGTS)	7500	49	49
Standby Liquid Control (SBLC) Piping	1100	33	364

CROSS REFERENCE BETWEEN IST REV 1 AND IST REV 2

IST PROGRAM REV 1 REL. REQ DESIGNATION	IST PROGRAM REV 2 REL. REQ./ DAIM DESIGNATION	NRC APPROVAL DATE	DESCRIPTION	
			PUMPS	
PR-1	PR-A1	9-16-87	PUMP VIBRATION MEASUREMENT, RELIEF FROM MILS DISPLACEMENT TO VELOCITY	
PR-1	PR-A2	9-16-87	PUMP BEARING TEMPERATURE MEASUREMENTS, RELIEF TO PERFORM VIBRATION MEASUREMENTS	
PR-2	PR-A3	9-16-87	PUMP INSERVICE TESTING MONTHLY, RELIEF TO PERFORM INSERVICE TESTING QUARTERLY	
N/A	PR-P4	PENDING	DIESEL OIL TRANSFER PUMP, RELIEF FROM INLET PRESSURE AND FLOW RATE MEASUREMENTS	
N/A	PR-P5	PENDING	DIESEL GENERATOR COOLING WATER PUMP, RELIEF FROM FLOW MEASUREMENT	
N/A	DAIM-P1	N/A	ESTABLISHING ALLOWABLE RANGES OF INSERVICE TEST QUANTITIES	
N/A	DAIM-P2	N/A	DETERMINING HPCI VIBRATION READINGS	
N/A	DAIM-P3	N/A	DETERMINING LPCI AND CORE SPRAY VIBRATION READINGS	
N/A	DAIM-P4	N/A	PUMP INSTRUMENTATION	
			VALVES	
VR-1	DAIM-V5	9-16-87	RR VALVE, EXERCISE DURING COLD SHUTDOWN	
VR-2	VR-A1	9-16-87	CRD SCRAM VALVES, EXERCISE DURING COLD SHUTDOWN AND RELIEF ON TIMING	
VR-3	N/A	N/A	CRD DISCHARGE VOLUME VENT AND DRAIN VALVES, EXERCISE DURING COLD SHUTDOWN	DELETE
VR-4	DAIM-V6	9-16-87	SBLC INJECTION CHECK VALVES, EXERCISE DURING REACTOR REFUELING	
VR-5	DAIM-V7	9-16-87	RHR HD SPRAY INBOARD ISOLATION CHECK, EXERCISE DURING LEAK RATE TEST	
VR-6	N/A	9-16-87	SDC ISOLATION VALVES, EXERCISED DURING COLD SHUTDOWN	DELETE
VR-7	DAIM-V9	9-16-87	RWCU & FW CHECK VALVES, EXERCISE DURING REACTOR REFUELING	
VR-8	DAIM-V10	9-16-87	CS, LPCI & HPCI CHECK VALVES, EXERCISE COLD SHUTDOWN	
VR-9	N/A	N/A	CS, LPCI & HPCI MIN FLOW VALVES, EXERCISE QUARTERLY	DELETE
VR-10	DAIM-V11	9-16-87	HPCI ISOLATION CHECK, EXERCISE DURING LEAK TEST	
VR-11	VR-A3	9-16-87	ADS TARGET ROCK AND RELIEF VALVES, EXERCISE ONCE PER REFUELING CYCLE	
VR-12	VR-A4	9-16-87	ADS TARGET ROCK AND RELIEF VALVES, RELIEF FROM PRESSURE SETPOINT	
VR-13	DAIM-V12	9-16-87	FW CONTAINMENT ISOLATION CHECK, EXERCISE DURING REACTOR REFUELING	

CROSS REFERENCE BETWEEN IST REV 1 AND IST REV 2

IST PROGRAM REV 1 REL. REQ DESIGNATION	IST PROGRAM REV 2 REL. REQ./ DAIM DESIGNATION	NRC APPROVAL DATE	DESCRIPTION	
			VALVES	
VR-14	N/A	N/A	TORUS VACUUM RELIEF, EXERCISE DURING REACTOR REFUELING	DELETE
VR-15	DAIM-V21	9-16-87	TIP NITROGEN PURGE ISOLATION CHECK VALVES	
VR-16	DAIM-V1	9-16-87	VALVE TIMING FOR STROKE TIMES GREATER THAN 2 SECONDS	
N/A	VR-P7	PENDING	VALVE TESTING DURING COLD SHUTDOWN AND REACTOR REFUELING	
VR-18	DAIM-V15	9-16-87	EXCESS FLOW CHECK ISOLATION VALVES, TESTED DURING PC SYSTEM PRESSURE TESTS DURING RR	
VR-19	DAIM-V13	9-16-87	INSTRUMENT AIR ISOLATION, EXERCISE/FAIL SAFE TEST DURING COLD SHUTDOWN	
VR-20	VR-A6	9-16-87	PC ISOLATION VALVES, LEAK TESTED PER 10CFR50 APPENDIX J.	
VR-21	DAIM-V14	9-16-87	HPCI CST TO TORUS CHECK VALVE, EXERCISE DURING DISASSEMBLY EVERY RR	
VR-22	DAIM-V4	9-16-87	CRD CHARGING WATER ACCUMULATOR CHECK VALVES, EXERCISE DURING RR	
VR-23	N/A	N/A	HPCI PC ISOLATION, EXERCISE DURING REACTOR REFUELING	DELETE
VR-24	VR-A2	9-16-87	ADS SAFETY VALVES, RELIEF FROM CODE ADDITIONAL TESTS	
N/A	VR-P5	PENDING	RELIEF FROM VALVE TIMING TOLERANCE OF S79 USE W81	
N/A	VR-P8	PENDING	CRD ARI/ATWS AIR HEADER BLEED VALVES, RELIEF FROM VALVE TIMING.	
N/A	VR-P9	PENDING	CRD BACKUP SCRAM AND SCRAM DUMP VALVES, RELIEF FROM VALVE TIMING	
N/A	VR-P10	PENDING	TARGET ROCK SAFETY-RELIEF VALVES, RELIEF FROM AS-FOUND TESTING.	
N/A	DAIM-V3	N/A	RUPTURE DISK TESTS	
N/A	DAIM-V2	N/A	LIST OF PRESSURE ISOLATION VALVES	
N/A	DAIM-V8	N/A	TESTING OF PASSIVE VALVES	
N/A	DAIM-V16	N/A	MS ELECTROMATIC AND TARGET ROCK VALVES, EXERCISE DURING REACTOR REFUELING	
N/A	DAIM-V17	N/A	MSIV AIR ACCUMULATOR CHECK VALVES, EXERCISE DURING REACTOR REFUELING	
N/A	DAIM-V18	N/A	CAM ISOLATION VALVES, EXERCISE DURING REACTOR REFUELING	
N/A	DAIM-V19	N/A	ACAD PRIMARY CONTAINMENT ISOLATION VALVES, EXERCISE DURING REACTOR REFUELING	
N/A	DAIM-V20	N/A	RBCCW ISOLATION VALVES, EXERCISE DURING REACTOR REFUELING	
N/A	DAIM-V22	N/A	EXERCISE CHECK VALVES BY DISASSEMBLY	
N/A	DAIM-V23	N/A	RBCCW CONTAINMENT ISOLATION VALVES, EXERCISED DURING COLD SHUTDOWN	
N/A	DAIM-V24	N/A	MAIN STEAM ISOLATION VALVES, EXERCISE DURING COLD SHUTDOWN	

PUMP FORMAT LEGEND

FIELD	DESCRIPTION
PUMP EPN	Pump equipment part number as used on the P&ID. To differentiate between units, the pump EPN is prefixed with "2-" or "3-" for units 2 and 3 respectively and with "2/3-" for a pump which is common to both units.
DESCRIPTION	Pump word description and name.
CLS	1 ASME Section III Code Class 1. 2 ASME Section III Code Class 2. 3 ASME Section III Code Class 3. SR Non ASME Code Class 1, 2 or 3, but is Safety-related.
PID	Piping and Instrumentation Drawing (P&ID) Number. All drawing numbers are prefixed with "M". Sheet numbers follow the drawing number.
CORD	Pump location on the P&ID.
SPEED	Speed of pump to be measured. N/A - Not applicable for pumps that are either synchronous or induction motor driven.
INLET PRESS	Inlet pressure of pump to be measured.
DIFF PRESS	Differential pressure of pump to be measured.
FLOW RATE	Flow rate of pump to be measured.
VIBS	Vibration amplitude of pump to be measured.
BEAR TEMP	Bearing temperature of pump to be measured.
TEST SCHED	Testing interval of pumps.
REMARKS	Any additional pump description, comments or DAIM No.

NOTE: A relief request number is listed in the respective pump parameter field, when a specific ASME Code requirement is determined to be impractical. Relief request numbers are prefixed with "PR" indicating pump relief requests.

VALVE FORMAT LEGEND

FIELD	DESCRIPTION
VALVE EPN	Valve equipment part number as used on the P&ID and in the IST Program. To differentiate between units, the valve EPN is prefixed with "2-" or "3-" for units 2 and 3 respectively and with "2/3- "for a valve which is common to both units.
SIZE	Nominal size of valve in inches.
PID	Piping and Instrumentation Drawing (P&ID) Number. All drawing numbers are prefixed with "M". Sheet numbers follow the drawing number.
CORD	Valve location on the P&ID.
CLS	1 ASME Section III Code Class 1. 2 ASME Section III Code Class 2. 3 ASME Section III Code Class 3. SR Non ASME Code Class 1, 2, or 3, but is Safety-Related.
CAT	A ASME Valve Category A. B ASME Valve Category B. C ASME Valve Category C. D ASME Valve Category D.
VALVE TYPE	BTF Butterfly CK Check ERV Electromatic Relief FCV Flow Control Valve GA Gate GL Globe RPD Rupture Diaphragm RV Relief SCK Stop Check SV Safety XFC Excess Flow Check TWV Three Way Valve
ACT TYPE	AO Air Operated EXP Explosive Actuated MO Motor Operated SA Self Actuated SO Solenoid Operated
NOR POS	O Valve is normally open during power operations (>1% power with mode switch in run) C Valve is normally closed during power operations (>1% power with mode switch in run)

VALVE FORMAT LEGEND

FIELD		DESCRIPTION
STR DIR	O	Valve stroke exercise is to the Open position
	C	Valve stroke exercise is to the Closed position
	O/C	Valve stroke exercise is to both the Open and to the Closed positions
A/P	A	Active valve. This valve is required to change its position to accomplish its safety-related function.
	P	Passive valve. This valve is not required to change its position to accomplish its safety-related function.
TEST	AT	Valve seat leakage tested per Appendix J of 10 CFR 50 and Dresden Technical Specification Sections 3.7 and 4.7 (Containment Systems).
	BT	Full stroke exercise which includes measurement of stroke times.
	CT-1	Check valve exercise.
	CT-2	Safety valve and relief valve test per ASME IWV-3510.
	DT	Fire explosive charge.
	FST	Fail-safe test.
	PIT	Position indication test.
TEST SCHED	OP	Tested Quarterly during normal operation.
	CS	Tested during Cold Shutdown.
	RR	Reactor refueling. For PIT, AT and DT tests, test frequency shall be at least once every 2 years.

VALVE FORMAT LEGEND

FIELD	DESCRIPTION
REL REQ	A relief request number is listed when a specific ASME Code requirement is determined to be impractical. Relief request numbers are prefixed with "VR" indicating a Valve relief request.
REMARKS	General valve description, comments or DAIM No. as necessary.

SORTED BY: EPN

PUMP EPN	DESCRIPTION	CLS	PID	COOR	SPEED	INLET PRESS	DIFF PRESS	FLOW RATE	VIBS	BEAR TEMP	TEST SCHED	REMARKS
2-2302	2 HPCI	2	51	A5	YES	YES	YES	YES	YES	PR-A2	PR-A3	DAIM-P2
2-3903	2 DIESEL COOLING	3	22	B10	N/A	YES	YES	PR-P5	PR-A1	PR-A2	PR-A3	
2/3-3903	2/3 DIESEL COOLING	3	355	A10	N/A	YES	YES	PR-P5	PR-A1	PR-A2	PR-2	
2A-1102	2A-SBLC	2	33	D7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
2A-1401	2A CORE SPRAY	2	27	D9	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
2A-1501-44	2A CCSW	3	29	D10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
2A-1502	2A LPCI	2	29	F7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
2B-1102	2B-SBLC	2	33	E7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
2B-1401	2B CORE SPRAY	2	27	E7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
2B-1501-44	2B CCSW	3	29	C10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
2B-1502	2B LPCI	2	29	E7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
2C-1501-44	2C CCSW	3	29	B10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	

SORTED BY: EPN

PUMP EPN	DESCRIPTION	CLS	PID	COOR	SPEED	INLET PRESS	DIFF PRESS	FLOW RATE	VIBS	BEAR TEMP	TEST SCHED	REMARKS
2C-1502	2C LPCI	2	29	E3	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
2D-1501-44	2D CCSW	3	29	A10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
2D-1502	2D LPCI	2	29	F3	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
3-2302	3 HPCI	2	374	A5	YES	YES	YES	YES	YES	PR-A2	PR-A3	DAIM-P2
3-3903	3 DIESEL COOLING	3	355	B10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
3A-1102	3A SBLC	2	364	D7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
3A-1401	3A CORE SPRAY	2	358	E7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
3A-1501-44	3A CCSW	3	360	A10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
3A-1502	3A LPCI	2	360	E3	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
3B-1102	3B SBLC	2	364	E7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
3B-1401	3B CORE SPRAY	2	358	E9	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
3B-1501-44	3B CCSW	3	360	A10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	

SORTED BY: EPN

PUMP EPN	DESCRIPTION	CLS	PID	COOR	SPEED	INLET PRESS	DIFF PRESS	FLOW RATE	VIBS	BEAR TEMP	TEST SCHED	REMARKS
3B-1502	3B LPCI	2	360	F3	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
3C-1501-44	3C CCSW	3	360	C10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
3C-1502	3C LPCI	2	360	E7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3
3D-1501-44	3D CCSW	3	360	D10	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	
3D-1502	3D LPCI	2	360	F7	N/A	YES	YES	YES	PR-A1	PR-A2	PR-A3	DAIM-P3

IST PROGRAM FOR PUMPS
DRESDEN UNITS 2 & 3
NRC SUBMITTAL

12:51 THURSDAY, MAY 5, 1988

SORTED BY: EPN

PUMP EPN	DESCRIPTION	CLS	PID	COOR	SPEED	INLET PRESS	DIFF PRESS	FLOW RATE	VIBS	BEAR TEMP	TEST SCHED	REMARKS
2-5203	2 DIESEL OIL TRANSFER PUMP	SR	41	E6	N/A	PR-P4	PR-P4	PR-P4	PR-A1	PR-A2	PR-A3	
2/3-5203	2/3 DIESEL OIL TRANSFER PUMP	SR	41	D2	N/A	PR-P4	PR-P4	PR-P4	PR-A1	PR-A2	PR-A3	
3-5203	3 DIESEL OIL TRANSFER PUMP	SR	41	B6	N/A	PR-P4	PR-P4	PR-P4	PR-A1	PR-A2	PR-A3	

DRESDEN ADDITIONAL INFORMATION/METHODOLOGY INDEX

IST PROGRAM REV 2 DAIM DESIGNATION	IST PROGRAM REV 1 REL. REQ DESIGNATION	NRC APPROVAL DATE	DESCRIPTION
DAIM-P1	N/A	N/A	ESTABLISHING ALLOWABLE RANGES OF INSERVICE TEST QUANTITIES
DAIM-P2	N/A	N/A	DETERMINING HPCI VIBRATION READINGS
DAIM-P3	N/A	N/A	DETERMINING LPCI AND CORE SPRAY VIBRATION READINGS
DAIM-P4	N/A	N/A	PUMP INSTRUMENTATION

ESTABLISHING ALLOWABLE RANGES OF INSERVICE TEST QUANTITIES DAIM-P1

1. **Description**

1.1. This provides additional information/methodology when establishing allowable ranges of inservice test quantities in accordance with ASME Section XI IWP-3210, Allowable Ranges of Inservice Test Quantities.

2. **Discussion**

2.1. In observing pump IST data, it is the Station's experience that the ASME Section XI test parameters are subject to a number of conditions that produce data scatter. Data scatter is the apparent mix of data which does not clearly indicate a trend, either increasing or decreasing.

2.2. Specifically, the Flow and Differential Pressure data scatter may exceed the 2% High Value Alert Range or the 3% High Value Required Action Range of ASME Section XI Table IWP-3100-2.

2.3. The Station has investigated probable causes as to the conditions which would produce test results which exceed these upper ASME IST limits and reveals a situation where the complete pump performance was actually better than its established IST reference values would indicate. A major contributor to data scatter and spurious readings is the cumulative effect of instrument fluctuations and allowable instrument accuracy range(s).

2.3.1. In observing the instrument used to conduct IST testing, the Station has discovered that instrument fluctuations and allowable instruments accuracy range often times are responsible for such variations in the measured quantities. The Station has concluded from the pump test data, that these instrument conditions may often times produce quantities which exceed the ASME Section XI Table IWP-3100-2 Upper Limits, when in fact no deterioration in the pump performance can be found and the pump produces acceptable test parameters on subsequent tests without any adjustment (repair or replacement) to the pump.

2.3.2. In reviewing other industry documents[1], acceptable industrial practice is to set the Upper Limit Required Action Range at 10% of the reference value. The Station views this as the High Limit and in no case will the upper limit exceed 10%. Each pump has been evaluated and its allowable ranges of test quantities has been established in accordance with ASME Section IWP-3210..

[1] American National Standard for Inservice Testing Of Pumps; ANSI/ASME OM-6-1986, Draft 11

DETERMINING HPCI PUMP VIBRATION READINGS DAIM-P2

1. Description

1.1. This provides additional information/methodology when determining HPCI pump vibration readings in accordance with ASME Section XI IWP-4500, Vibration or in accordance with Dresden Nuclear Station's Relief Request No. PR-A1.

2. Discussion

2.1. In observing HPCI pump IST data for both units, the pump vibration readings are high. Because of these high and fairly consistent readings, Dresden has scheduled to replace the pump's impellers during the Spring 1988 outage for Unit 3 and the Fall 1988 outage for Unit 2.

2.2. Vibration readings are currently being recorded both in mils displacement (ASME Section XI) and velocity (Relief Request PR-A1). ASME Section XI IST pump vibration displacement is the current criteria by which the pump is evaluated.

2.3. After impeller replacement, it is Dresden's intent to take the HPCI pump vibration readings in both mils displacement and velocity, for some period of time. The use of velocity (Relief Request PR-A1) is anticipated to be the prime vibration measurement and subsequent criteria by which the pump is evaluated.

DETERMINING LPCI AND CORE SPRAY PUMP VIBRATION READINGS DAIM-P3

1. Description

   1.1. This provides additional information/methodology when determining LPCI and Core Spray pump vibration readings in accordance with ASME Section XI IWP-4500, Vibration or in accordance with Dresden Nuclear Station's Relief Request No. PR-A1.

2. Discussion

   2.1. The LPCI and Core Spray pumps are vertically mounted pumps. Only one or two velocity vibration readings have been taken on the upper and lower motor bearings. These readings are baseline information for the Dresden preventive maintenance program. In some cases, the velocity readings exceed the OM-6 Draft 11 limits. Dresden is currently investigating the cause for the high vibration and will perform maintenance and or modification as required. In this interim period, Dresden will use the Vibration requirements and limits of ASME Section XI.

   2.2. Vibration readings are currently being recorded both in displacement (ASME Section XI) and velocity (Relief Request PR-A1). ASME Section XI IST pump vibration is the current criteria by which the pump is evaluated. The pump(s) bearing vibrations have been acceptable (low) and steady.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-P4

1. Description

1.1. ASME Section XI Article IWP-4000 Methods of Measurement.

1.2. This DAIM provides additional information regarding Dresden's implementation of the Methods of Measurements of ASME Section XI Article IWP-4000.

2. Discussion

2.1. Instrument accuracy for Pressure, Differential Pressure, and Flow Rate type instruments are $\pm$ 2% of full scale. For temperature and vibration amplitude, the instrument accuracy is $\pm$ 5% of full scale.

