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ACCESSION NBR: 8702200027 DDC. DATE: 87/02/11 NOTARIZED: NO DOCKET #  
 FACIL: 50-412 Beaver Valley Power Station, Unit 2, Duquesne Light C 05000412  
 AUTH. NAME AUTHOR AFFILIATION  
 CAREY, J. J. Duquesne Light Co.  
 RECIP. NAME RECIPIENT AFFILIATION  
 TAM, P. Division of Pressurized Water Reactor Licensing - A (post 8  
 DENTON, H. R. Office of Nuclear Reactor Regulation, Director (post 851125

SUBJECT: Forwards human engineering discrepancies contained in App A  
 of DCRDR supplemental summary rept, per R Eckenrode request.

DISTRIBUTION CODE: A003D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 91  
 TITLE: OR/Licensing Submittal: Suppl 1 to NUREG-0737(Generic Ltr 82-33)

NOTES: LPDR 2cys Transcripts. LPDR 2cys PDR Documents. 05000412  
 Application for permit renewal filed.

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|           | PWR-A EICSB               | 2 2                 | PWR-A FOB                 | 1 1                 |
|           | PWR-A PD2 LA              | 1 1                 | PWR-A PD2 PD              | 7 7                 |
|           | TAM, P                    | 1 1                 | PWR-A PSB                 | 1 1                 |
|           | PWR-A RSB                 | 1 1                 |                           |                     |
| INTERNAL: | ADM/LFMB                  | 1 0                 | IE/DEPER/EPB              | 3 3                 |
|           | NRR BWR ADTS              | 1 1                 | NRR PWR-B ADTS            | 1 1                 |
|           | NRR/DSRO EMRIT            | 1 1                 | NRR/DSRO/EIB              | 1 1                 |
|           | NRR/DSRO/RSIB             | 1 1                 | <u>REG FILE</u> 01        | 1 1                 |
| EXTERNAL: | LPDR                      | 1 1                 | NRC PDR                   | 1 1                 |
|           | NSIC                      | 1 1                 |                           |                     |
| NOTES:    |                           | 2 2                 |                           |                     |

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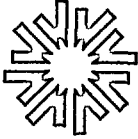
TO: DIRECTOR, FBI (100-442101)  
FROM: SAC, NEW YORK (100-158741) (P)

RE: JAMES EARL RAY, AKA; MURKIN; C-100-158741-1000

NY 100-158741-1000 (NY 100-158741-1000) (NY 100-158741-1000)

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| 1      | MR. WOOD      | 2/22/68 |          |
| 1      | MR. YERGEN    | 2/22/68 |          |
| 1      | MR. ZANDER    | 2/22/68 |          |



# Duquesne Light

Beaver Valley No. 2 Unit Project Organization  
S.E.G. Building  
P.O. Box 328  
Shippingport, PA 15077

8702200027 870211  
PDR ADDCK 05000412  
A PDR

2NRC-7-024  
(412) 643-5200  
Telecopy (412) 643-5200 Ext. 160  
February 11, 1987

Mr. Harold R. Denton, Director  
United States Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

ATTENTION: Mr. Peter Tam, Project Manager  
Division of PWR Licensing - A  
Office of Nuclear Reactor Regulation

SUBJECT: Beaver Valley Power Station - Unit No. 2  
Docket No. 50-412  
Detailed Control Room Design Review--Supplemental Summary Report

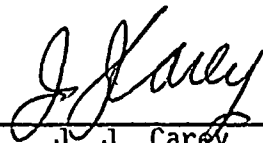
Gentlemen:

The Detailed Control Room Design Review Supplemental Summary Report was submitted by DLC on January 8, 1987 (2NRC-7-005). Subsequent review of this report has determined that HEDs 2CIC-5132 through 2CIC-5230 contained in Appendix A of the report were improperly reproduced and should be removed from the report and replaced with the copies of the HEDs attached to this letter.

Attached are 3 copies of the HEDs for the 3 copies of the report provided in the original submittal. Mr. Richard Eckenrode's copies have been directly forwarded per his direction.

If you have any questions regarding this matter please contact Mr. E. T. Eilmann at (412) 393-7895.

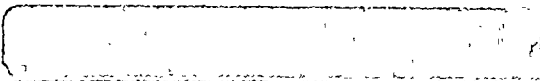
DUQUESNE LIGHT COMPANY