2.2. The full-scale range of each instrument shall be three times the reference value or less.

2.3. Dresden is actively reviewing the instrumentation that is used to provide measurement of the various pump performance parameters (flow, temperature, vibration amplitude and differential pressure) as referenced in TABLE IWP-3100-1, Inservice Test Quantities. This review consists primarily of:

2.3.1. Verification of calibration (2% or 5% accuracy range);
2.3.2. Verification that full-scale range is within 3 times the reference value or less;
2.3.3. Instrument location, including pressure tap construction are being reviewed and modified, as necessary, to properly meet ASME requirements and provide meaningful IST methods of measurements.

3. Instrument Location

3.1. Instrument location, including pressure tap construction are being reviewed and modified, as necessary, to properly meet ASME requirements and provide meaningful IST methods of measurements. Pressure taps are verified that they are located in a section of the flow path that is expected to have reasonably stable flow as close as practical to the pump. Any line valves between inlet and the discharge pressure taps shall be in the open position during the inservice test.

4. Portable Flow Meter

4.1. Dresden is obtaining a portable ultrasonic flow meter which meets or exceeds the ASME accuracy range of IWP-4110 Quality. This meter will allow for verification of current flow meter readings and where current instrumentation is not within the calibration range, it will provide an alternative way to get flow readings without delaying the inservice test. Additionally, the flow meter may be used to verify exercising certain valves where flow, pressure or other positive means of verification is not available.

5. Vibration Readings

5.1. Vibration readings are currently being taken in both mils displacement and velocity using the Technology for Energy Corporation's (TEC) Model 1320 SMART Meter. This equipment, using computer technology, automatically scales to no greater than 3 times the reading to maintain accuracy.

6. Instrument Tolerances

6.1. The effects of tolerance upon specified limits are two fold[1]. They may allow pump operation outside the specified range without operator knowledge. Or the effects of tolerance may require corrective action to be taken when, in fact, the pump is operating in an acceptable range.

6.2. When the Code tolerance is specified as "of full scale", it means that the percent tolerance at the full-scale point is converted into units (PSI) and is applied at any point on the scale. The following example is based on one variable, the outlet pressure.

EXAMPLE: 1000 PSI gauge
$\pm$ 2% tolerance Instrument
1000 PSI x 0.02 = 20 PSI

Acceptable reading $\pm$ 20 PSI anywhere on the scale

Effects at 1/3 scale;

1/3 x 1000 = 333 PSI (reference value)
$\underline{+ 20 \text{ PSI}}$ (tolerance)
353 PSI (High side of ref. value)

353/333 = 1.06 or 6% high reading

6.3. Referencing the Example above, based on a gauge which is 3 times the reference value, the instrument tolerance at the reference value is 6%.

[1] T.F. Hoyle, Effects of Tolerance On The Results of Section XI Pump Testing, February 11, 1980.

DRESDEN PUMP RELIEF REQUEST INDEX

IST PROGRAM REV 2 REL. REQ DESIGNATION	IST PROGRAM REV 1 REL. REQ DESIGNATION	NRC APPROVAL DATE	DESCRIPTION
PR-A1	PR-1	9-16-87	PUMP VIBRATION MEASUREMENT RELIEF FROM MILS DISPLACEMENT TO VELOCITY
PR-A2	PR-1	9-16-87	PUMP BEARING TEMPERATURE MEASUREMENTS RELIEF TO PERFORM VIBRATION MEASUREMENTS
PR-A3	PR-2	9-16-87	PUMP INSERVICE TESTING MONTHLY RELIEF TO PERFORM INSERVICE TESTING QUARTERLY
PR-P4	N/A	PENDING	DIESEL OIL TRANSFER PUMP RELIEF FROM INLET PRESSURE AND FLOW RATE MEASUREMENTS
PR-P5	N/A	PENDING	DIESEL GENERATOR COOLING WATER PUMP RELIEF FROM FLOW MEASUREMENT

RELIEF REQUEST NUMBERS FORMAT:

Relief Request No.	Description

PR-A1

This is a sequencial number given to the Pump relief request.

D - NRC approval has been Denied
A - Written NRC approval has been Granted
P - The Relief Request is Pending NRC approval

PR - Signifies it is a Pump Relief Request.

RELIEF REQUEST NO. PR-A1

1. Description

1.1. Relief from Code pump vibration measurement of mils displacement to velocity.

1.2. This relief request has been previously approved by the NRC as PR-1 per the Interim Safety Evaluation letter dated 9-16-87.

2. AFFECTED COMPONENT(S)

2.1. Component description:

2.1.1. All pumps in the program.

3. ASME SECTION XI (S79) TEST REQUIREMENT(S)

3.1. IWP-4500 Vibration

4. BASIS FOR RELIEF

4.1. The ASME Code requires measurement of displacement vibration amplitude in mils, thousandths of an inch, every inservice test and bearing temperatures once per year. A far more informative reading is obtained using vibration velocity equipment because it accounts for both displacement and range of frequency.

4.2. The alternative testing described herein for pump vibration monitoring was developed using ANSI/ASME OM-6 (Draft 11) as a guideline. Pump vibration measurements will be obtained and recorded in velocity (inches per second) and are broadband (unfiltered) peak readings. All monitored locations are clearly marked to identify the specific point at which the transducer is to be placed while taking vibration measurements using portable equipment. The readout system and transducers used to take vibration measurements are capable of frequency response in the range of one-third minimum pump speed to at least one-thousand hertz, and they have a minimum accuracy over that range of $\pm$ 5%, with the exception of the Standby Liquid Control pumps.

4.2.1 The SBLC pumps operate at 250 rpm. The low frequency response range requirement of ASME (1/2 minimum pump shaft rotational speed) for these pumps is 2.1 Hz. The current vibration measurement system used at Dresden is the Technology for Energy Corporation's (TEC) Model 1320 SMART Meter. The frequency range of this vibration measuring system (includes the SMART meter, cable and probe) is 2 to 10K Hz. When applying the OM-6 Draft 11 frequency response range criteria (1/3 minimum pump shaft rotational speed), the low frequency response range requirement becomes 1.4Hz. Dresden knows of no available equipment which have this low range ability (limited by probe performance).

4.3. Dresden Station proposes an alternate program which is believed to be more comprehensive than that required by ASME Section XI. This program consists of performing the required vibration readings in velocity rather than mils of displacement. The technique of velocity measurement is an industry accepted method which is much more meaningful and sensitive to small changes that are indicative of developing mechanical problems.

4.4. Velocity measurements detect not only high amplitude vibrations that indicate major mechanical problems but also the equally harmful low amplitude - high frequency due to misalignment, imbalance, or bearing wear that usually go undetected by simple displacement measurements.

4.5. All centrifugal pumps in the IST Program will have vibration taken in a plane approximately perpendicular to the rotating shaft in two orthogonal directions on each accessible pump bearing housing. Measurement will also be taken in the axial direction on all bearing housings when accessible. Reciprocating pumps will have vibration measurements taken approximately perpendicular to the crankshaft and the line of plunger travel, including the axial direction when accessible on each pump bearing housing.

5. **ALTERNATIVE TEST**

5.1. Pump vibration measurements will be taken in vibration velocity (inches/second). The limit for vibration readings will not exceed ANSI/ASME OM-6 (Draft 11). The following vibration limits are applicable for Dresden Units 2 and 3.

TABLE PR-A1

RANGES OF VIBRATIONS

PUMP TYPE	ALERT RANGE LOW	ALERT RANGE HIGH	REQUIRED ACTION RANGE
Centrifugal	$>2.5V_{ref}$	$6V_{ref}$	$>6V_{ref}$
	But not >0.325 in/sec		But not >0.70 in/sec
Reciprocating	$>2.5V_{ref}$	$6V_{ref}$	$>6V_{ref}$

NOTE: V_{ref} is the reference velocity in inches per second.

Any vibration measurement value below the low alert range is acceptable.

All of Dresden's Centrifugal pumps in the IST Program operate at a speed of greater than 600 rpm.

RELIEF REQUEST NO. PR-A2

1. Description

   1.1. Relief from Code pump bearing temperature measurements.

   1.2. This relief request has been previously approved by the NRC as PR-1 per the Interim Safety Evaluation letter dated 9-16-87.

2. AFFECTED COMPONENT(S)

   2.1. Component description:

      2.1.1. All pumps in the program.

3. ASME SECTION XI (S79) TEST REQUIREMENT(S)

   3.1. TABLE IWP-3100-1 Inservice Test Quantities, Bearing Temperature, T_b.

   3.2. IWP-3300 Scope of Tests, Bearing temperatures shall be measured during at least one inservice test each year.

4. BASIS FOR RELIEF

   4.1. Bearing temperature measurements will not provide significant additional information regarding bearing condition than that already obtained by measuring vibration. Measurement of vibration provides more concise and consistent information with respect to pump and bearing condition. The usage of vibration measurements can provide information as to a change in the balance of rotating parts, misalignment of bearings, worn bearings, changes in internal hydraulic forces and general pump integrity prior to the condition degrading to the point where the component is jeopardized. Bearing temperature does not always predict such problems.

   4.2. An increase in bearing temperature most often does not occur until the bearing has deteriorated to a point where additional pump damage may occur. Bearing temperatures are also affected by the temperatures of the medium being pumped, which could yield misleading results. Vibration readings are not affected by the temperature of the medium being pumped, thus the readings are more consistent.

5. ALTERNATIVE TEST

   5.1. Pump vibration measurements will be taken quarterly.

RELIEF REQUEST NO. PR-A3

1. Description

1.1. Relief from Code pump testing monthly to testing quarterly.

1.2. This relief request has been previously approved by the NRC as PR-2 per the Interim Safety Evaluation letter dated 9-16.87.

2. AFFECTED COMPONENT(S)

2.1. Component description:

2.1.1. All pumps in the program.

3. ASME SECTION XI (S79) TEST REQUIREMENT(S)

3.1. IWP-3400 Frequency of Inservice Tests

4. BASIS FOR RELIEF

4.1. Changes in hydraulic and mechanical pump parameters will not significantly change over the period of one month because the pumps are primarily run only for operability and remain in a standby mode of operation. Quarterly measurement of these parameters is more than adequate in determining pump degradation.

5. ALTERNATIVE TEST

5.1. Pump parameters will be measured quarterly.

RELIEF REQUEST NO. PR-P4

1. Description

1.1. Relief from Code method of measurements for pump inlet pressure, and pump flow rate.

2. AFFECTED COMPONENT(S)

2.1. Component description:

Unit-Pump No./ Size	CLS	System	P&ID/CORD	Function
2-5203/1.5"	SR	DO	41-2/E6	Diesel Oil Fuel Transfer Pump
2/3-5203/1.5"	"	"	41-2/D2	"
3-5203/1.5"	"	"	41-2/B6	"

3. ASME SECTION XI (S79) TEST REQUIREMENT(S)

3.1. IWP-4200 Pressure Measurement

3.2. IWP-4600 Flow Measurement

4. BASIS FOR RELIEF

4.1. The Diesel Oil Transfer pumps do not have gauges installed to directly measure suction pressure, or installed flow rate meters to directly measure flow rate necessary to perform the required ASME XI testing.

4.2. Relief is requested from the requirement of measuring pump inlet pressure during pump tests. These pumps are utilized in transferring fuel oil from the diesel generator fuel oil storage tank to the diesel fuel oil day tank. The configuration of the piping is such that the the pump is located above the storage tank. The pump is a positive displacement gear type pump not requiring a positive suction head for proper operation. Since this pump is a positive displacement type, the discharge pressure is independent of the suction pressure and, therefore, inlet pressure data is not important in evaluating pump performance.

4.3 The alternate test method proposed provides adequate performance monitoring of these pumps in order to determine their hydraulic and mechanical condition such that their operational readiness is adequately assessed.

5. ALTERNATIVE TEST

5.1. As an alternate to pump inlet pressure measurement, the pump discharge pressure will be monitored at each inservice test.

5.2. The Diesel oil Transfer pumps will be tested using indirect means for determining the flow rate as follows.

5.2.1. Pump Flow Rate will be calculated using the Diesel Oil Day Tank level indicator and converting the measured rate of change, during the operability test, to flow rate in GPM.

RELIEF REQUEST NO. PR-P5

1. Description

1.1. Relief from Code method of measurements for pump flow.

2. AFFECTED COMPONENT(S)

2.1. Component description:

Unit-Pump No./ Size	CLS	System	P&ID/CORD	Function
2-3903-8"	2	DG	22/A10	Diesel Generator Cooling Water Pump
2/3-3903/8"	2	"	355/A8	"
3-3903/8"	2	"	355/A10	"

3. ASME SECTION XI (S79) TEST REQUIREMENT(S)

3.1. IWP-4200 Pressure Measurement

3.2. IWP-4600 Flow Measurement

4. BASIS FOR RELIEF

4.1. The Diesel Generator Cooling Water pump has the flow gauge located after the heat exchanger which is some distance away from the discharge of the pump. Dresden feels this design has led to inaccurate and unstable readings such that relevant inservice testing and trending cannot be performed.

4.2. Dresden has established modification packages nos. M12-2-87-54, M12-3-87-54, and M12-2/3-87-21 for pumps 2-3903, 3-3903 and 2/3-3903 respectively. These modifications relocate the flow gauges to a proper location in their respective hydraulic circuits.

5. ALTERNATIVE TEST

5.1. Dresden will perform inservice testing and will set differential pressure, measure vibration and observe flow. No trending of flow readings will be made; however, determination of flow for the Diesel Generator Cooling Water pump will be performed by verification of proper cooling of the Diesel Generator. Proper cooling is determined by monitoring the inlet and outlet temperature and pressure of the diesel generator cooling water, verifying they are within the allowable ranges as specified in monthly surveillance procedure DOS 6600-1.

5.2. Upon successful completion of the modifications, flow measurements will be performed and trended in accordance with ASME Section XI. At that time, this relief request will be deleted.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0202-4A	28	26-2	5C	1	B	GA	MO	O	O	P	N/A			
2-0202-4B	28	26-2	2C	1	B	GA	MO	O	O	P	N/A			
2-0202-5A	28	26-2	6D	1	B	GA	MO	O	C	A	BT	CS		DAIM-V5
											PIT	RR		
2-0202-5B	28	26-2	3C	1	B	GA	MO	O	C	A	BT	CS		DAIM-V5
											PIT	RR		
2-0202-7A	4	26-2	6D	1	B	GA	MO	C	C	P	N/A			
2-0202-7B	4	26-2	3C	1	B	GA	MO	C	C	P	N/A			
2-0202-9A	2	26-2	5B	1	B	GA	MO	O/C	C	A	BT	OP		
											PIT	RR		
2-0202-9B	2	26-2	4B	1	B	GA	MO	O/C	C	A	BT	OP		
											PIT	RR		
2-0203-1A	20	12-1	4E	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
2-0203-1B	20	12-1	4D	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
2-0203-1C	20	12-1	4C	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0203-1D	20	12-1	4B	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
2-0203-2A	20	12-2	7F	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
2-0203-2B	20	12-2	7E	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
2-0203-2C	20	12-2	7D	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
2-0203-2D	20	12-2	7C	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
2-0203-3A	6	12-1	7F	1	BC	TRV	AO/SA	C	O	A	BT	RR	VR-A3	
											CT-2	RR	VR-A4	
											PIT	RR		
2-0203-3B	6	12-1	7E	1	BC	ERV	SO	C	O	A	BT	RR	VR-A3	
											CT-2	RR	VR-A4	
											PIT	RR		
2-0203-3C	6	12-1	7C	1	BC	ERV	SO	C	O	A	BT	RR	VR-A3	
											CT-2	RR	VR-A4	
											PIT	RR		
2-0203-3D	6	12-1	7B	1	BC	ERV	SO	C	O	A	BT	RR	VR-A3	
											CT-2	RR	VR-A4	
											PIT	RR		
2-0203-3E	6	12-1	6E	1	BC	ERV	SO	C	O	A	BT	RR	VR-A3	
											CT-2	RR	VR-A4	
											PIT	RR		
2-0203-4A	6	12-1	8E	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0203-4B	6	12-1	8E	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
2-0203-4C	6	12-1	8D	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
2-0203-4D	6	12-1	8D	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
2-0203-4E	6	12-1	8C	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
2-0203-4F	6	12-1	8C	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
2-0203-4G	6	12-1	8B	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
2-0203-4H	6	12-1	8B	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
2-0205-2-4	2.5	26-1	6E	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-0205-27	2.5	26-1	5E	1	A	CK	SA	C	O/C	A	AT	RR		DAIM-V7
											CT-1	RR		
2-0220-1	2	12-1	4E	1	A	GL	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-0220-17A	0.5	12-2	8E	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0220-17B	0.5	12-2	8D	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-17C	0.5	12-2	8C	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-17D	0.5	12-2	8B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-18A	0.5	12-2	8E	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-18B	0.5	12-2	8D	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-18C	0.5	12-2	8C	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-18D	0.5	12-2	8B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-19A	0.5	26-2	5B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-19B	0.5	26-2	3B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-2	2	12-2	7E	1	A	GL	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
2-0220-20A	0.5	26-2	5B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0220-20B	0.5	26-2	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0220-21A	0.5	26-2	8D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0220-21B	0.5	26-2	1D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0220-22A	0.5	26-2	8D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0220-22B	0.5	26-2	1D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0220-44	.75	26-2	2E	1	A	GL	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-0220-45	.75	26-2	1E	1	A	GL	AO	O	C	A	AT	RR		DAIM-V2
											BT	OP		
											FST	OP		
											PIT	RR		
2-0220-46	0.5	26-1	4E	1	B	GL	AO	C	C	P	N/A			
2-0220-47	0.5	26-1	4E	1	B	GL	AO	C	C	P	N/A			
2-0220-51	0.5	26-1	5E	1	B	GL	AO	C	C	P	N/A			
2-0220-52	0.5	26-1	5E	1	B	GL	AO	O	O	P	N/A			

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0220-54	0.5	26-1	5E	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-58A	18	14	4E	1	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V12
2-0220-58B	18	14	4F	1	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V12
2-0220-59	18	14	2F	2	C	CK	SA	O	C	A	CT-1	RR		DAIM-V9
2-0220-62A	18	14	3E	1	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V12
2-0220-62B	18	14	3F	1	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V12
2-0220-67A	0.5	26-2	5F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-67B	0.5	26-2	5F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-67C	0.5	26-2	5F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-67D	0.5	26-2	5F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-67E	0.5	26-2	3F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0220-67F	0.5	26-2	3F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-67G	0.5	26-2	3F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0220-67H	0.5	26-2	3F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0262-25A	0.5	26-2	7B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0262-25B	0.5	26-2	2B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0262-26A	0.5	26-2	7B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0262-26B	0.5	26-2	2B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0263-2-11	0.5	26-1	5E	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0263-2-13A	0.5	26-1	5D	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0263-2-13B	0.5	26-1	3D	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
2-0263-2-15A	0.5	26-1	5D	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0263-2-15B	0.5	26-1	3D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-17A	0.5	26-1	5D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-17B	0.5	26-1	3D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-19A	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-19B	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-20A	0.5	26-1	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-20B	0.5	26-1	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-20C	0.5	26-1	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-20D	0.5	26-1	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-23A	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-23B	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0263-2-23C	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-23D	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-25	0.5	26-1	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-27	0.5	26-1	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31B	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31C	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31D	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31E	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31G	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31H	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31J	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0263-2-31K	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31M	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31N	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31P	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31R	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31T	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31U	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31V	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-31W	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-2-33	0.5	26-1	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0263-42A	0.5	26-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0263-42B	0.5	26-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-0301-95	4	34	2D	1	AC	CK	SA	C	C	P	AT	RR		
2-0301-98	4	34	2D	1	AC	CK	SA	C	C	P	AT	RR		
2-0302-157A	1	34	2F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-0302-157B	1	34	5F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-0302-158A	1	34	2F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-0302-158B	1	34	5F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-0302-160A	1	34	1F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-0302-160B	1	34	6F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-0302-161A	1	34	1F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-0302-161B	1	34	6F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0305-114	0.5	34	9D	2	C	CK	SA	C	O	A	CT-1	OP	VR-A1	
2-0305-115	0.5	34	0E	1	C	CK	SA	O	C	A	CT-1	RR		DAIM-V4
2-0305-120	0.5	34	0D	1	B	GA	SO	C	C	P	N/A			
2-0305-121	0.5	34	0D	1	B	GA	SO	C	C	P	N/A			
2-0305-122	0.5	34	0D	1	B	GA	SO	C	C	P	N/A			
2-0305-123	0.5	34	0D	1	B	GA	SO	C	C	P	N/A			
2-0305-126	0.5	34	0E	1	B	GA	AO	C	O	A	BT FST	OP OP	VR-A1	
2-0305-127	0.5	34	9D	1	B	GA	AO	C	O	A	BT FST	OP OP	VR-A1	
2-0305-138	0.5	34	0C	1	C	CK	SA	O	C	A	CT-1	OP		
2-0399-544	1	34	D2		B	GA	SO	C	C	P	N/A			
2-1001-1A	16	32	9B	1	A	GA	MO	C	C	P	AT BT PIT	RR CS RR		DAIM-V8 DAIM-V2

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1001-1B	16	32	9E	1	A	GA	MO	C	C	P	AT BT PIT	RR CS RR		DAIM-V8 DAIM-V2
2-1001-2A	14	32	8A	1	A	GA	MO	C	C	P	AT BT PIT	RR CS RR		DAIM-V8 DAIM-V2
2-1001-2B	14	32	8C	1	A	GA	MO	C	C	P	AT BT PIT	RR CS RR		DAIM-V8 DAIM-V2
2-1001-2C	14	32	8F	1	A	GA	MO	C	C	P	AT BT PIT	RR CS RR		DAIM-V8 DAIM-V2
2-1001-5A.	14	32	1E	1	A	GA	MO	C	C	P	AT BT PIT	RR CS RR		DAIM-V8 DAIM-V2
2-1001-5B	14	32	2E	1	A	GA	MO	C	C	P	AT BT PIT	RR CS RR		DAIM-V8 DAIM-V2
2-1101-15	1.5	33	3C	1	AC	CK	SA	C	O/C	A	AT CT-1	RR RR		DAIM-V6
2-1101-16	1.5	33	4C	1	AC	CK	SA	C	O/C	A	AT CT-1	RR RR		DAIM-V6
2-1101-43A	1.5	33	6D	2	C	CK	SA	C	O	A	CT-1	OP		
2-1101-43B	1.5	33	6E	2	C	CK	SA	C	O	A	CT-1	OP		
2-1105A	0.5	33	4C	2	C	RV	SA	C	O	A	CT-2	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1105B	0.5	33	4D	2	C	RV	SA	C	O	A	CT-2	RR		
2-1106A	1.5	33	4C	2	D	GA	EXP	C	O	A	DT	RR		
2-1106B	1.5	33	4C	2	D	GA	EXP	C	O	A	DT	RR		
2-1201-1	8	30	3A	1	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
2-1201-1A	2	30	3A	1	A	GL	MO	O/C	C	A	AT BT PIT	RR OP RR		DAIM-V1
2-1201-158	8	30	5A	2	C	CK	SA	O	C	A	CT-1	RR		DAIM-V9
2-1201-2	8	30	3A	1	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
2-1201-3	8	30	4A	1	A	GA	MO	C	C	P	AT BT PIT	RR OP RR		DAIM-V1 DAIM-V8
2-1301-1	14	28	9C	1	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
2-1301-10	4	28	3C	3	B	GA	MO	C	O	A	BT PIT	OP RR		
2-1301-11	4	28	3C	3	C	CK	SA	C	O	A	CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1301-17	.75	28	2A	2	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
2-1301-2	14	28	0B	1	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1301-20	.75	28	3A	2	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
2-1301-23	0.5	28	0C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-1301-24	0.5	28	0C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-1301-29	0.5	28	8E	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-1301-3	12	28	7E	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1301-30	0.5	28	8E	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-1301-36	4	28	5D	3	C	CK	SA	C	O	A	CT-1	OP		
2-1301-4	12	28	8E	1	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1402-13A	1.5	27	0C	2	C	SCK	SA	C	O	A	CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1402-13B	1.5	27	7D	2	C	SCK	SA	C	O	A	CT-1	OP		
2-1402-24A	10	27	2B	2	A	GA	MO	O	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1402-24B	10	27	5B	2	A	GA	MO	O	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1402-25A	10	27	2C	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V2
											BT	OP		DAIM-V1
											PIT	RR		
2-1402-25B	10	27	5C	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V2
											BT	OP		DAIM-V1
											PIT	RR		
2-1402-28A	2	27	6D	2	C	RV	SA	C	O	A	CT-2	RR		
2-1402-28B	2	27	9B	2	C	RV	SA	C	O	A	CT-2	RR		
2-1402-3A	16	27	7F	2	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1402-3B	16	27	5F	2	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1402-31A	0.5	27	3D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-1402-31B	0.5	27	4D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1402-34A	.75	27	8D	2	C	CK	SA	O	C	A	CT-1	OP		
2-1402-34B	.75	27	6D	2	C	CK	SA	O	C	A	CT-1	OP		
2-1402-36A	.75	27	8E	2	C	SCK	SA	O	C	A	CT-1	OP		
2-1402-36B	.75	27	6E	2	C	SCK	SA	O	C	A	CT-1	OP		
2-1402-38A	1.5	27	8B	2	B	GA	MO	O	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
2-1402-38B	1.5	27	7C	2	B	GA	MO	O	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
2-1402-4A	8	27	8B	2	A	GL	MO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											PIT	RR		
2-1402-4B	8	27	8B	2	A	GL	MO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											PIT	RR		
2-1402-8A	12	27	8C	2	C	SCK	SA	C	O	A	CT-1	OP		
2-1402-8B	12	27	7B	2	C	SCK	SA	C	O	A	CT-1	OP		
2-1402-9A	10	27	3C	1	AC	CK	SA	C	O/C	A	CT-1	CS		DAIM-V10
											PIT	RR		DAIM-V2

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1402-9B	10	27	4C	1	AC	CK	SA	C	O/C	A	CT-1 PIT	CS RR		DAIM-V10 DAIM-V2
2-1499-14	1	27	8E	2	C	CK	SA	O	C	A	CT-1	OP		
2-1499-15	1	27	8E	2	C	CK	SA	O	C	A	CT-1	OP		
2-1501-1A	10	29-2	3B	3	C	CK	SA	C	O	A	CT-1	OP		
2-1501-1B	10	29-2	3C	3	C	CK	SA	C	O	A	CT-1	OP		
2-1501-1C	10	29-2	3E	3	C	CK	SA	C	O	A	CT-1	OP		
2-1501-1D	10	29-2	3F	3	C	CK	SA	C	O	A	CT-1	OP		
2-1501-11A	18	29-1	9E	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
2-1501-11B	18	29-1	2D	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
2-1501-13A	3	29-1	7C	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
2-1501-13B	3	29-1	2C	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1501-17A	2	29-1	8C	2	C	RV	SA	C	O	A	CT-2	RR		
2-1501-17B	2	29-1	2C	2	C	RV	SA	C	O	A	CT-2	RR		
2-1501-18A	6	29-1	8B	2	A	GL	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-18B	6	29-1	2B	2	A	GL	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-20A	14	29-1	7B	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-20B	14	29-1	2B	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-21A	18	29-1	8A	2	B	GA	MO	O	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
2-1501-21B	18	29-1	2A	2	B	GA	MO	O	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
2-1501-22A	18	29-1	7B	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V2
											BT	OP		DAIM-V1
											PIT	RR		
2-1501-22B	18	29-1	3B	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V2
											BT	OP		DAIM-V1
											PIT	RR		
2-1501-25A	14	29-1	5B	1	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V2
											CT-1	CS		DAIM-V10
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1501-25B	14	29-1	4B	1	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V2
											CT-1	CS		DAIM-V10
											PIT	RR		
2-1501-27A	16	29-1	6A	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-27B	16	29-1	6A	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-28A	16	29-1	3A	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-28B	16	29-1	3A	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-32A	18	29-1	8D	2	B	GA	MO	O	C	A	BT	OP		
											PIT	RR		
2-1501-32B	18	29-1	2D	2	B	GA	MO	O	C	A	BT	OP		
											PIT	RR		
2-1501-38A	14	29-1	8B	2	A	GL	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-38B	14	29-1	3B	2	A	GL	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-5A	14	29-1	5E	2	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-5B	14	29-1	5F	2	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1501-5C	14	29-1	4E	2	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-5D	14	29-1	4F	2	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-63A	12	29-1	7E	2	C	CK	SA	C	O	A	CT-1	OP		
2-1501-63B	12	29-1	7F	2	C	CK	SA	C	O	A	CT-1	OP		
2-1501-63C	12	29-1	2E	2	C	CK	SA	C	O	A	CT-1	OP		
2-1501-63D	12	29-1	2F	2	C	CK	SA	C	O	A	CT-1	OP		
2-1501-65A	2	29-1	7F	2	C	CK	SA	C	O	A	CT-1	OP		
2-1501-65B	2	29-1	7E	2	C	CK	SA	C	O	A	CT-1	OP		
2-1501-65C	2	29-1	2E	2	C	CK	SA	C	O	A	CT-1	OP		
2-1501-65D	2	29-1	2F	2	C	CK	SA	C	O	A	CT-1	OP		
2-1501-66A	2	29-1	8F	2	C	SCK	SA	O	C	A	CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1501-66B	2	29-1	2F	2	C	SCK	SA	O	C	A	CT-1	OP		
2-1501-67A	2	29-1	8F	2	C	CK	SA	O	C	A	CT-1	OP		
2-1501-67B	2	29-1	2F	2	C	CK	SA	O	C	A	CT-1	OP		
2-1599-13A	2	29-1	6E	2	C	RV	SA	C	O	A	CT-2	RR		
2-1599-13B	2	29-1	6E	2	C	RV	SA	C	O	A	CT-2	RR		
2-1599-13C	2	29-1	4E	2	C	RV	SA	C	O	A	CT-2	RR		
2-1599-13D	2	29-1	4E	2	C	RV	SA	C	O	A	CT-2	RR		
2-2001-102A	2.5	39	6F	2	AC	CK	SA	C	O	A	AT	RR		
											CT-1	OP		
2-2001-102B	2.5	39	6F	2	AC	CK	SA	C	O	A	AT	RR		
											CT-1	OP		
2-2001-105	3	39	6F	2	A	GA	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
2-2001-3	3	39	4E	2	A	GA	AO	O/C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-2001-5	3	39	4E	2	A	GA	AO	O/C	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
2-2301-10	12	51	4E	2	B	GL	MO	C	C	P	BT	OP		DAIM-V1
											PIT	RR		DAIM-V8
2-2301-14	4	51	6C	2	B	GL	MO	C	O/C	A	BT	OP		
											PIT	RR		
2-2301-20	16	51	2E	2	C	CK	SA	C	O	A	CT-1	OP		
2-2301-23	1.5	51	4A	2	C	RV	SA	C	O	A	CT-2	RR		
2-2301-26	.75	51	0C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-2301-27	.75	51	0D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-2301-28	1	51	8B	2	B	GL	AO	C	O	A	BT	OP		DAIM-V1
											PIT	RR		
											FST	OP		
2-2301-29	1	51	9B	2	B	GL	AO	O	C	A	BT	OP		DAIM-V1
											PIT	RR		
											FST	OP		
2-2301-3	10	51	9A	2	B	GA	MO	C	O	A	BT	OP		DAIM-V1
											PIT	RR		
2-2301-31	1	51	9A	2	B	GL	AO	C	O	A	BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-2301-32	1	51	7B	2	B	GL	SO	C	O/C	A	BT	OP		
											PIT	RR		
2-2301-34	2	51	8D	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V11
											CT-1	OP		
2-2301-35	16	51	2E	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-2301-36	16	51	9E	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-2301-39	16	51	8E	2	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V14
2-2301-4	10	51	9C	1	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-2301-40	4	51	C7	3	AC	CK	SA	C	O/C	A	CT-1	OP		
2-2301-45	24	51	8B	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V11
											CT-1	OP		
2-2301-48	4	51	4B	2	B	GA	MO	O	O	P	BT	OP		DAIM-V8
											PIT	RR		
2-2301-49	4	51	4D	2	B	GA	MO	C	C	P	BT	OP		DAIM-V8
											PIT	RR		
2-2301-5	10	51	8B	1	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-2301-50A	4	51	4C	2	C	CK	SA	C	O	A	CT-1	OP		
2-2301-51	4	51	4C	2	C	CK	SA	O	C	A	CT-1	OP		
2-2301-53	4	51	3C	2	C	RV	SA	C	O	A	CT-2	RR		
2-2301-6	16	51	2F	2	B	GA	MO	O	C	A	BT PIT	OP RR		DAIM-V1
2-2301-68	16	51	7A	2	C	RPD	SA	C	O	A	N/A			DAIM-V3
2-2301-69	16	51	7A	2	C	RPD	SA	C	O	A	N/A			DAIM-V3
2-2301-7	14	51	6E	2	AC	CK	SA	C	O/C	A	CT-1	CS		DAIM-V10
2-2301-71	2	51	8D	2	AC	SCK	SA	C	O/C	A	AT CT-1	RR OP		DAIM-V11
2-2301-74	12	51	8C	2	AC	SCK	SA	C	O/C	A	AT CT-1	RR OP		DAIM-V11
2-2301-75	4	51	4B	2	C	CK	SA	C	O/C	A	CT-1	OP		
2-2301-76	2	51	4C	2	C	CK	SA	C	O/C	A	CT-1	OP		

EST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-2301-8	14	51	6E	2	B	GA	MO	C	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
2-2301-9	14	51	5E	2	B	GA	MO	O	O	P	BT	OP		DAIM-V8
											PIT	RR		
2-2354-500	.75	51	6E	2	C	CK	SA	O	C	A	CT-1	OP		
2-2354-501	.75	51	6E	2	C	SCK	SA	O	C	A	CT-1	OP		
2-2499-1A	0.5	706-1	6D	2	A	GA	SO	O	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2499-1B	0.5	706-1	2D	2	A	GA	SO	O	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2499-2A	0.5	706-1	6D	2	A	GA	SO	O	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2499-2B	0.5	706-1	3D	2	A	GA	SO	O	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2499-28A	0.5	706-1	7C	2	AC	CK	SA	O	C	A	AT	RR		DAIM-V18
											CT-1	RR		
2-2499-28B	0.5	706-1	2C	2	AC	CK	SA	O	C	A	AT	RR		DAIM-V18
											CT-1	RR		
2-2499-3A	0.5	706-1	7B	2	A	GA	SO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

EST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-2499-3B	0.5	706-1	2B	2	A	GA	SO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2499-4A	0.5	706-1	6B	2	A	GA	SO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2499-4B	0.5	706-1	3B	2	A	GA	SO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2599-1A	1.5	707	8C	2	B	GL	AO	C	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
											FST	OP		
2-2599-1B	1.5	707	1C	2	B	GL	AO	C	O/C	A	BT	OP		
											PIT	RR		
											FST	OP		
2-2599-2A	1	707	5C	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2599-2B	1	707	4C	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2599-22	1.5	707	6A	2	C	CK	SA	C	O/C	A	CT-1	OP		
2-2599-23A	1	707	6C	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V19
											CT-1	RR		
2-2599-23B	1	707	3C	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V19
											CT-1	RR		
2-2599-24A	1	707	6C	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V19
											CT-1	RR		

[T]EST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-2599-24B	1	707	3C	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V19
											CT-1	RR		
2-2599-26A	0.5	707	4D	2	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-2599-26B	0.5	707	3D	2	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
2-2599-3A	1	707	6C	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2599-3B	1	707	3C	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2599-4A	0.5	707	3F	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2599-4B	0.5	707	3E	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-2599-5A	0.5	707	5F	2	B	GL	AO	C	O/C	A	BT	OP		
											PIT	RR		
											FST	OP		
2-2599-5B	0.5	707	5E	2	B	GL	AO	C	O/C	A	BT	OP		
											PIT	RR		
											FST	OP		
2-3702	6	20	3B	2	A	GA	MO	O	C	A	AT	RR		DAIM-V23
											BT	CS		
											PIT	RR		
2-3703	6	20	1B	2	A	GA	MO	O	C	A	AT	RR		DAIM-V23
											BT	CS		
											PIT	RR		

T: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-3706	6	20	1B	2	A	GA	MO	O	C	A	AT BT PIT	RR CS RR		DAIM-V23
2-3769-500	6	20	3B	2	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V20
2-3930-501	8	22	0B	3	C	CK	SA	C	O	A	CT-1	OP		
2-3999-252	4	22	7B	3	C	CK	SA	O	C	A	CT-1	OP		
2-3999-253	4	22	8B	3	C	CK	SA	C	O	A	CT-1	OP		
2-3999-336	1	29-2	4C	3	C	CK	SA	O	C	A	CT-1	OP		
2-3999-338	1	29-2	4E	3	C	CK	SA	O	C	A	CT-1	OP		
2-4107-501	4	28	5C	3	C	CK	SA	C	O	A	CT-1	OP		
2-4899-72	1	39	6E	2	C	RV	SA	C	O	A	CT-2	RR		
2-4899-77	1	39	5E	3	C	RV	SA	C	O	A	CT-2	RR		
2-4899-78	1	39	5E	2	C	RV	SA	C	O	A	CT-2	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-4899-79	1	39	6E	3	C	RV	SA	C	O	A	CT-2	RR		
2/3-3899-200	2.5	3121	2B	3	C	CK	SA	C	O	A	CT-1	OP		
2/3-3930-501	8	355	8A	3	C	CK	SA	C	O	A	CT-1	OP		
2/3-3999-336	3	3121	2B	3	C	CK	SA	C	O	A	CT-1	OP		
2/3-5741-35	2.5	3121	D7	3	B	GL	AO	C	O	A	BT FST	OP OP		
2/3-5741-48A	2.5	3121	2A	3	B	GA	AO	O/C	O	A	BT FST	OP OP		
2/3-5741-48B	3	3121	2B	3	B	GA	AO	O/C	C	A	BT FST	OP OP		
3-0202-4A	28	357-2	6D	1	B	GA	MO	O	O	P	N/A			
3-0202-4B	28	357-2	2C	1	B	GA	MO	O	O	P	N/A			
3-0202-5A	28	357-2	6D	1	B	GA	MO	O	C	A	BT PIT	CS RR		DAIM-V5
3-0202-5B	28	357-2	3C	1	B	GA	MO	O	C	A	BT PIT	CS RR		DAIM-V5

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0203-1A	20	345-1	4E	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
3-0203-1B	20	345-1	4D	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
3-0203-1C	20	345-1	4C	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
3-0203-1D	20	345-1	4B	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
3-0203-2A	20	345-2	7F	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
3-0203-2B	20	345-2	7E	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
3-0203-2C	20	345-2	7D	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
3-0203-2D	20	345-2	7C	1	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V24
											FST	CS		
											PIT	RR		
3-0203-3A	6	345-1	7F	1	BC	TRV	AO/SA	C	O	A	BT	RR	VR-A3	
											CT-2	RR	VR-A4	
											PIT	RR		
3-0203-3B	6	345-1	7E	1	BC	ERV	SO	C	O	A	BT	RR	VR-A3	
											CT-2	RR	VR-A4	
											PIT	RR		
3-0203-3C	6	345-1	7C	1	BC	ERV	SO	C	O	A	BT	RR	VR-A3	
											CT-2	RR	VR-A4	
											PIT	RR		

EST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0203-3D	6	345-1	7B	1	BC	ERV	SO	C	O	A	BT CT-2 PIT	RR RR RR	VR-A3 VR-A4	
3-0203-3E	6	345-1	6E	1	BC	ERV	SO	C	O	A	BT CT-2 PIT	RR RR RR	VR-A3 VR-A4	
3-0203-4A	6	345-1	8E	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
3-0203-4B	6	345-1	8E	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
3-0203-4C	6	345-1	8D	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
3-0203-4D	6	345-1	8D	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
3-0203-4E	6	345-1	8C	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
3-0203-4F	6	345-1	8C	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
3-0203-4G	6	345-1	8B	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
3-0203-4H	6	345-1	8B	1	C	SV	SA	C	O	A	CT-2	RR	VR-A2	
3-0205-2-4	2.5	357-1	6E	1	A	GA	MO	C	O/C	A	AT BT PIT	RR OP RR		DAIM-V1

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0205-27	2.5	357-1	5E	1	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V7
											CT-1	RR		
3-0220-1	2	345-1	4E	1	A	GL	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-0220-17A	0.5	345-2	8E	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-17B	0.5	345-2	8D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-17C	0.5	345-2	8C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-17D	0.5	345-2	8B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-18A	0.5	345-2	8E	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-18B	0.5	345-2	8D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-18C	0.5	345-2	8C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-18D	0.5	345-2	8B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-19A	0.5	357-2	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0220-19B	0.5	357-2	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-2	2	345-2	7E	1	A	GL	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-0220-20A	0.5	357-2	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-20B	0.5	357-2	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-21A	0.5	357-2	8D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-21B	0.5	357-2	1D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-22A	0.5	357-2	8D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-22B	0.5	357-2	1D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0220-44	.75	357-2	2E	1	A	GL	AO	C	C	P	AT	RR		DAIM-V8
											BT	OP		
											FST	OP		
											PIT	RR		
3-0220-45	.75	357-2	1E	1	A	GL	AO	C	C	P	AT	RR		DAIM-V2
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
3-0220-46	0.5	357-1	4E	1	B	GL	AO	C	C	P	N/A			

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

RTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0220-47	0.5	357-1	4E	1	B	GL	AO	C	C	P	N/A			
3-0220-51	0.5	357-1	5E	1	B	GL	AO	C	C	P	N/A			
3-0220-54	0.5	357-1	5E	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0220-58A	18	347	4E	1	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V12
3-0220-58B	18	347	4F	1	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V12
3-0220-59	18	347	2F	2	C	CK	SA	O	C	A	CT-1	RR		DAIM-V9
3-0220-62A	18	347	3E	1	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V12
3-0220-62B	18	347	3F	1	AC	CK	SA	O	C	A	AT CT-1	RR RR		DAIM-V12
3-0220-67A	0.5	357-2	5F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0220-67B	0.5	357-2	5F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0220-67C	0.5	357-2	5F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15

EST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0220-67D	0.5	357-2	5F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0220-67E	0.5	357-2	3F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0220-67F	0.5	357-2	3F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0220-67G	0.5	357-2	3F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0220-67H	0.5	357-2	3F	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0262-25A	0.5	357-2	7B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0262-25B	0.5	357-2	2B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0262-26A	0.5	357-2	7B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0262-26B	0.5	357-2	2B	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0263-2-11	0.5	357-1	5E	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-0263-2-13A	0.5	357-1	5D	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0263-2-13B	0.5	357-1	3D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-15A	0.5	357-1	5D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-15B	0.5	357-1	3D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-17A	0.5	357-1	5D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-17B	0.5	357-1	3D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-19A	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-19B	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-20A	0.5	357-1	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-20B	0.5	357-1	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-20C	0.5	357-1	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-20D	0.5	357-1	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0263-2-23A	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-23B	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-23C	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-23D	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-25	0.5	357-1	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-27	0.5	357-1	5B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31B	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31C	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31D	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31E	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31G	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0263-2-31H	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31J	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31K	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31M	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31N	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31P	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31R	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31S	0.5	357-1	C3	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31T	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31U	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-31V	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0263-2-31W	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-2-33	0.5	357-1	3B	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-42A	0.5	357-1	5C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-42B	0.5	357-1	3C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-0263-52	0.5	357-1	5E	1	B	GL	AO	O	O	P	N/A			DAIM-V22
3-0301-95	4	365	2D	1	AC	CK	SA	C	C	P	N/A			PIPE CUT AND CAPPED
3-0302-156A	1	365	5F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-0302-156B	1	365	2F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-0302-157A	1	365	2F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-0302-157B	1	365	5F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-0302-158A	3	365	2F	2	C	RV	SA	C	O	A	CT-2	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0302-158B	3	365	5F	2	C	RV	SA	C	O	A	CT-2	RR		
3-0302-160A	1	365	1F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-0302-160B	1	365	6F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-0302-161A	1	365	1F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-0302-161B	1	365	6F	2	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-0305-114	0.5	365	9D	2	C	CK	SA	C	O	A	CT-1	OP	VR-A1	
3-0305-115	0.5	365	0E	1	C	CK	SA	O	C	A	CT-1	RR		DAIM-V4
3-0305-120	0.5	365	0D	1	B	GA	SO	C	C	P	N/A			
3-0305-121	0.5	365	0D	1	B	GA	SO	C	C	P	N/A			
3-0305-122	0.5	365	0D	1	B	GA	SO	C	C	P	N/A			
3-0305-123	0.5	365	0D	1	B	GA	SO	C	C	P	N/A			

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0305-126	0.5	365	0E	1	B	GA	AO	C	O	A	BT	OP	VR-A1	
											FST	OP		
3-0305-127	0.5	365	9D	1	B	GA	AO	C	O	A	BT	OP	VR-A1	
											FST	OP		
3-0305-138	0.5	365	0C	1	C	CK	SA	O	C	A	CT-1	RR		
3-1001-1A	16	363	9B	1	A	GA	MO	C	C	P	AT	RR		DAIM-V8
											BT	CS		DAIM-V2
											PIT	RR		
3-1001-1B	16	363	9E	1	A	GA	MO	C	C	P	AT	RR		DAIM-V8
											BT	CS		DAIM-V2
											PIT	RR		
3-1001-2A	14	363	8A	1	A	GA	MO	C	C	P	AT	RR		DAIM-V8
											BT	CS		DAIM-V2
											PIT	RR		
3-1001-2B	14	363	8C	1	A	GA	MO	C	C	P	AT	RR		DAIM-V8
											BT	CS		DAIM-V2
											PIT	RR		
3-1001-2C	14	363	8F	1	A	GA	MO	C	C	P	AT	RR		DAIM-V8
											BT	CS		DAIM-V2
											PIT	RR		
3-1001-5A	14	363	1E	1	A	GA	MO	C	C	P	AT	RR		DAIM-V8
											BT	CS		DAIM-V2
											PIT	RR		
3-1001-5B	14	363	2E	1	A	GA	MO	C	C	P	AT	RR		DAIM-V8
											BT	CS		DAIM-V2
											PIT	RR		
3-1101-15	1.5	364	3C	1	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V6
											CT-1	RR		

EST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1101-16	1.5	364	4C	1	AC	CK	SA	C	O/C	A	AT CT-1	RR RR		DAIM-V6
3-1101-43A	1.5	364	6D	2	C	CK	SA	C	O	A	CT-1	OP		
3-1101-43B	1.5	364	6E	2	C	CK	SA	C	O	A	CT-1	OP		
3-1105A	0.5	364	4C	2	C	RV	SA	C	O	A	CT-2	RR		
3-1105B	0.5	364	4D	2	C	RV	SA	C	O	A	CT-2	RR		
3-1106A	1.5	364	4C	2	D	GA	EXP	C	O	A	DT	RR		
3-1106B	1.5	364	4C	2	D	GA	EXP	C	O	A	DT	RR		
3-1201-1	8	361	3A	1	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1201-1A	2	361	3A	1	A	GL	MO	O/C	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1201-158	8	361	5A	2	C	CK	SA	O	C	A	CT-1	RR		DAIM-V9
3-1201-2	8	361	3A	1	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1

EST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1201-3	8	361	4A	1	A	GA	MO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											PIT	RR		
3-1301-1	14	359	9C	1	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1301-10	4	359	3C	3	B	GA	MO	C	O	A	BT	OP		DAIM-V1
											PIT	RR		
3-1301-11	4	359	3C	3	C	CK	SA	C	O	A	CT-1	OP		
3-1301-17	.75	359	2A	2	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
3-1301-2	14	359	0B	1	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1301-20	.75	359	3A	2	A	GL	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
3-1301-23	0.5	359	0C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-1301-24	0.5	359	0C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-1301-29	0.5	359	8E	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-1301-3	12	359	7E	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1301-30	0.5	359	8E	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-1301-36	4	359	5D	3	C	CK	SA	C	O	A	CT-1	OP		
3-1301-4	12	359	8E	1	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1402-13A	1.5	358	0C	2	C	SCK	SA	C	O	A	CT-1	OP		
3-1402-13B	1.5	358	7D	2	C	SCK	SA	C	O	A	CT-1	OP		
3-1402-24A	10	358	2B	2	A	GA	MO	O	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1402-24B	10	358	5B	2	A	GA	MO	O	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1402-25A	10	358	2C	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V2
											PIT	RR		
3-1402-25B	10	358	5C	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V2
											PIT	RR		
3-1402-28A	2	358	6D	2	C	RV	SA	C	O	A	CT-2	RR		
3-1402-28B	2	358	9B	2	C	RV	SA	C	O	A	CT-2	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1402-3A	16	358	7F	2	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1402-3B	16	358	5F	2	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1402-31A	0.5	358	3D	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-1402-31B	0.5	358	4D	1	AC	XFC	SA	O	C	A	AT CT-1	RR RR		DAIM-V15
3-1402-34B	.75	358	6D	2	C	CK	SA	O	C	A	CT-1	OP		
3-1402-36A	.75	358	8E	2	C	SCK	SA	O	C	A	CT-1	OP		
3-1402-36B	.75	358	6E	2	C	SCK	SA	O	C	A	CT-1	OP		
3-1402-38A	1.5	358	8B	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
3-1402-38B	1.5	358	7C	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
3-1402-4A	8	358	8B	2	B	GL	MO	C	C	P	BT PIT	OP RR		DAIM-V1 DAIM-V8
3-1402-4B	8	358	8B	2	B	GL	MO	C	C	P	BT PIT	OP RR		DAIM-V1 DAIM-V8

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1402-8A	12	358	8C	2	C	SCK	SA	C	O	A	CT-1	OP		
3-1402-8B	12	358	7B	2	C	SCK	SA	C	O	A	CT-1	OP		
3-1402-9A	10	358	3C	1	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V10
											CT-1	CS		DAIM-V2
											PIT	RR		
3-1402-9B	10	358	4C	1	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V10
											CT-1	CS		DAIM-V2
											PIT	RR		
3-1499-14	1	358	8E	2	C	CK	SA	O	C	A	CT-1	OP		
3-1499-15	1	358	8E	2	C	CK	SA	O	C	A	CT-1	OP		
3-1499-34A	.75	358	D9	2	C	CK	SA	O	C	A	CT-1	OP		
3-1501-1A	10	360-2	3B	3	C	CK	SA	C	O	A	CT-1	OP		
3-1501-1B	10	360-2	3C	3	C	CK	SA	C	O	A	CT-1	OP		
3-1501-1C	10	360-2	3E	3	C	CK	SA	C	O	A	CT-1	OP		
3-1501-1D	10	360-2	3F	3	C	CK	SA	C	O	A	CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1501-11A	18	360-1	9E	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
3-1501-11B	18	360-1	2D	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
3-1501-13A	3	360-1	2C	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
3-1501-13A(RV)	3	360-1	F4	2	C	RV	SA	C	O	A	CT-2	RR		
3-1501-13B	3	360-1	7C	2	B	GA	MO	O	O/C	A	BT PIT	OP RR		DAIM-V1
3-1501-13B(RV)	2	360-1	E4	2	C	RV	SA	C	O	A	CT-2	RR		
3-1501-13C(RV)	2	360-1	E6	2	C	RV	SA	C	O	A	CT-2	RR		
3-1501-17A	2	360-1	8C	2	C	RV	SA	C	O	A	CT-2	RR		
3-1501-17B	2	360-1	2C	2	C	RV	SA	C	O	A	CT-2	RR		
3-1501-18A	6	360-1	8B	2	A	GL	MO	C	O/C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1501-18B	6	360-1	2B	2	A	GL	MO	C	O/C	A	AT BT PIT	RR OP RR		DAIM-V1

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1501-20A	14	360-1	7B	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1501-20B	14	360-1	2B	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1501-21A	18	360-1	8A	2	B	GA	MO	O	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
3-1501-21B	18	360-1	2A	2	B	GA	MO	O	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
3-1501-22A	18	360-1	3A	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V2
											PIT	RR		
3-1501-22B	18	360-1	7A	1	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		DAIM-V2
											PIT	RR		
3-1501-25A	14	360-1	5B	1	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V10
											CT-1	CS		DAIM-V2
											PIT	RR		
3-1501-25B	14	360-1	4B	1	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V10
											CT-1	CS		DAIM-V2
											PIT	RR		
3-1501-27A	16	360-1	6A	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1501-27B	16	360-1	6A	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1501-28A	16	360-1	3A	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1501-28B	16	360-1	3A	2	A	GA	MO	C	O/C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1501-32A	18	360-1	8D	2	B	GA	MO	O	C	A	BT PIT	OP RR		DAIM-V1
3-1501-32B	18	360-1	2D	2	B	GA	MO	O	C	A	BT PIT	OP RR		DAIM-V1
3-1501-38A	14	360-1	8B	2	A	GL	MO	C	O/C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1501-38B	14	360-1	3B	2	A	GL	MO	C	O/C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1501-5A	14	360-1	5E	2	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1501-5B	14	360-1	5F	2	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1501-5C	14	360-1	4E	2	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1501-5D	14	360-1	4F	2	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-1501-63A	12	360-1	7E	2	C	CK	SA	C	O	A	CT-1	OP		
3-1501-63B	12	360-1	7F	2	C	CK	SA	C	O	A	CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1501-63C	12	360-1	2E	2	C	CK	SA	C	O	A	CT-1	OP		
3-1501-63D	12	360-1	2F	2	C	CK	SA	C	O	A	CT-1	OP		
3-1501-65A	2	360-1	7F	2	C	CK	SA	C	O	A	CT-1	OP		
3-1501-65B	2	360-1	7E	2	C	CK	SA	C	O	A	CT-1	OP		
3-1501-65C	2	360-1	2E	2	C	CK	SA	C	O	A	CT-1	OP		
3-1501-65D	2	360-1	2F	2	C	CK	SA	C	O	A	CT-1	OP		
3-1501-66A	2	360-1	8F	2	C	SCK	SA	O	C	A	CT-1	OP		
3-1501-66B	2	360-1	2F	2	C	SCK	SA	O	C	A	CT-1	OP		
3-1501-67A	2	360-1	8F	2	C	CK	SA	O	C	A	CT-1	OP		
3-1501-67B	2	360-1	2F	2	C	CK	SA	O	C	A	CT-1	OP		
3-1501-85D(RV)	2	360-1	F6	2	C	RV	SA	C	O	A	CT-2	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-2001-101A	2.5	369	6F	2	AC	CK	SA	C	O	A	AT	RR		
											CT-1	OP		
3-2001-101B	2.5	369	6F	2	AC	CK	SA	C	O	A	AT	RR		
											CT-1	OP		
3-2001-105	3	369	6F	2	A	GA	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
3-2001-3	3	369	4E	2	A	GA	AO	O/C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
3-2001-5	3	369	4E	2	A	GA	AO	O/C	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
3-2301-10	12	374	4E	2	B	GL	MO	C	C	P	BT	OP		DAIM-V1
											PIT	RR		DAIM-V8
3-2301-14	4	374	6C	2	B	GL	MO	C	O/C	A	BT	OP		DAIM-V1
											PIT	RR		
3-2301-20	16	374	2E	2	C	CK	SA	C	O	A	CT-1	OP		
3-2301-23	1.5	374	4A	2	C	RV	SA	C	O	A	CT-2	RR		
3-2301-26	.75	374	0C	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-2301-27	.75	374	0D	1	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-2301-28	1	374	8B	2	B	GL	AO	C	O	A	BT	OP		DAIM-V1
											PIT	RR		
											FST	OP		
3-2301-29	1	374	9B	2	B	GL	AO	O	C	A	BT	OP		DAIM-V1
											PIT	RR		
											FST	OP		
3-2301-3	10	374	9A	2	B	GA	MO	C	O	A	BT	OP		DAIM-V1
											PIT	RR		
3-2301-31	1	374	9A	2	B	GL	AO	C	O	A	BT	OP		
											PIT	RR		
											FST	OP		
3-2301-32	1	374	7B	2	B	GL	SO	C	O/C	A	BT	OP		
											PIT	RR		
3-2301-34	2	374	8D	2	AC	CK	SA	O	O/C	A	AT	RR		DAIM-V11
											CT-1	OP		
3-2301-35	16	374	2E	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-2301-36	16	374	9E	2	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-2301-39	16	374	8E	2	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V14
3-2301-4	10	374	9C	1	A	GA	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-2301-40	4	374	C7	3	AC	CK	SA	C	O/C	A	CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-2301-45	24	374	8B	2	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		DAIM-V11
3-2301-48	4	374	4B	2	B	GA	MO	O	O	P	BT PIT	OP RR		DAIM-V1 DAIM-V8
3-2301-49	4	374	4D	2	B	GA	MO	C	C	P	BT PIT	OP RR		DAIM-V1 DAIM-V8
3-2301-5	10	374	8B	1	A	GA	MO	O	C	A	AT BT PIT	RR OP RR		DAIM-V1
3-2301-50A	4	374	4C	2	C	CK	SA	C	O	A	CT-1	OP		
3-2301-51	4	374	4C	2	C	CK	SA	O	C	A	CT-1	OP		
3-2301-53	4	374	3C	2	C	RV	SA	C	O	A	CT-2	RR		
3-2301-6	16	374	2F	2	B	GA	MO	O	C	A	BT PIT	OP RR		DAIM-V1
3-2301-68	16	374	7A	2	C	RPD	SA	C	O	A	N/A			DAIM-V3
3-2301-69	16	374	7A	2	C	RPD	SA	C	O	A	N/A			DAIM-V3
3-2301-7	14	374	6E	2	AC	CK	SA	C	O/C	A	CT-1	CS		DAIM-V10

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-2301-71	2	374	8D	2	AC	SCK	SA	C	O/C	A	AT CT-1	RR RR		DAIM-V11
3-2301-74	12	374	8C	2	AC	CK	SA	C	O/C	A	AT CT-1	RR RR		DAIM-V11
3-2301-75	4	374	4B	2	C	CK	SA	C	O/C	A	CT-1	OP		
3-2301-76	2	374	4C	2	C	CK	SA	C	O/C	A	CT-1	OP		
3-2301-8	14	374	6E	2	B	GA	MO	C	O/C	A	BT PIT	OP RR		DAIM-V1
3-2301-9	14	374	5E	2	B	GA	MO	O	O	P	BT PIT	OP RR		DAIM-V1 DAIM-V8
3-2354-500	.75	374	6E	2	C	CK	SA	O	C	A	CT-1	OP		
3-2354-501	.75	374	6E	2	C	SCK	SA	O	C	A	CT-1	OP		
3-2399-44	.75	374	D4	2	C	RV	SA	C	O	A	CT-2	CS		
3-2499-1A	0.5	706-2	6D	2	A	GA	SO	O	O/C	A	AT BT PIT FST	RR OP RR OP		
3-2499-1B	0.5	706-2	2D	2	A	GA	SO	O	O/C	A	AT BT PIT FST	RR OP RR OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-2499-2A	0.5	706-2	6D	2	A	GA	SO	O	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2499-2B	0.5	706-2	3D	2	A	GA	SO	O	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2499-28A	0.5	706-2	7C	2	AC	CK	SA	O	C	A	AT	RR		DAIM-V18
											CT-1	RR		
3-2499-28B	0.5	706-2	2C	2	AC	CK	SA	O	C	A	AT	RR		DAIM-V18
											CT-1	RR		
3-2499-3A	0.5	706-2	7B	2	A	GA	SO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2499-3B	0.5	706-2	2B	2	A	GA	SO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2499-4A	0.5	706-2	6B	2	A	GA	SO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2499-4B	0.5	706-2	3B	2	A	GA	SO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2599-1A	1.5	707-2	8C	2	B	GL	AO	C	O/C	A	BT	OP		
											PIT	RR		
											FST	OP		
3-2599-1B	1.5	707-2	1C	2	B	GL	AO	C	O/C	A	BT	OP		
											PIT	RR		
											FST	OP		
3-2599-2A	1	707-2	5C	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-2599-2B	1	707-2	4C	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2599-22	1.5	707-2	6A	2	C	CK	SA	C	O/C	A	CT-1	OP		
3-2599-23A	1	707-2	6C	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V19
											CT-1	RR		
3-2599-23B	1	707-2	3C	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V19
											CT-1	RR		
3-2599-24A	1	707-2	6C	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V19
											CT-1	RR		
3-2599-24B	1	707-2	3C	2	AC	CK	SA	C	O/C	A	AT	RR		DAIM-V19
											CT-1	RR		
3-2599-26A	0.5	707-2	4D	2	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-2599-26B	0.5	707-2	3D	2	AC	XFC	SA	O	C	A	AT	RR		DAIM-V15
											CT-1	RR		
3-2599-3A	1	707-2	6C	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2599-3B	1	707-2	3C	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2599-4A	0.5	707-1	3F	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-2599-4B	0.5	707-2	3E	2	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-2599-5A	0.5	707-2	5F	2	B	GL	AO	C	O/C	A	BT	OP		
											PIT	RR		
											FST	OP		
3-2599-5B	0.5	707-2	5E	2	B	GL	AO	C	O/C	A	BT	OP		
											PIT	RR		
											FST	OP		
3-3702	6	353	3B	2	A	GA	MO	O	C	A	AT	RR		DAIM-V23
											BT	CS		
											PIT	RR		
3-3703	6	353	1B	2	A	GA	MO	O	C	A	AT	RR		DAIM-V23
											BT	CS		
											PIT	RR		
3-3706	6	353	1B	2	A	GA	MO	O	C	A	AT	RR		DAIM-V23
											BT	CS		
											PIT	RR		
3-3769-500	6	353	3B	2	AC	CK	SA	O	C	A	AT	RR		DAIM-V20
											CT-1	RR		
3-3930-501	8	355	0B	3	C	CK	SA	C	O	A	CT-1	OP		
3-3999-252	4	355	7B	3	C	CK	SA	O	C	A	CT-1	OP		
3-3999-253	4	355	8B	3	C	CK	SA	C	O	A	CT-1	OP		
3-3999-336	1	360-2	4C	3	C	CK	SA	O	C	A	CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-3999-338	1	360-2	4E	3	C	CK	SA	O	C	A	CT-1	OP		
3-4107-501	4	359	5C	3	C	CK	SA	C	O	A	CT-1	OP		
3-4899-84	1	369	8E	3	C	RV	SA	C	O	A	CT-2	RR		
3-4899-89	1	369	8E	2	C	RV	SA	C	O	A	CT-2	RR		
3-4899-98	1	369	7E	2	C	RV	SA	C	O	A	CT-2	RR		
3-4899-99	1	369	7E	3	C	RV	SA	C	O	A	CT-2	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
BACK DRAFT DAMP	24	49	9A	SR	C	CK	SA	C	O/C	A	CT-1	OP		
BACK DRAFT DAMP	24	49	9C	SR	C	CK	SA	C	O/C	A	CT-1	OP		
2-0220-105A	8	25	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
2-0220-105B	8	25	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
2-0220-105C	8	25	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
2-0220-105D	8	25	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
2-0220-105E	8	25	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
2-0220-84A	0.5	12-1	3F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
2-0220-84B	0.5	12-1	3F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
2-0220-84C	0.5	12-1	3F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
2-0220-84D	0.5	12-1	3F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

IST PROGRAM FOR VALVES
DRESDEN UNITS 2 & 3
NRC SUBMITTAL

12:38 THURSDAY, MAY 5, 1988

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0220-85A	0.5	12-2	7F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
2-0220-85B	0.5	12-2	7F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
2-0220-85C	0.5	12-2	7F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
2-0220-85D	0.5	12-2	7F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
2-0302-166A	1	34	F2	SR	C	CK	SA	C	O	A	CT-1	OP		
2-0302-166B	1	34	F6	SR	C	CK	SA	C	O	A	CT-1	OP		
2-0302-19A	0.5	34	7E	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
2-0302-19B	0.5	34	7E	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
2-0302-20A	0.5	34	8E	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
2-0302-20B	0.5	34	8E	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
2-0305-117	0.5	34	0D	SR.	B	TWV	SO	O	C	A	BT	RR		VR-P9

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN;, RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0305-118	0.5	34	8D	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
2-0399-524A	1	34	8D	SR	B	TWV	SO	O	C	A	BT	RR		VR-P8
2-0399-524B	1	34	8D	SR	B	TWV	SO	O	C	A	BT	RR		VR-P8
2-0399-525	1	34	8D	SR	B	CK	SA	C	O	A	CT-1	OP		
2-0399-548A	1	34	9C	SR	B	GA	SO	C	O	A	BT	RR		VR-P8
2-0399-548B	1	34	9C	SR	B	GA	SO	C	O	A	BT	RR		VR-P8
2-0399-549A	1	34	8E	SR	B	GA	SO	C	O	A	BT	RR		VR-P8
2-0399-549B	1	34	8E	SR	B	GA	SO	C	O	A	BT	RR		VR-P8
2-0733-1	0.5	37-2	1F	SR	A	BAL	SO	C	C	P	AT BT PIT	RR OP RR		DAIM-V8
2-0733-2	0.5	37-2	1F	SR	A	BAL	SO	C	C	P	AT BT PIT	RR OP RR		DAIM-V8
2-0733-3	0.5	37-2	1F	SR	A	BAL	SO	C	C	P	AT BT PIT	RR OP RR		DAIM-V8

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-0733-4	0.5	37-2	1F	SR	A	BAL	SO	C	C	P	AT	RR		DAIM-V8
											BT	OP		
											PIT	RR		
2-0733-5	0.5	37-2	1F	SR	A	BAL	SO	C	C	P	AT	RR		DAIM-V8
											BT	OP		
											PIT	RR		
2-0736-1	0.5	37-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
2-0736-2	0.5	37-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
2-0736-3	0.5	37-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
2-0736-4	0.5	37-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
2-0736-5	0.5	37-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
2-1501-19A	6	29-1	7B	SR	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1501-19B	6	29-1	2B	SR	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1599-61	3	29-1	4D	SR	A	GA	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											PIT	RR		
											FST	OP		
2-1599-62	3	29-1	4D	SR	A	GA	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1601-20A	20	25	8D	SR	A	BTF	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
2-1601-20B	20	25	8E	SR	A	BTF	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
2-1601-21	18	25	6C	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
2-1601-22	18	25	6C	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
2-1601-23	18	25	3B	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
2-1601-24	18	25	2B	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
2-1601-31A	20	25	9D	SR	AC	CK	SA	C	O/C	A	AT	RR		
											CT-1	OP		
2-1601-31B	20	25	9E	SR	AC	CK	SA	C	O/C	A	AT	RR		
											CT-1	OP		
2-1601-32A	18	25	3D	SR	AC	CK	SA	C	O/C	A	AT	RR		
											CT-1	OP		
2-1601-32B	18	25	3D	SR	AC	CK	SA	C	O/C	A	AT	RR		
											CT-1	OP		
2-1601-32C	18	25	3D	SR	AC	CK	SA	C	O/C	A	AT	RR		
											CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1601-32D	18	25	3E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-32E	18	25	3E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-32F	18	25	3E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-33A	18	25	7D	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-33B	18	25	7D	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-33C	18	25	7D	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-33D	18	25	7E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-33E	18	25	7E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-33F	18	25	7E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
2-1601-55	4	25	6B	SR	A	BTF	AO	O	C	A	AT BT FST PIT	RR OP OP RR		
2-1601-56	18	25	6D	SR	A	BTF	AO	O	C	A	AT BT FST PIT	RR OP OP RR		DAIM-V1

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-1601-57	1.5	25	8D	SR	A	GL	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
2-1601-58	1.5	25	7D	SR	A	GL	AO	C	C	P	AT	RR		DAIM-V8
											BT	OP		
											FST	OP		
											PIT	RR		
2-1601-59	1.5	25	6D	SR	A	GL	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-1601-60	18	25	2E	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
2-1601-61	2	25	2E	SR	A	GA	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
2-1601-62	2	25	3B	SR	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-1601-63	6	25	2A	SR	A	BTF	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
2-2001-106	3	39	7F	SR	A	GA	AO	O/C	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
2-2001-6	3	39	3E	SR	A	GA	AO	O/C	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
2-2301-64	1	51	5A	SR	B	GL	AO	O	C	A	BT	OP		
2-2301-65	1	51	6A	SR	B	GL	AO	O	C	A	BT	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

IST PROGRAM FOR VALVES
DRESDEN UNITS 2 & 3
NRC SUBMITTAL

12:38 THURSDAY, MAY 5, 1988

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-2399-76A	1	51	8D	SR	C	CK	SA	C	O/C	A	CT-1	OP		
2-2399-76B	1	51	8D	SR	C	CK	SA	C	O/C	A	CT-1	OP		
2-2399-77A	1	51	8D	SR	C	CK	SA	C	O/C	A	CT-1	OP		
2-2399-77B	1	51	8D	SR	C	CK	SA	C	O/C	A	CT-1	OP		
2-2599-8	0.5	707	A8	SR	C	CK	SA	C	O	A	CT-1	OP		
2-4720	1	37-2	7C	SR	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-4721	1	37-2	7C	SR	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
2-4722	1	37-2	2E	SR	A	GL	AO	O	C	A	AT	RR		DAIM-V13
											BT	CS		
											FST	CS		
											PIT	RR		
2-4799-511	0.5	37-2	5F	SR	A	GA	SO	O	C	A	AT	RR		
											BT	OP		
2-4799-514	0.5	37-2	4F	SR	AC	CK	SA	O	C	A	AT	RR		DAIM-V21
											CT-1	RR		
2-4799-567	.25	37-2	8B	SR	C	CK	SA	O	C	A	CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-4799-569	.25	37-2	8B	SR	C	CK	SA	O	C	A	CT-1	OP		
2-4799-570	.25	37-2	8B	SR	C	CK	SA	O	C	A	CT-1	OP		
2-5425	1.5	43-1	8B	SR	C	RV	SA	C	O	A	CT-2	RR		
2-5741A	48	269	1A	SR	B	BTF	AO	O	C	A	BT	OP		
2-5741B	48	269	1A	SR	B	BTF	AO	O	C	A	BT	OP		
2-5742A	48	269	0B	SR	B	BTF	AO	O	C	A	BT	OP		
2-5742B	48	269	0B	SR	B	BTF	AO	O	C	A	BT	OP		
2-7503	18	49	2B	SR	B	BTF	MO	O	O/C	A	BT	OP		
											PIT	RR		
2-8501-1A	0.5	25	2E	SR	A	CV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-8501-1B	0.5	25	2E	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-8501-3A	0.5	25	4D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-8501-3B	0.5	25	4D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-8526	.75	25	8D	SR	C	RV	SA	C	O	A	CT-2	RR		
2-8541-5A	0.5	25	3D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-8541-5B	0.5	25	3D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-8941-709	0.5	1234-1	5E	SR	B	GA	AO	C	O	A	BT	OP		
2-8941-710	0.5	1234-1	5D	SR	B	GA	AO	C	O	A	BT	OP		
2-9205A	0.5	25	3D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-9205B	0.5	25	3D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-9206A	0.5	25	4D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-9206B	0.5	25	4D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-9207A	0.5	25	6D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2-9207B	0.5	25	6D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-9208A	0.5	25	6D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2-9208B	0.5	25	6D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
2/3-5741-55	10	3121	5C	SR	B	BTF	AO	O	C	A	BT	OP		
											FST	OP		
											PIT	OP		
2/3-5741-56	10	3121	5C	SR	B	BTF	AO	O	C	A	BT	OP		
											FST	OP		
											PIT	OP		
2/3-5741-57	10	3121	6B	SR	B	BTF	AO	O	C	A	BT	OP		
											FST	OP		
											PIT	OP		
2/3-5741-58	10	3121	7C	SR	B	BTF	AO	C	O	A	BT	OP		
											FST	OP		
											PIT	OP		
2/3-7505A	24	49	3A	SR	B	BTF	MO	C	O	A	BT	OP		
											PIT	RR		
2/3-7505B	24	49	3A	SR	B	BTF	MO	C	O	A	BT	OP		
											PIT	RR		
2/3-7507A	24	49	9C	SR	B	BTF	MO	C	O	A	BT	OP		
											PIT	RR		
2/3-7507B	24	49	9A	SR	B	BTF	MO	C	O	A	BT	OP		
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
2/3-7510A	24	49	9C	SR	B	BTF	MO	O	O	P	N/A			
2/3-7510B	24	49	9A	SR	B	BTF	MO	O	O	P	N/A			
3-0220-105A	8	356	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
3-0220-105B	8	356	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
3-0220-105C	8	356	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
3-0220-105D	8	356	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
3-0220-105E	8	356	5E	SR	C	CK	SA	C	O/C	A	CT-1	RR		DAIM-V16
3-0220-83A	0.5	345-2	7F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
3-0220-83B	0.5	345-2	7F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
3-0220-83C	0.5	345-2	7F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
3-0220-83D	0.5	345-2	7F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0220-84A	0.5	345-1	3F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
3-0220-84B	0.5	345-1	3F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
3-0220-84C	0.5	345-1	3F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
3-0220-84D	0.5	345-1	3F	SR	C	CK	SA	O	C	A	CT-1	RR		DAIM-V17
3-0301-58A(RV)		365	F2	SR	C	RV	SA	C	O	A	CT-2	RR		
3-0301-58B(RV)		365	F5	SR	C	RV	SA	C	O	A	CT-2	RR		
3-0302-166A	1	365	F2	SR	C	CK	SA	C	O	A	CT-1	OP		
3-0302-166B	1	365	F6	SR	C	CK	SA	C	O	A	CT-1	OP		
3-0302-19A	0.5	365	7E	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
3-0302-19B	0.5	365	7E	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
3-0302-20A	0.5	365	8E	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0302-20B	0.5	365	8E	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
3-0305-117	0.5	365	0D	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
3-0305-118	0.5	365	0D	SR	B	TWV	SO	O	C	A	BT	RR		VR-P9
3-0399-524A	1	365	8D	SR	B	TWV	SO	O	C	A	BT	RR		VR-P8
3-0399-524B	1	365	8D	SR	B	TWV	SO	O	C	A	BT	RR		VR-P8
3-0399-525	1	365	8D	SR	B	CK	SA	C	O	A	CT-1	OP		
3-0399-548A	1	365	9C	SR	B	GA	SO	C	O	A	BT	RR		VR-P8
3-0399-548B	1	365	9C	SR	B	GA	SO	C	O	A	BT	RR		VR-P8
3-0399-549A	1	365	8E	SR	B	GA	SO	C	O	A	BT	RR		VR-P8
3-0399-549B	1	365	8E	SR	B	GA	SO	C	O	A	BT	RR		VR-P8
3-0733-1	0.5	367-2	1F	SR	A	BAL	SO	C	C	P	AT BT PIT	RR OP RR		DAIM-V8

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-0733-2	0.5	367-2	1F	SR	A	BAL	SO	C	C	P	AT	RR		DAIM-V8
											BT	OP		
											PIT	RR		
3-0733-3	0.5	367-2	1F	SR	A	BAL	SO	C	C	P	AT	RR		DAIM-V8
											BT	OP		
											PIT	RR		
3-0733-4	0.5	367-2	1F	SR	A	BAL	SO	C	C	P	AT	RR		DAIM-V8
											BT	OP		
											PIT	RR		
3-0733-5	0.5	367-2	1F	SR	A	BAL	SO	C	C	P	AT	RR		DAIM-V8
											BT	OP		
											PIT	RR		
3-0736-1	0.5	367-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
3-0736-2	0.5	367-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
3-0736-3	0.5	367-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
3-0736-4	0.5	367-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
3-0736-5	0.5	367-2	1F	SR	D	GA	EXP	O	C	A	DT	RR		
3-1501-19A	6	360-1	7B	SR	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1501-19B	6	360-1	2B	SR	A	GA	MO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1599-61	3	360-1	4D	SR	A	GA	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											PIT	RR		
											FST	OP		
3-1599-62	3	360-1	4D	SR	A	GA	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											PIT	RR		
											FST	OP		
3-1601-20A	20	356	8D	SR	A	BTF	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
3-1601-20B	20	356	8E	SR	A	BTF	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
3-1601-21	18	356	6C	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
3-1601-22	18	356	6C	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
3-1601-23	18	356	3B	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
3-1601-24	18	356	2B	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
3-1601-31A	20	356	9D	SR	AC	CK	SA	C	O/C	A	AT	RR		
											CT-1	OP		
3-1601-31B	20	356	9E	SR	AC	CK	SA	C	O/C	A	AT	RR		
											CT-1	OP		
3-1601-32A	18	356	3D	SR	AC	CK	SA	C	O/C	A	AT	RR		
											CT-1	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1601-32B	18	356	3D	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-32C	18	356	3D	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-32D	18	356	3E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-32E	18	356	3E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-32F	18	356	3E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-33A	18	356	7D	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-33B	18	356	7D	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-33C	18	356	7D	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-33D	18	356	7E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-33E	18	356	7E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		
3-1601-33F	18	356.	7E	SR	AC	CK	SA	C	O/C	A	AT CT-1	RR OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-1601-55	4	356	6B	SR	A	BTF	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
3-1601-56	18	356	6D	SR	A	BTF	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
3-1601-57	1.5	356	8D	SR	A	GL	MO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
3-1601-58	1.5	356	7D	SR	A	GL	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
3-1601-59	1.5	356	6D	SR	A	GL	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-1601-60	18	356	2E	SR	A	BTF	AO	C	C	P	AT	RR		DAIM-V1
											BT	OP		DAIM-V8
											FST	OP		
											PIT	RR		
3-1601-61	2	356	2E	SR	A	GA	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
3-1601-62	2	356	3B	SR	A	GL	AO	C	O/C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-1601-63	6	356	2A	SR	A	BTF	AO	C	O/C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
3-2001-106	3	369	7F	SR	A	GA	AO	O/C	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		
3-2001-6	3	369	3E	SR	A	GA	AO	O/C	C	A	AT	RR		DAIM-V1
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-2301-64	1	374	5A	SR	B	GL	AO	O	C	A	BT	OP		
3-2301-65	1	374	6A	SR	B	GL	AO	O	C	A	BT	OP		
3-2399-76A	1	374	8D	SR	C	CK	SA	C	O/C	A	CT-1	OP		
3-2399-76B	1	374	8D	SR	C	CK	SA	C	O/C	A	CT-1	OP		
3-2399-77A	1	374	8D	SR	C	CK	SA	C	O/C	A	CT-1	OP		
3-2399-77B	1	374	8D	SR	C	CK	SA	C	O/C	A	CT-1	OP		
3-2599-8	0.5	707-2	A8	SR	C	CK	SA	C	O	A	CT-1	OP		
3-4720	1	367-2	7C	SR	A	GA	AO	O	C	A	AT	RR		DAIM-V1
											BT	OP		
											FST	OP		
											PIT	RR		
3-4721	1	367-2	7C	SR	A	GA	AO	O	C	A	AT	RR		
											BT	OP		
											FST	OP		
											PIT	RR		
3-4722	1	367-2	2E	SR	A	GL	AO	O	C	A	AT	RR		DAIM-V13
											BT	CS		
											FST	CS		
											PIT	RR		
3-4799-511	0.5	367-2	5F	SR	A	GA	SO	O	C	A	AT	RR		
											BT	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-4799-514	0.5	367-2	4F	SR	AC	CK	SA	O	C	A	AT	RR		DAIM-V21
											CT-1	RR		
3-4799-567	.25	367-2	8B	SR	C	CK	SA	O	C	A	CT-1	OP		
3-4799-569	.25	367-2	8B	SR	C	CK	SA	O	C	A	CT-1	OP		
3-4799-570	.25	367-2	8B	SR	C	CK	SA	O	C	A	CT-1	OP		
3-5425	48	371-1	8B	SR	C	RV	SA	C	O	A	CT-2	RR		
3-5741A	48	529	1A	SR	B	BTF	AO	O	C	A	BT	OP		
3-5741B	48	529	1A	SR	B	BTF	AO	O	C	A	BT	OP		
3-5742A	48	529	OB	SR	B	BTF	AO	O	C	A	BT	OP		
3-5742B	48	529	OB	SR	B	BTF	AO	O	C	A	BT	OP		
3-7503	18	49	2A	SR	B	BTF	MO	O	O/C	A	BT	OP		
											PIT	RR		
3-8501-1A	0.5	356	2E	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-8501-1B	0.5	356	2E	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-8501-3A	0.5	356	4D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-8501-3B	0.5	356	4D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-8501-5A	0.5	356	3D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-8501-5B	0.5	356	3D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-8526	.75	356	8D	SR	C	RV	SA	C	O	A	CT-2	RR		
3-8941-101	0.5	1240	6C	SR	B	GA	AO	C	C	P	N/A			
3-8941-709	0.5	1239-1	5E	SR	B	GA	AO	C	O	A	BT	OP		
3-8941-710	0.5	1239-1	5D	SR	B	GA	AO	C	O	A	BT	OP		
3-9205A	0.5	356	3D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-9205B	0.5	356	3D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK; DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

SORTED BY: VALVE EPN

EPN	SIZE	PID	CORD	CLS	CAT	VALVE TYPE	ACT TYPE	NOR POS	STR DIR	A/P	TEST	TEST SCHED	REL REQ	REMARKS
3-9206A	0.5	356	4D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-9206B	0.5	356	4D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-9207A	0.5	356	6D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-9207B	0.5	356	6D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-9208A	0.5	356	6D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		
3-9208B	0.5	356	6D	SR	A	FCV	AO	O	C	A	AT	RR		
											BT	OP		
											PIT	RR		
											FST	OP		

TEST: AT-SEAT LEAKAGE TEST; BT-FULL STROKE EXERCISE; CT-1-CHECK VALVE EXERCISE; CT-2-RELIEF VALVE SETPOINT CHECK;
DT-EXPLOSIVE VALVE TEST; FST-FAIL SAFE TEST; PIT-POSITION INDICATOR CHECK.

TEST SCHED: OP-NORMAL OPERATION; CS-COLD SHUTDOWN; RR-REACTOR REFUELING.

DRESDEN ADDITIONAL INFORMATION/METHODOLOGY INDEX

IST PROGRAM REV 2 DAIM DESIGNATION	IST PROGRAM REV. 1 REL. REQ DESIGNATION	NRC APPROVAL DATE	DESCRIPTION
DAIM-V1	VR-16	9-16-87	VALVE TIMING FOR STROKE TIMES GREATER THAN 2 SECONDS
DAIM-V2	N/A	N/A	LIST OF PRESSURE ISOLATION VALVES
DAIM-V3	N/A	N/A	RUPTURE DISK TESTS
DAIM-V4	VR-22	9-16-87	CRD CHARGING WATER ACCUMULATOR CHECK VALVES, EXERCISE DURING RR
DAIM-V5	VR-1	9-16-87	RR VALVE, EXERCISE DURING COLD SHUTDOWN
DAIM-V6	VR-4	9-16-87	SBLC INJECTION CHECK VALVES, EXERCISE DURING REACTOR REFUELING
DAIM-V7	VR-5	9-16-87	REACTOR HD SPRAY INBOARD ISOLATION CHEC, EXERCISE DURING LEAK RATE TEST
DAIM-V8	N/A	N/A	TESTING OF PASSIVE VALVES
DAIM-V9	VR-7	9-16-87	RWCU & FW CHECK VALVES, EXERCISE DURING REACTOR REFUELING
DAIM-V10	VR-8	9-16-87	CS, LPCI & HPCI CHECK VALVES, EXERCISE COLD SHUTDOWN
DAIM-V11	VR-10	9-16-87	HPCI ISOLATION CHECK, EXERCISE DURING LEAK TEST
DAIM-V12	VR-13	9-16-87	FW CONTAINMENT ISOLATION CHEC, EXERCISE DURING REACTOR REFUELING
DAIM-V13	VR-19	9-16-87	INSTRUMENT AIR ISOLATION, EXERCISE DURING COLD SHUTDOWN
DAIM-V14	VR-21	9-16-87	HPCI CST TO TORUS CHECK VALVE, EXERCISE DURING DISASSEMBLE EVERY RR
DAIM-V15	VR-18	9-16-87	EXCESS FLOW CHECK ISOLATION VALVES, TESTED DURING PC SYSTEM PRESSURE TESTS DURING RR
DAIM-V16	N/A	N/A	MS ELECTROMATIC AND TARGET ROCK VALVES, EXERCISE DURING REACTOR REFUELING
DAIM-V17	N/A	N/A	MSIV AIR ACCUMULATOR CHECK VALVES, EXERCISE DURING REACTOR REFUELING
DAIM-V18	N/A	N/A	CAM ISOLATION VALVES, EXERCISE DURING REACTOR REFUELING
DAIM-V19	N/A	N/A	ACAD PRIMARY CONTAINMENT ISOLATION VALVES, EXERCISE DURING REACTOR REFUELING
DAIM-V20	N/A	N/A	RBCCW ISOLATION VALVES, EXERCISE DURING REACTOR REFUELING
DAIM-V21	VR-15	N/A	TIP CONTAINMENT ISOLATION VALVES, EXERCISE DURING REACTOR REFUELING
DAIM-V22	N/A	N/A	EXERCISE CHECK VALVES BY DISASSEMBLY
DAIM-V23	N/A	N/A	RBCCW CONTAINMENT ISOLATION VALVES, EXERCISE DURING COLD SHUTDOWN
DAIM-V24	N/A	N/A	MAIN STEAM ISOLATION VALVES, EXERCISE DURING COLD SHUTDOWN

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V1

1. Description

Valve timing alert ranges for valves with stroke times greater than 2 seconds.

2. Discussion

2.1. Most air operated (AO) and motor operated (MO) valves have maximum stroke times that are much longer than actual stroke times. For example, MO-1301-3, Isolation Condenser Condensate Return Isolation Valve, has a maximum acceptable stroke time of 30 seconds but typically strokes in about 2 seconds. Stroke times could increase moderately (less than 50%) over successive tests and not trigger any closer observations, thus not allowing detection and corrective action. Degradation in such valves could then be severe before corrective actions would be taken[1].

2.2. Errors have occurred with analyzing stroke times. Some valves with stroke times that have increased by over 50% from previous tests have not been placed in the Alert Range for closer observation and to allow detection and corrective action should further degradation occur. Providing a known Alert Range and Maximum Stroke Time, will eliminate these errors.

3. Alternative Valve Timing

3.1. In accordance with ASME Section XI IWA-2240, Dresden Nuclear Station has determined an alternative test method which is equivalent or superior to those of ASME Section XI, IWV-3413(c). Specifically, the test method provides for alternative valve timing, Reference Values, Alert Stroke Time and Maximum Stroke Time for the valves tested in the IST Program. A summary of the determination of these timed action ranges are provided below.

3.2. Valves that require timing have their reference values established after the first normally scheduled inservice testing of these valves. These valve timing Reference Values shall then be added to their respective surveillance procedure's data sheet for use.

[1]Institute of Nuclear Power Operations' (INPO) July 1987 Evaluation of Dresden Station. Page 37; Finding (TS.2-1).

3.2.1. Stroke time Reference Values are established during the first normally scheduled inservice testing of the specific valve. These reference values are used to determine the alert stroke time limits.

3.2.2. Maximum Stroke Times for the valves tested in the IST Program are determined by the Technical Specifications. If Maximum Stroke Times are not included in the Technical Specifications, then the FSAR and valve manufacturer will be researched to establish the maximum stroke time. If maximum stroke times are unavailable in these documents, then a calculation will be performed for the establishment of the maximum stroke time.

3.2.3. The Alert Stroke Time limit for each valve is determined as follows:

3.2.3.1. For valves with a reference value stroke time from 2 to 10 seconds, the Alert Stroke Time limit is equal to 1.5 times the reference value. If the Alert Stroke Time limit calculated this way exceeds the Maximum Stroke Time, then the Alert Stroke Time is equal to 1.2 times the reference value.

3.2.3.2. For valves with a reference value stroke time greater than 10 seconds, the Alert Stroke Time limit is equal to 1.25 times the reference value. If the Alert Stroke Time limit calculated this way exceeds the Maximum Stroke Time, then the Alert Stroke Time is equal to 1.15 times the reference value.

NOTE: In no case will the Alert Stroke Time Limit exceed the Maximum Stroke Time Limit.

4. Valve Stroke Time Measurement

4.1. Measurement of valve stroke times is from the initiation of switch movement to the previously illuminated light going off. This is referred to as "switch-to-light' valve timing.

AUTHORIZED NUCLEAR INSERVICE INSPECTOR CONCURRENCE

The alternative test method described in DAIM-V1 Section 3. is equivalent or superior to those of ASME Section XI IWV-3413, Power Operated Valves.

Kenneth R. Kilmer 5-6-88
Signature/Date

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V2

1. Description

1.1. This DAIM addresses and identifies Pressure Isolation Valves (PIVs). PIVs are defined for each interface as any two valves in series within the reactor coolant pressure boundary which separates the high pressure reactor coolant system (RCS) from an attached low pressure or low temperature system. These valves are normally closed during power operation.

1.2. All the PIVs are Category A Valves in the IST Program and receive Appendix J type leak tests.

1.3. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-1402-9A/10"	AC	CS	27/3C	Core Spray Inboard Check
2-1402-9B/10"	AC	"	27/4C	"
2-1402-25A/10"	AC	"	27/2C	Core Spray Outboard Injection
2-1402-25B/10"	AC	"	27/5C	"
2-1501-25A/14"	AC	LPCI	29-1/5B	LPCI Loop I Injection Check Valve
2-1501-25B/14"	AC	"	29-1/4B	LPCI Loop II Injection Check Valve
2-1501-22A/18"	A	"	29-1/7B	LPCI Injection Isolation
2-1511-22B/18"	A	"	29-1/3B	"
2-1001-1A/16"	A	SDC	32/9B	SDC Inlet Isolation
2-1001-1B/16"	A	"	32/9E	"
2-1001-2A/14"	A	"	32/8A	SDC Pump Suction Isolation
2-1001-2B/14"	A	"	32/8C	"
2-1001-2C/14"	A	"	32/8F	"
2-1001-5A/14"	A	"	32/1E	SDC Outlet Isolation
2-1001-5B/14"	A	"	32/2E	"
2-0220-44/0.75"	A	RECIRC	26-2/2E	Recirc Primary Sample Line Isolation
2-0220-45/0.75"	A	"	26-2/1E	"
3-1402-9A/10"	AC	CS	358/3C	Core Spray Inboard Check
3-1402-9B/10"	AC	"	358/4C	"
3-1402-25A/10"	AC	"	358/2C	Core Spray Outboard Injection
3-1402-25B/10"	AC	"	358/5C	"
3-1501-25A/14"	AC	LPCI	360-1/5B	Loop I Injection Check Valve
3-1501-25B/14"	AC	"	360-1/4B	Loop II Injection Check Valve

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
3-1501-22A/18"	A	"	360-1/3A	Injection Isolation
3-1501-22B/18"	A	"	360-1/7A	"
3-1001-1A/16"	A	SDC	363/9B	Inlet Isolation
3-1001-1B/16"	A	"	363/9E	"
3-1001-2A/14"	A	"	363/8A	Pump Suction Isolation
3-1001-2B/14"	A	"	363/8C	"
3-1001-2C/14"	A	"	363/8F	"
3-1001-5A/14"	A	"	363/1E	Outlet Isolation
3-1001-5B/14"	A	"	363/2E	"
3-0220-44/0.75"	A	RECIRC	357-2/2E	Primary Sample Line Isolation
3-0220-45/0.75"	A	"	357-2/1E	"

2. **Discussion**

2.1. All these valves, except 2-1402-9A, 2-1402-9B, 3-1402-9A and 3-1402-9B check valves, are also primary containment isolation (PCI) valves that are tested in accordance with 10 CFR 50 Appendix J, Dresden Technical Staff Surveillance Procedure DTS-1600-1, Local Leak Rate Testing of Primary Containment Isolation Valves. These PCI valves are tested using DTS 1600-1 every refueling outage (or at least once every two years) and after valve maintenance.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V3

1. Description

    1.1. Rupture Disk Tests.

    1.2. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-2301-68/16"	C	HPCI	51/7A	HPCI Turbine Exhaust
2-2301-69/16"	C	"	51/7A	"
3-2301-68/16"	C	"	374/7A	"
3-2301-69/16"	C	"	374/7A	"

2. Additional Information/Methodology

    2.1. These Rupture Disks are of a non-testable design and provide a vent path on high exhaust pressure from the High Pressure Coolant Injection turbine.

    2.2. ASME Section XI IWV-3620 Rupture Disk Tests, requires only rupture disks of testable design shall be tested. Because these rupture disks are of a non-testable design, no testing is required.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V4

I. Description

A. This is a revision of VR-22 that was inappropriately submitted as a relief request with the IST Program Revision 1.

B. This has been previously submitted to the NRC as VR-22 and received NRC comments in the Interim Safety Evaluation letter dated 9-16-87 as Enclosure items 2 and 3.

C. ASME Section XI IWV-3522, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

D. This DAIM provides documentation for exercising the listed components during Cold Shutdown.

E. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0305-115/.5"	C	CRD	34/OE	CRD Accumulator Backflow Check to Charging Water Line
3-0305-115/.5"	C	"	365/OE	"

II. Discussion

A. In order to verify closure of these valves, the control rod drive pump would need to be secured. In doing this, the seal purge water flow to the recirculation pump seals and cooling water to the control rod drive seals would be stopped and possible damage to these seals could result.

B. Therefore, these valves will be exercised during Cold Shutdown outages when the charging water header can be depressurized and Monitoring individual accumulator pressure and alarms will be performed to verify that the check valves have closed on reversed flow.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V5

I. Description

1.1. This is a revision of VR-1 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-1 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. This DAIM provides documentation for exercising the listed components during cold shutdown.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0202-5A/28"	B	Recirc	26-2/6D	Recirc Pump Discharge Valve
2-0202-5B/28"	B	"	26-2/3C	"
3-0202-5A/28"	B	"	357-2/6D	"
3-0202-5B/28"	B	"	357-2/3D	"

II. Discussion

2.1.. For Unit 2, the discharge valves cannot be full stroke tested during reactor operation because it would require a load drop (of approximately 400 megawatts) to a minimum recirculation pump speed of 28%. This is deemed impractical.

2.2. For Unit 3, the discharge valves cannot be full stroke tested during reactor operation because it would require a load drop to a minimum recirculation pump speed of 28% and insertion of control rods to achieve less than 80% Flow Control Line. The closure logic for these valves would result in the recirculation pump trip and would place the plant in an unwanted system/power transient, as well as in Technical Specifications LCO.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V5

2.3. The potential of operating the prohibited region of the power flow map [above 80% Flow Control Line (FCL) below 39% core flow] exists when one (1) recirculation pump is shut down. The low flow/high power region of the operating map typically exhibits less margin to stability than other regions. Instabilities result in LPRM and APRM Oscillations significantly greater than normal noise levels.

2.3.1 Reference Procedure DOP 202-10, Recirculation System Shutdown of One Pump

2.4. To place the plant in this potential condition is deemed not practical.

2.5. Therefore, these valves will be full stroke tested during cold shutdown conditions.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V6

1. Description

1.1. This is a rewrite of VR-4 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-4 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. This DAIM provides documentation for exercising the listed components during reactor refueling.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-1101-15/1.5"	AC	SBLC	33/3C	SBLC injection Check Valves
2-1101-16/1.5"	AC	"	33/4C	"
3-1101-15/1.5"	AC	"	364/3C	"
3-1101-16/1.5"	AC	"	364/4C	"

2. Discussion

2.1. Full stroke exercising of these valves can only be accomplished by using the standby liquid control pumps. Because the section of piping involved is a non-redundant section of the system, and Technical Specifications require system operability during reactor operation, testing cannot be completed on a 3-month basis.

2.2. Because sodium pentaborate is a neutron poison, it is imperative that there be a physical separation between the poison and the primary system. To attempt a full flow test during a cold shutdown period would required thorough system flushing and either removal or firing of one explosive valve. This work is beyond the scope of a normal cold shutdown period.

2.3. Therefore, these valves will be exercised during each reactor refueling outage in conjunction with the firing of one explosive squib valve, and then demineralized water will be injected into the reactor vessel at rated system flow.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V7

1. Description

1.1. This is a rewrite of VR-5 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-5 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. This DAIM provides documentation for exercising the listed components during reactor refueling.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-205-27/2.5"	AC	NB	26-1/5E	Inboard isolation function for the reactor head spray line
3-205-27/2.5"	AC	"	357-1/5E	"

2. Discussion

2.1. These valves are normally closed during both reactor operation and extended shutdown periods. The designated safety position of these valves is closed; however, reactor head spray could be used for injecting into the vessel, although credit for this feature is not taken. In accordance with ASME Section XI, these valves, which are normally closed and whose safety function is to be closed, are passive and require no exercising.

2.1.1. Dresden Station believes these valves should be exercised and will exercise them during reactor refueling outages.

2.1.2. To exercise these valves during operation would required injecting approximately 70°F water into a 545°F vessel with no thermal barrier. Dresden believes exercising during normal operation is not practical.

2.2. Therefore, these valves will be exercised and leak tested during reactor refueling.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V8

1. **Description**

1.1. This DAIM provides additional information of those valves that are Passive in the IST Program. In accordance with ASME Section XI TABLE IWV-3700-1, Inservice Test Requirements, passive valves are not required to be exercise tested.

1.2. Passive valves are those valves which are not required to change position (from normal operation position) to accomplish its safety-related function.

1.3. Component description:

1.3.1 Various valves which are identified in the valve list with this DAIM number in the remarks column.

2. **Discussion**

2.1. There are valves in the IST Program which are passive by definition and are not required to be tested by Code. These valves are required to be tested by Technical Specifications and are included in the IST Program.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V9

1. Description

1.1. This is a rewrite of VR-7 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-7 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. This DAIM provides documentation for exercising the listed components during reactor refueling.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-1201-158/8"	C	RWCU	30/5A	Backflow check into RWCU during HPCI injection
3-1201-158/8"	C	"	361/5A	"
2-0220-59/18"	C	Feedwater	14/2F	Backflow check into FW during HPCI injection
3-0220-59/18"	C	"	347/2F	"

2. Discussion

2.1. The FW check valves cannot be tested during either normal operation or cold shutdown conditions as the feedwater system is normally required to be operable to maintain reactor water inventory. The system would be available only during an extended cold shutdown period (i.e. two weeks). The system would then need to be drained to do the tests.

2.2. The RWCU check valves cannot be tested during normal operation, as the CU system is utilized to maintain reactor water chemistry. To test these valves at cold shutdown would necessitate an extended cold shutdown period. This is due to high dose rates in the area of the check valves, and due to the complex sytem draining operation that would be required.

2.3. During HPCI pump operability test, water is not injected into the vessel; hence, closure demonstration of these valves would not be performed during this test.

2.4. Therefore, these valves will be exercised during each reactor refueling outage.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V10

1. **Description**

1.1. This is a rewrite of VR-8 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-8 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. This DAIM provides documentation for exercising the listed components during cold shutdown.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-1402-9A/10"	AC	CS	27/3C	Core Spray injection check
2-1402-9B/10"	AC	"	27/4C	"
3-1402-9A/10"	AC	"	358/3C	Core Spray injection check
3-1402-9B/10"	AC	"	358/4C	"
2-1501-25A/14"	AC	LPCI	29-1/5B	LPCI injection check
2-1501-25B/14"	AC	"	29-1/4B	"
3-1501-25A/14"	AC	"	360-1/4B	LPCI injection check
3-1501-25B/14"	AC	"	360-1/4B	"
2-2301-7/14"	AC	HPCI	51/6E	HPCI injection check
3-2301-7/14"	AC	HPCI	374/6E	"

2. **Discussion**

2.1. During normal plant operation, the high differential pressure across the seats of the CS and LPCI valves prohibits the stroking of these valves. Additionally, for CS and LPCI valves, the reactor pressure is too high for the system and injection into the reactor is not possible.

2.2. HPCI injection during operation would require the injection of cold water into the vessel and would result in an unwanted cold water transient.

2.3. Therefore, these valves will be exercised during cold shutdown.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V11

1. **Description**

1.1. This is a rewrite of VR-10 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-10 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. This DAIM provides documentation for exercising the listed components during cold shutdown.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-2301-34/2"	AC	HPCI	51/8D	HPCI Steam Exhaust Drain to Torus Check
3-2301-34/2"	AC	"	374/8D	"
2-2301-45/24"	AC	"	51/8B	HPCI Steam Exhaust to Torus Check
3-2301-45/24"	AC	"	374/8B	"
2-2301-71/2"	AC	"	51/8D	HPCI Steam Exhaust Stop Check to Torus
2-2301-74/12"	AC	"	51/8C	HPCI Steam Exhaust to Torus Check
3-2301-71/2"	AC	"	374/8D	HPCI Steam Exhaust Stop Check to Torus
3-2301-74/12"	AC	"	374/8C	HPCI Steam Exhaust to Torus Check

2. **Discussion**

2.1. These valves have a safety function in the open direction for proper operation of the HPCI system and they also have a safety function in the closed direction for primary containment isolation.

2.2. These valves are considered to be open as demonstrated during HPCI surveillance tests. To verify closure, as is required for containment isolation, these valves will be tested during the leakage test requirements of Category A testing.

2.3. Verification that these valves are closed is not readily possible during normal operation. These valves open when operating the HPCI Turbine. Verification of closure would require manual exercising of the stop checks which would require securing the HPCI Turbine. This is not considered to be a safe practice and would require Dresden to enter a Limiting Condition of Operation with the HPCI system inoperable.

2.4. Therefore, these valves will be exercised during reactor refueling.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V12

1. Description

1.1. This is a rewrite of VR-13 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-13 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. This DAIM provides documentation for exercising the listed components during reactor refueling.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0220-58A/18"	AC	FW	14/4E	Feedwater Check Valves
2-0220-58B/18"	AC	"	14/4F	"
2-0220-62A/18"	AC	"	14/3E	"
2-0220-62B/18"	AC	"	14/3F	"
3-0220-58A/18"	AC	"	347/4E	"
3-0220-58B/18"	AC	"	347/4F	"
3-0220-62A/18"	AC	"	347/3E	"
3-0220-62B/18"	AC	"	347/3F	"

2. Discussion

2.1. These check valves cannot be tested for operability during reactor operation because the feedwater system is needed to maintain primary coolant inventory. It is impractical to test these valves during cold shutdown periods (except for extended shut downs) as the feedwater system is needed to be operable to maintain reactor water inventory. Additionally, due to the design of these valves, verification that these valves full stroke closed requires a leak rate test be performed. Since leak testing is performed only during refueling outages, these valves will be demonstrated to be in the full closed position during each refueling outage.

2.2. Therefore, these valves will be exercised during each reactor refueling outage.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V13

1. Description

1.1. This is a rewrite of VR-19 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-19 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. ASME Section XI IWV-3415, Fail-Safe Valves, states in part "When practical, valves with fail-safe actuators shall be tested by observing the opertion of the valves upon loss of actuator power. If these valves cannot be tested once every 3 months, they shall be tested during each cold shutdown;"

1.5. This DAIM provides documentation for exercising and fail-safe testing the listed components during Cold Shutdown.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-4722/1"	A	Inst.Air	37-2/2E	Instrument Air Containment Isolation (drywell pneumatic)
3-4722/1"	A	Inst.Air	367-2/7C	"

2. Discussion

2.1. Exercising and fail-safe testing of these valves during reactor operation could place the plant in an unsafe condition. These valves provide the containment isolation function for the drywell pneumatic system which supplies various fail safe valves, including the MSIV's. Testing of these pneumatic valves could cause the fail-safe valves to exercise. The resultant exercising of the MSIV's could place the plant in an unsafe mode of operation causing transient conditions which would result in a reactor scram and loss of the primary heat sink.

2.2. Therefore, these valves will be exercised and fail-safe tested during cold shutdown periods.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V14

1. Description

1.1. This is a revision of VR-21 that was submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-21 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3522, Exercising Procedure, (check valves).

1.4. This DAIM provides documentation for:

1.4.1. Exercising the listed components during reactor refueling.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-2301-39/16"	C	HPCI	51/8E	HPCI Suction, Torus backflow check
3-2301-39/16"	C	HPCI	374/8E	HPCI Suction Torus backflow check

2. Discussion

2.1. These valves are normally closed and are designed to prevent backflow into the suppression pool in the event of a pump suction shift from the condensate storage tank (CST) to the suppression pool. The safety related stroke direction of the valve is in the open direction, this to provide suction flow to the HPCI pump.

2.2. To exercise this valve requires the HPCI pump suction to use water from the suppression pool (torus). The system test circuit utilizes the CST as the pump suction rather than the suppression pool. The suppression pool is not used as the pump suction for testing because the system test loop is not designed to recirculate water from torus to torus.

2.3. Upon preliminary review of the system design, it is believed that proper exercising of these valves may require demonstration by disassembly. Whether exercised by disassembly or flow, the schedule will be every refueling outage.

2.4. Therefore, these valves will be exercised every refueling outage.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V15

1. Description

1.1. This is a rewrite of VR-18 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-18 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3522, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns".

1.4. This DAIM provides documentation for exercising the listed components during reactor refueling.

1.5. Component description:

1.5.1. All Excess Flow Check (XFC) valves as listed in the IST Program.

2. Discussion

2.1. These are reactor process instrument line excess flow check valves that are tested in accordance with Technical Specification 4.7.D.1.B. requirements which consist of a leakage test conducted every reactor refueling outage. The testing involves uncoupling the instrument lines and verifying that each valve strokes to the closed position. The test also verifies that the valve limits flow to an acceptable level. These excess flow check valves are designed to automatically close in the event of a down stream line rupture. Valving operations and instrument line disconnections during the performance of the inservice testing can result in emergency core cooling system initiation or other automatic actuations during the time the vessel is pressurized. This would result in uncontrolled rapid vessel pressure transients and/or other undesirable consequences. The optimum time for the inservice testing of these valves is during reactor refueling.

2.2. Therefore, these valves will be exercised during reactor refueling in accordance with Technical Specification 4.7.D.1.B.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V16

1. **Description**

1.1. ASME Section XI IWV-3522, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.2. This DAIM provides documentation for exercising the listed components during Reactor Refueling.

1.3. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0220-105A/8"	C	MAIN STEAM	25/5E	Main Steam Relief Valve Discharge Piping Vacuum Breaker Check Valves
2-0220-105B/8"	C	"	25/5E	"
2-0220-105C/8"	C	"	25/5E	"
2-0220-105D/8"	C	"	25/5E	"
2-0220-105E/8"	C	"	25/5E	"
3-0220-105A/8"	C	"	356/5E	"
3-0220-105B/8"	C	"	356/5E	"
3-0220-105C/8"	C	"	356/5E	"
3-0220-105D/8"	C	"	356/5E	"
3-0220-105E/8"	C	"	356/5E	"

2. **Discussion**

2.1. These valves provide vacuum relief on the main steam electomatic and target rock relief valve piping to the torus. They are normally closed and are required to open on vacuum after steam, which has been blown down to the torus, is condensing.

2.2. To exercise these valves would require de-inerting and entering the Drywell and manually exercising the valves. This is considered to be impractical during normal operation.

2.3. Therefore, these valves will be exercised during Reactor Refueling.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V17

1. Description

1.1. ASME Section XI IWV-3522, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.2. This DAIM provides documentation for exercising the listed components during Reactor Refueling.

1.3. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0220-84A/.5	C	MAIN STEAM	12-1/3F	MSIV Air Accumulator Check Valve
2-0220-84B/.5	C	"	12-1/3F	"
2-0220-84C/.5	C	"	12-1/3F	"
2-0220-84D/.5	C	"	12-1/3F	"
2-0220-85A/.5	C	"	12-2/7F	"
2-0220-85B/.5	C	"	12-2/7F	"
2-0220-85C/.5	C	"	12-2/7F	"
2-0220-85D/.5	C	"	12-2/7F	"
3-0220-83A/.5	C	"	345-2/7F	"
3-0220-83B/.5	C	"	345-2/7F	"
3-0220-83C/.5	C	"	345-2/7F	"
3-0220-83D/.5	C	"	345-2/7F	"
3-0220-84A/.5	C	"	345-1/3F	"
3-0220-84B/.5	C	"	345-1/7F	"
3-0220-84C/.5	C	"	345-1/3F	"
3-0220-84D/.5	C	"	345-1/3F	"

2. Discussion

2.1. These valves are normally open and are required to close upon loss of the pneumatic system to the MSIV air accumulators. To verify closure would require securing the pneumatic system and could cause the MSIV's to close. This would place the plant in an unsafe mode of operation causing transient conditions which would result in a reactor scram, and loss of the primary heat sink.

2.2. Therefore, these valves will be exercised during Reactor Refueling.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V18

1. Description

1.1. ASME Section XI IWV-3522, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.2. This DAIM provides documentation for exercising the listed components during Reactor Refueling.

1.3. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-2499-28A/0.5"	AC	CAM	706-1/7C	Containment Air Monitor System Containment Isolation
2-2499-28B/0.5"	AC	"	706-1/2C	"
3-2499-28A/0.5"	AC	"	706-2/7C	"
3-2499-28B/0.5"	AC	"	706-2/7C	"

2. Discussion

2.1. These valves are normally open and are required to close for containment isolation, additionally they are required to be open for proper operation of the containment atmosphere monitor system. To verify closure would require securing the system, and disconnecting the line and air back pressurizing. This would violate primary containment during operation. Verification of closure is performed during reactor refueling leak testing.

2.2. Therefore, these valves will be exercised during Reactor Refueling.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V19

1. Description

1.1. ASME Section XI IWV-3522, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.2. This DAIM provides documentation for exercising the listed components during Reactor Refueling.

1.3. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-2599-23A/1	AC	ACAD	707-1/6C	Primary Containment Isolation Valve
2-2599-23B/1	AC	"	707-1/3C	"
2-2599-24A/1	AC	"	707-1/6C	"
2-2599-24B/1	AC	"	707-1/3C	"
3-2599-23A/1	AC	"	707-2/6C	"
3-2599-23B/1	AC	"	707-2/3C	"
3-2599-24A/1	AC	"	707-2/6C	"
3-2599-24B/1	AC	"	707-2/3C	"

2. Discussion

2.1. These valves are normally closed and are required to close for containment isolation, additionally they are required to open for proper operation of the atmospheric containment atmosphere dilution system. These valves could be exercised open every quarter; however, to verify closure would require securing the system, and disconnecting the line and air back pressurizing. The preferred position of these valves is in the closed position for primary containment isolation. Verification of open and close is performed during reactor refueling.

2.2. Therefore, these valves will be exercised during Reactor Refueling.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V20

1. Description

1.1. ASME Section XI IWV-3522, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.2. This DAIM provides documentation for exercising the listed components during Reactor Refueling.

1.3. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-3769-500/6"	AC	RBCCW	20/3B	Isolation Valve
3-3769-500/6"	AC	"	253/3B	"

2. Discussion

2.1. These valves are normally open during reactor operations and their designated safety position is closed. Exercising these valves closed would shut off the water supply to the drywell coolers and recirculation pump seals and consequently is not practical during Reactor Power.

2.2. These valves will be exercised during Reactor Refueling when recirculation water is secured.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V21

1. Description

1.1. This is a rewrite of VR-15 that was inappropriately submitted as a relief request with the IST Program Revision 1.

1.2. This has been approved by the NRC as VR-8 per the Interim Safety Evaluation letter dated 9-16-87.

1.3. ASME Section XI IWV-3522, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.4. This DAIM provides documentation for exercising the listed components during Reactor Refueling.

1.5. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-4799-514/0.5"	AC	TIP	37-2/4F	TIP Nitrogen Purge Containment Isolation
3-4799-514/0.5"	AC	"	367-2/4F	"

2. Discussion

2.1. These valves are normally open and are required to close for containment isolation. These check valves are required to be open during opertion to maintain a constant nitrogen purge. Exercising of these valves requires disconnecting the line downstream of the valves and applying external pressure to back seat the valves. This is performed during the reactor refueling leak testing. To secure the TIP system during operation in order to exercise these valves is not considered practical, and would result in violating primary containment.

2.2. Therefore, these valves will be exercised during Reactor Refueling.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V22

1. **Description**

1.1. ASME Section XI IWV-3522, Exercising Procedure, describes the exercising test procedures for Category C valves.

1.2. This DAIM provides documentation for:

1.2.1. Alternative testing to the referenced ASME exercising procedure.

1.3. Component description:

1.3.1 Any check valve as identified in the IST Program.

2. **Discussion**

2.1. ASME Section XI provides for exercising of valves which have been Categorized as A, B, or C valves. There are certain valves which cannot be effectively exercised using the standard ASME test procedures. As an alternative to the ASME exercising procedures, Dresden is providing the following alternative valve exercising methodology. This methodology essentially verifies operability by disassembly.

3. **Alternative Valve Exercising**

3.1. In accordance with ASME Section XI IWA-2240, Alternative Examinations, Dresden Nuclear Station has determined an alternative test method which is equivalent or superior to those of ASME Section XI IWV-3522. Specifically, the alternative valve exercising provides for the valve to be disassembled and a visual examination performed to verify that the disassembled valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

3.2. When there are several valves to be tested, Dresden may institute a sample disassembly program to inspect those valves that cannot be full stroke exercised any other way.

3.2.1 The valve disassembly program utilizes a manual full-stroke of one disk to verify check valve full-stroke capacity.

3.2.2 The sampling technique that Dresden uses, requires that one valve from a valve grouping be disassembled at each refueling outage. At subsequent refueling outages, a different valve in the group should be inspected. A valve group is defined as a valve of the same design (manufacturer, size, model number and materials of construction) and having the same service conditions.

3.2.3 Upon valve disassembly, a visual examination is performed to verify that the disassembled valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

3.2.4 If it is found that a disassembled valve's full stroke capability is inadequate to fulfill its safety related function, the valve is declared inoperative and a root cause analysis should be performed and valves within the group having the possibility of a similar discrepancy shall be inspected.

AUTHORIZED NUCLEAR INSERVICE INSPECTOR CONCURRENCE

The alternative valve exercising method described in DAIM-V25 Section 3. is equivalent or superior to those of ASME Section XI IWV-3522, Exercising Procedure.

Kenneth R. Kilmer 5-6-88
Signature/Date

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V23

1. Description

1.1. ASME Section XI IWV-3412, Exercising Procedure, states in part "Valves that cannot be exercised during plant operation shall be specifically identified by the Owner and shall be full-stroke exercised during cold shutdowns."

1.2. This DAIM provides documentation for exercising the listed components during Cold Shutdown.

1.3. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-3702/6	A	RBCCW	20/3B	Reactor Building Containment Isolation
2-3703/6	A	"	20/1B	"
2-3706/6	A	"	20/1B	"
3-3702/6	A	"	20/1B	"
3-3703/6	A	"	20/1B	"
3-3706/6	A	"	20/1B	"

2. Discussion

2.1. These valves are normally open and are required to close for containment isolation. They provide primary containment isolation for the reactor building cooling water system. To exercise these valves to the closed position would require both recirculation pumps to be out of service, this is because the recirculation pumps require seal purge for operation. This action is considered impractical during normal operation.

2.2. Therefore, these valves will be exercised during Cold Shutdown.

ADDITIONAL INFORMATION/METHODOLOGY DAIM-V24

1. Description

1.1. ASME Section XI IWV-3415, Fail-Safe Valves, states in part "When practical, valves with fail-safe actuators shall be tested by observing the opertion of the valves upon loss of actuator power. If these valves cannot be tested once every 3 months, they shall be tested during each cold shutdown:"

1.2. This DAIM provides documentation for fail-safe testing the listed components during Cold Shutdown.

1.3. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0203-1A/20"	A	MAIN STEAM	12-1/4E	Main Steam Isolation Valves
2-0203-1B/20"	A	MAIN STEAM	12-1/4D	"
2-0203-1C/20"	A	MAIN STEAM	12-1/4C	"
2-0203-1D/20"	A	MAIN STEAM	12-1/4B	"
2-0203-2A/20"	A	MAIN STEAM	12-2/7F	"
2-0203-2B/20"	A	MAIN STEAM	12-2/7E	"
2-0203-2C/20"	A	MAIN STEAM	12-2/7D	"
2-0203-2D/20"	A	MAIN STEAM	12-2/7C	"
3-0203-1A/20"	A	MAIN STEAM	345-1/4E	"
3-0203-1B/20"	A	MAIN STEAM	345-1/4D	"
3-0203-1C/20"	A	MAIN STEAM	345-1/4C	"
3-0203-1D/20"	A	MAIN STEAM	345-1/4B	"
3-0203-2A/20"	A	MAIN STEAM	345-2/7F	"
3-0203-2B/20"	A	MAIN STEAM	345-2/7E	"
3-0203-2C/20"	A	MAIN STEAM	345-2/7D	"
3-0203-2D/20"	A	MAIN STEAM	345-2/7C	"

2. Discussion

2.1. These valves are normally open and are required to close for containment isolation. They provide primary containment isolation for the main steam system. These valves are air operated open and air to close with spring assist. To completely fail-safe exercise these valves to the closed position, the air lines to the valves must be disconnected. Thus, with the loss of air, the fail-safe mechanism (springs) would be demonstrated. The resultant exercising of the MSIV's could place the plant in an unsafe mode of operation causing transient conditions which would result in a reactor scram.

2.2. Therefore, these valves will be exercised during Cold Shutdown.

DRESDEN VALVES RELIEF REQUEST INDEX

IST PROGRAM REV 2 REL. REQ DESIGNATION	IST PROGRAM REV 1 REL. REQ DESIGNATION	NRC APPROVAL DATE	DESCRIPTION
VR-A1	VR-2	9-16-87	CRD SCRAM VALVES, EXERCISE DURING COLD SHUTDOWN AND RELIEF ON TIMING
VR-A2	VR-18	9-16-87	SAFETY VALVES, RELIEF FROM CODE ADDITIONAL TESTS
VR-A3	VR-11	9-16-87	TARGET ROCK AND RELIEF VALVES, EXERCISE ONCE PER CYCLE AND RELIEF ON TIMING
VR-A4	VR-12	9-16-87	TARGET ROCK AND RELIEF VALVES, RELIEF FROM PRESSURE SETPOINT
VR-P5	N/A	PENDING	RELIEF FROM VALVE TIMING TOLERANCE OF S79 USE W81
VR-A6	VR-20	9-16-87	PC ISOLATION VALVES, LEAK TESTED PER 10CFR50 APPENDIX J.
VR-P7	N/A	PENDING	VALVE TESTING DURING COLD SHUTDOWN AND REACTOR REFUELING
VR-P8	N/A	PENDING	CRD ARI/ATWS AIR HEADER BLEED VALVES, RELIEF FROM VALVE TIMING
VR-P9	N/A	PENDING	CRD BACKUP SCRAM AND SCRAM DUMP VALVES, RELIEF FROM VALVE TIMING
VR-P10	N/A	PENDING	TARGET ROCK SAFETY-RELIEF VALVES, RELIEF FROM AS-FOUND TESTING

RELIEF REQUEST NUMBERS FORMAT:

Relief Request No.	Description

VR-A1

This is a sequencial number given to a Valve relief request.

D - NRC approval has been Denied
A - Written NRC approval has been Granted
P - The Relief Request is Pending NRC approval

VR - Signifies it is a Valve Relief Request.

RELIEF REQUEST NO. VR-A1

1. Description

1.1. Relief from Code timing and information on valve exercising frequency in accordance with Technical Specification frequency.

1.2. This relief request has been previously approved by the NRC as VR-2 per the Interim Safety Evaluation letter dated 9-16-87.

2. AFFECTED COMPONENT(S)

2.1 Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0305-126/.5"	B	CRD	34/0D	CRD Scram Inlet Valve
2-0305-127/.5"	B	"	34/9D	CRD Scram Outlet Valve
2-0305-114/.5"	C	"	34/9D	CRD Scram Outlet Check.
3-0305-126/.5"	B	"	365/0E	CRD Scram Inlet Valve
3-0305-127/.5"	B	"	365/9D	CRD Scram Outlet Valve
3-0305-114/.5"	C	"	365/9D	CRD Scram Outlet Check

There are 177 of each of the valve numbers listed. One for each of the CRD Hydraulic Control Units (HCU).

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0305-117/.5"	B	CRD	34/10D	CRD Scram Pilot Valve
2-0305-118/.5"	B	"	34/10D	"
3-0305-117/.5"	B	"	365/10D	"
3-0305-118/.5"	B	"	365/10D	"

3. ASME SECTION XI (S79) TEST REQUIREMENTS(S)

3.1. IWV-3411 Test Frequency

3.2. IWV-3413 Power Operated Valves

3.3. IWV-3522 Exercising Procedure

4. BASIS FOR RELIEF

4.1. To exercise these valves requires scramming the individual CRD's.

4.2. The proper operation of each of the valves is demonstrated by the Technical Specification required scram testing. To exercise these valves more than the current Technical Specification requirements is not practical.

4.3. These valves are exercised and each individual control rod drive scram insertion is timed and must meet specific time increments as stated in the Technical Specifications. This individual rod timing ensures that the valves function properly.

5. ALTERNATIVE TEST

5.1. Individual scram insertion times and subsequent valve exercising will be performed per the Technical Specification requirements. The required frequency is as follows:

5.1.1. After each refueling outage, prior to operation greater than 30 percent of rated thermal power, all control rods shall be subject to scram-time tests from the fully withdrawn position with reactor pressure above 800 psig; and

5.1.2. At 16-week intervals, 50% of the control rod drives shall be tested so that every 32 weeks, all the control rods shall have been tested.

RELIEF REQUEST NO. VR-A2

1. Description

1.1. Relief from Code Safety Valve test sample expansion.

1.2. This relief request is rewritten here and has been previously approved by the NRC as VR-24 per the Interim Safety Evaluation letter dated 9-16-87.

2. AFFECTED COMPONENT(S)

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0203-4A/6"	C	MS	12-1/8E	Main Steam Safety
2-0203-4B/6"	C	MS	12-1/8E	"
2-0203-4C/6"	C	MS	12-1/8D	"
2-0203-4D/6"	C	MS	12-1/8D	"
2-0203-4E/6"	C	MS	12-1/8C	"
2-0203-4F/6"	C	MS	12-1/8C	"
2-0203-4G/6"	C	MS	12-1/8B	"
2-0203-4H/6"	C	MS	12-1/8B	"
3-0203-4A/6"	C	MS	345-1/8E	"
3-0203-4B/6"	C	MS	345-1/8E	"
3-0203-4C/6"	C	MS	345-1/8D	"
3-0203-4D/6"	C	MS	345-1/8D	"
3-0203-4E/6"	C	MS	345-1/8C	"
3-0203-4F/6"	C	MS	345-1/8C	"
3-0203-4G/6"	C	MS	345-1/8B	"
3-0203-4H/6"	C	MS	345-1/8B	"

3. ASME Section XI (S79) Test Requirement(s)

3.1. IWV-3511 Test Frequency

3.2. IWV-3513 Additional Tests

4. Basis For Relief

4.1. Dresden Technical Specification Surveillance Requirement 4.6.E. provides that a minimum of ½ of all safety valves shall be bench checked or replaced with a bench checked valve each refueling outage. ASME requires that N/60 x Total No. of safety relief valves be tested, where N is the number of months between outages.

4.1.1. Dresden's existing program replaces ½ of 8 valves or 4 valves per outage per unit. Every other outage or every 36 months, all of the valves will have been tested or replaced with cleaned, rebuilt valves, which have verified set points.

4.1.2. ASME Section XI requires that 18/60 X 8 or 2.4 valves be tested per outage per unit. All valves will have been tested at least once every 60 months.

4.1.3. ASME Section XI requires a sample expansion testing program of an additional 2.4 valves (in Dresden's case) when any valve in a system fails to function properly during a regular test.

4.2. Dresden Station has reviewed the ASME Section XI IST sample expansion requirements and believes that the frequency of removal and maintenance of these valves on an accelerated basis provide adequate assurance that these valves will perform safely and reliably.

5. ALTERNATIVE TEST

5.1. Dresden Station will remove and replace with rebuilt safety valves every refueling outage, ½ of the total number of Main Steam safety valves. This means that all Main Steam safety valves will be replaced with rebuilt safety valves every other refueling outage or approximately every 36 months. Therefore, should any of the 4 removed valves fail as-found testing, no sample expansion will be performed.

RELIEF REQUEST NO. VR-A3

1. Description

1.1. Relief from Code timing and information on valve exercising during Cold Shutdown.

1.2. This relief request is a complete rewrite of a relief request which has been previously approved by the NRC as VR-11 per the Interim Safety Evaluation letter dated 9-16-87.

2. AFFECTED COMPONENT(S)

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0203-3A/6"	BC	MS	12-1/7F	Main Steam Target Rock ADS
2-0203-3B/6"	BC	MS	12-1/7E	Main Steam Electromatic Relief ADS
2-0203-3C/6"	BC	MS	12-1/7C	"
2-0203-3D/6"	BC	MS	12-1/7B	"
2-0203-3E/6"	BC	MS	12-1/6E	"
3-0203-3A/6"	BC	MS	345-1/7F	Main Steam Target Rock ADS
3-0203-3B/6"	BC	MS	345-1/7E	Main Steam Electromatic Relief ADS
3-0203-3C/6"	BC	MS	345-1/7C	"
3-0203-3D/6"	BC	MS	345-1/7B	"
3-0203-3E/6"	BC	MS	345-1/6E	"

3. ASME Section XI (S79) Test Requirement(s)

3.1. IWV-3411 Test Frequency

3.2. IWV-3412 Exercising Procedure

3.3. IWV-3413 Power Operated Valves

4. Basis For Relief

4.1. Valve Timing

4.1.1. Relief is requested for the timing requirement for these valves. These valves provide steam blowdown (relief) to the torus which is initiated either automatically or manually by the use of a key operated switch. Because of the ability to be manually operated, they are categorized as both "B" and "C" valves.

4.1.2. These valves are exercised once each operating cycle with the reactor at pressure. Each valve is manually opened and is verified open by a compensating turbine bypass valve or control valve closure. Consistent timing of this event for the purpose of determining the operational readiness of these valves is not considered practical.

4.2. Valve Exercising

4.2.1. The relief valve discharges at one location in the torus and should the valve remain open for longer than five minutes, there is a concern that the extended blowdown at a given point could overheat the water locally, resulting in the release of free steam. This can create localized problems with the interior coating.

4.2.2. Manually exercising these valves requires steam pressure behind the disk before cycling and thus must be performed with the reactor at pressure. Thus, the plant must be in an operating or startup condition with the required steam pressure in the main steam lines.

4.2.3. Additionally, under IST Category C safety valve and relief valve tests, all these valves are rebuilt every other outage or approximately 36 months. Dresden Station believes the combination of rebuilding (once every 36 months) and insitu exercising (once each operating cycle) adequately verifies the valves operational readiness.

5. Alternative Test

5.1. These valves will be full stroke exercised without timing at least once per operating cycle in accordance with Technical Specification 4.5.D.1.b.

RELIEF REQUEST NO. VR-A4

1. Description

1.1. Relief from Code relief valve set points.

1.2. This relief request has been previously approved by the NRC as VR-12 per the Interim Safety Evaluation letter dated 9-16-87.

2. AFFECTED COMPONENT(S)

2.1. Component description:

Unit-Valve No./ Size	IST CAT	System	P&ID/CORD	Function
2-0203-3A/6"	BC	MS	12-1/7F	Main Steam Target Rock ADS
2-0203-3B/6"	BC	MS	12-1/7E	Main Steam Electromatic Relief ADS
2-0203-3C/6"	BC	MS	12-1/7C	"
2-0203-3D/6"	BC	MS	12-1/7B	"
2-0203-3E/6"	BC	MS	12-1/6E	"
3-0203-3A/6"	BC	MS	345-1/7F	Main Steam Target Rock ADS
3-0203-3B/6"	BC	MS	345-1/7E	Main Steam Electromatic Relief ADS
3-0203-3C/6"	BC	MS	345-1/7C	"
3-0203-3D/6"	BC	MS	345-1/7B	"
3-0203-3E/6"	BC	MS	345-1/6E	"

3. ASME Section XI (S79) Test Requirement(s)

3.1. IWV-3512 Test Procedure

4. Basis For Relief

4.1. The electromatic relief valves and the relief function of the target rock valve are operated by actuation of a pilot solenoid valve which opens the main valve by creating differential pressure across the main disk. The pilot valve is actuated from an electric signal from either a control switch, the auto-depressurization logic, or a pressure switch that senses reactor system pressure.

4.2. The requirement of IWV-3512 to check relief and safety valve setpoints in accordance with ASME PTC-25.3-1976 is not applicable in this case because the set points are established by calibrating the pressure switch which senses system pressure. Therefore, relief is requested from compliance with this requirement.

4.3. The pressure setpoint of these valves is set by calibrating the pressure switch rather than testing the complete valve assembly. The combination of the pressure switch calibration and the exercising test for operability (BT) satisfies the intent of paragraph IWV-3512.

5. Alternative Test

5.1. The pressure switch for each of these valves will be calibrated to verify the correct setpoint and the exercise test in accordance with Technical Specification 4.5.D.1.b. will verify operability of the valve.

RELIEF REQUEST NO. VR-P5

1. Description

1.1. Valve Timing Tolerances for Valves with Maximum Allowable Stroke Times of 10 seconds and less.

2. Affected Component(s)

2.1. All Valve timing for power operated valves.

3. ASME Section XI (S79) Test Requirement(s)

3.1. IWV-3413 Power Operated Valves

(b) The stroke time of all power-operated valves shall be measured to the nearest second or 10% of the maximum allowable stroke time, whichever is less, whenever such a valve is full-stroke tested.

4. Basis For Relief

4.1. The NRC has evaluated and found acceptable later editions and addenda of ASME Section XI which provide a more practical approach to valve timing tolerances. Specifically, the same paragraph in the ASME Section XI 1980 Edition with Winter 1981 Addenda states:

IWV-3413 Power Operated Valves

(b) The stroke time of all power operated valves shall be measured to the nearest second, for stroke times 10 sec or less, or 10% of the specified limiting stroke time for full-stroke times longer than 10 sec whenever such a valve is full-stroke tested.

4.2. To record stroke times to the nearest 10% of the maximum stroke time does not measurably increase the assurance of the ability of valves to perform their intended function, but does increase the administration burden and probability for recording errors.

5. Alternative Test

5.1. The stroke time of all power operated valves shall be measured to the nearest second, for stroke times 10 sec or less, or 10% of the specified limiting stroke time for full-stroke times longer than 10 sec, whenever such a valve is full-stroke tested.

RELIEF REQUEST NO. VR-A6

1. Description

1.1. Relief from Code leak test requirements to do tests in accordance with 10CFR50 Appendix J.

1.2. This relief request has been previously approved by the NRC as VR-20 per the Interim Safety Evaluation letter dated 9-16-87.

2. AFFECTED COMPONENT(S)

2.1. Component description:

2.1.1. All Category A, Primary Containment Isolation valves.

3. ASME SECTION XI (S79) TEST REQUIREMENT(S)

3.1. IWV-3420 Valve Leak Rate Test

4. BASIS FOR RELIEF

4.1. Primary containment Category A isolation valves will be seat leak tested in accordance with the requirements of Technical Specification Sections 3.7 and 4.7 Containment System and Appendix J to 10 CFR 50.

4.2. The intent of IWV-3420 Valve Leak Rate Test is met by Appendix J requirements, and Appendix J type tests still give assurance of valve leak-tight integrity intended by the Code.

5. ALTERNATIVE TEST

5.1. Perform seat leakage testing in accordance with the requirements of Appendix J to 10 CFR 50, or as amended by Technical Specifications.

5.2. The seat leakage results of the primary containment isolation valves will be analyzed in accordance with Appendix J to 10 CFR 50, and Technical Specification Section 3.7 and 4.7.

5.3. Corrective action will be taken in accordance with the Technical Specifications.

RELIEF REQUEST NO. VR-P7

1. Description

1.1. This Relief Request provides additional information on Dresden's methodology for determining test frequencies when exercising valves to the position required to fulfill their safety-related function is not practical during plant operation.,

1.2. ASME Section XI permits valves to be exercised during cold shutdowns when it is not practical to exercise them during plant operations, provided these valves are specifically identified by the Owner. Where it has been determined that exercising valves during plant operations would be impractical, Dresden Station has identified them in specific Dresden Additional Information/Methodolgies (DAIM) which give explanations as to why exercising these valves during normal operation is impractical. Since Dresden Station is meeting the requirements of ASME Section XI, it is not necessary for the NRC to grant relief; however, there is sufficient variations on defining cold shutdowns that this definition and methodology of exercising valves during cold shutdown at Dresden Station is being submitted.

2. Affected Components

2.1. All valves in the IST Program which are not exercised quarterly.

3. ASME Section XI (S79) Test Requirements

3.1. IWV-3412 Exercising Procedure
3.2. IWV-3512 Exercising Procedure
3.3. IWV-3417 Corrective Action
3.4. IWV-3523 Corrective Action

4. Basis for Relief

4.1. Dresden Station maintains as closely as practical the quarterly exercising frequency as specified by ASME Code.

4.2. ASME Code permits valves to be exercised during cold shutdowns when exercising is not practical during plant operation.

RELIEF REQUEST NO. VR-P7

4.3. Dresden Station further differentiates, for valve inservice testing purposes, between COLD SHUTDOWN and REACTOR REFUELING. In order to be in the reactor refueling mode, the reactor and associated systems must be in cold shutdown (less than 212°F); however, when the plant is in cold shutdown, it may not necessarily be in reactor refueling. For this reason, Dresden has included reactor refueling as a subcategory to the ASME Code Cold Shutdown.

4.4. ASME Section XI, paragraphs IWV-3417 and IWV-3523 state the corrective actions to be taken when valves fail to exhibit a required change of disc position. These actions include requirements to take corrective action prior to plant startup should a failure occur during cold shutdown testing. Also stated are requirements to declare valves inoperable if corrective action is unsuccessful within a 24 hour period. These paragraphs do not take into account the plant Technical Specifications requirements for limiting conditions for opertion which state the minimum conditions necessary for safe operation of the plant. The failure of a particular valve may not necessarily require a plant shutdown or prevent a startup. In addition, valves not capable of performing their safety function are declared inoperable as soon as that condition has been verified, not after a 24 hour period has elapsed. For the above reasons, Dresden will evaluate the condition of each valve with respect to its safety function and take the appropriate corrective action as stated in the Technical Specification/ Limiting Condition for Operation.

RELIEF REQUEST NO. VR-P7

5. Alternative Test

5.1. The following describes Dresden's hierarchy of determining the valve exercising frequency and are listed in overall priority.

5.1.1. Valves shall be full stroke exercised during plant operation to the position(s) required to fulfill its intended safety-related function(s); OR

5.1.2. If full stroke exercising during plant operation is not practicable, then testing may be limited to part stroke during plant operation and full stroke during cold shutdowns; OR

5.1.3. If exercising is not practical during plant operation, then testing may be limited to full stroke exercising during cold shutdowns; OR

5.1.4. If exercising is not practicable during plant operation or cold shutdowns, then full stroke exercising may be performed during reactor refueling outages.

5.2. All valve testing required to be performed during a refueling outage shall be completed prior to returning the plant to operation.

5.3. Inservice valve testing at cold shutdown is defined as valve testing which commences not later than forty eight (48) hours after cold shutdown and continues until the required testing is complete or the plant is ready to return to power.

5.3.1. Completion of all valve testing identified for a cold shutdown frequency is not a prerequisite to return to power.

5.3.2. Any testing not completed during one cold shutdown should be performed during any subsequent cold shutdowns that may occur before refueling to as closely as possible meet the Code specified testing frequency.

5.3.3. For valves which require entry into the containment to perform the test, such valves will only be tested when the drywell is de-inerted.

RELIEF REQUEST NO. VR-P7

5.3.4. In the event that a valve must be declared inoperable as a result of cold shutdown testing, the applicable unit start-up limitations will be as stated in the Technical Specification, Limiting Conditions for Operations.

5.3.5. In the event that a valve stroke time enters the Alert Range for a valve scheduled to be tested only during cold shutdowns or reactor refueling outages, Dresden's policy is to normally take corrective action prior to unit startup. However, the Station has the option of retesting the subject valve during the next cold shutdown or reactor refueling outage.

RELIEF REQUEST NO. VR-P7

5. Alternative Test

5.1. The following describes Dresden's hierarchy of determining the valve exercising frequency and are listed in overall priority.

5.1.1. Valves shall be full stroke exercised during plant operation to the position(s) required to fulfill its intended safety-related function(s); OR

5.1.2. If full stroke exercising during plant operation is not practicable, then testing may be limited to part stroke during plant operation and full stroke during cold shutdowns; OR

5.1.3. If exercising is not practical during plant operation, then testing may be limited to full stroke exercising during cold shutdowns; OR

5.1.4. If exercising is not practicable during plant operation or cold shutdowns, then full stroke exercising may be performed during reactor refueling outages.

5.2. All valve testing required to be performed during a refueling outage shall be completed prior to returning the plant to operation.

5.3. Inservice valve testing at cold shutdown is defined as valve testing which commences not later than forty eight (48) hours after cold shutdown and continues until the required testing is complete or the plant is ready to return to power.

5.3.1. Completion of all valve testing identified for a cold shutdown frequency is not a prerequisite to return to power.

5.3.2. Any testing not completed during one cold shutdown should be performed during any subsequent cold shutdowns that may occur before refueling to as closely as possible meet the Code specified testing frequency.

5.3.3. For valves which require entry into the containment to perform the test, such valves will only be tested when the drywell is de-inerted.

RELIEF REQUEST NO. VR-P7

5.3.4. In the event that a valve must be declared inoperable as a result of cold shutdown testing, the applicable unit start-up limitations will be as stated in the Technical Specification, Limiting Conditions for Operations.

5.3.5. In the event that a valve stroke time enters the Alert Range for a valve scheduled to be tested only during cold shutdowns or reactor refueling outages, Dresden's policy is to normally take corrective action prior to unit startup. However, the Station has the option of retesting the subject valve during the next cold shutdown or reactor refueling outage.

RELIEF REQUEST NO. VR-P8

1. **Description**

   1.1. Relief from Code valve timing.

2. **AFFECTED COMPONENT(S)**

   2.1. Component description:

Unit-Pump No./ Size	IST CAT	System	P&ID/CORD	Function
2-0399-524A/1"	A	CRD	34/8D	CRD-ARI/ATWS Air Header Bleed Valve
2-0399-524B/1"	A	CRD	34/8D	"
2-0399-548A/1"	A	CRD	34/9C	"
2-0399-548B/1"	A	CRD	34/9C	"
2-0399-549A/1"	A	CRD	34/8E	"
2-0399-549B/1"	A	CRD	34/8E	"
2-0399-524A/1"	A	CRD	365/8D	"
2-0399-524B/1"	A	CRD	365/8D	"
2-0399-548A/1"	A	CRD	365/9C	"
2-0399-548B/1"	A	CRD	365/9C	"
2-0399-549A/1"	A	CRD	365/8E	"
2-0399-548B/1"	A	CRD	365/8E	"

3. **ASME SECTION XI (S79) TEST REQUIREMENT(S)**

   3.1. IWV-3413 Power Operated Valves

   3.2. IWV-3522 Exercising Procedure

4. **BASIS FOR RELIEF**

   4.1. These Valves are part of the alternate rod insertion/ anticipated transient without scram (ARI/ATWS) system. These solenoid operated valves provide an alternate method of relieving the CRD scram air header of air pressure so as to provide CRD insertion.

   4.2. Exercising these valves results in the insertion of all the control rod drives. This is not considered practical during normal operation.

   4.3. These 1/2" valves operate too rapidly and there is no position indication for any practical timing measurements. Their operational readiness and safety-related function are verified during Reactor Refueling. Additional testing for valve timing is considered impractical.

RELIEF REQUEST NO. VR-P8

5. ALTERNATIVE TEST

5.1. These valves will be exercised, without timing, and verify proper operation and venting during Cold Shutdown.

RELIEF REQUEST NO. VR-P9

1. Description

1.1. Relief from Code valve timing.

2. AFFECTED COMPONENT(S)

2.1. Component description:

Unit-Pump No./ Size	IST CAT	System	P&ID/CORD	Function
2-0302-19A/0.5"	A	CRD	34/7E	CRD Backup Scram Valve
2-0302-19B/0.5"	A	CRD	34/7E	"
2-0302-20A/0.5"	A	CRD	34/8E	CRD Scram Dump Valve
2-0302-20B/0.5"	A	CRD	34/8E	"
3-0302-19A/0.5"	A	CRD	365/7E	CRD Backup Scram Valve
3-0302-19B/0.5"	A	CRD	365/7E	"
3-0302-20A/0.5"	A	CRD	365/8E	CRD Scram Dump Valve
3-0302-20B/0.5"	A	CRD	365/8E	"

3. ASME SECTION XI (S79) TEST REQUIREMENT(S)

3.1. IWV-3413 Power Operated Valves

3.2. IWV-3522 Exercising Procedure

4. BASIS FOR RELIEF

4.1. Exercising these valves results in the insertion of all the control rod drives. This is not considered practical during normal operation.

4.2. These 1/2" valves operate too rapidly and there is no position indication for any practical timing measurements. Their operational readiness and safety-related function are verified during Reactor Refueling. Additional testing for valve timing is considered impractical.

5. ALTERNATIVE TEST

5.1. These valves will be exercised, without timing, and verify proper venting during Cold Shutdown.

RELIEF REQUEST NO. VR-P10

1. **Description**

   1.1. Relief from Code safety valve and relief valve testing in the as-found condition.

2. **AFFECTED COMPONENT(S)**

   2.1. Component description:

Unit-Pump No./ Size	IST CAT	System	P&ID/CORD	Function
2-0203-3A/6"	BC	MS	12-1/7F	Main Steam Target Rock ADS
3-0203-3A/6"	BC	MS	345-1/7F	"

3. **ASME SECTION XI (S79) TEST REQUIREMENT(S)**

   3.1. IWV-3512 Test Procedure

4. **BASIS FOR RELIEF**

   4.1. There is one main steam Target Rock Safety-relief valve on each unit. These valves have their pilot assembly replaced with a rebuilt and tested assembly every Reactor Refueling outage. The main valve body is replaced every other Reactor Refueling outage.

   4.2. To perform as-found testing of the one valve when the pilot assembly is being replaced with a rebuilt and tested assembly is impractical.

5. **ALTERNATIVE TEST**

   5.1. Therefore, these valves will have their pilot assembly replaced with a rebuilt and tested assembly every Reactor Refueling outage and the main valve body will be replaced every other Reactor Refueling outage.

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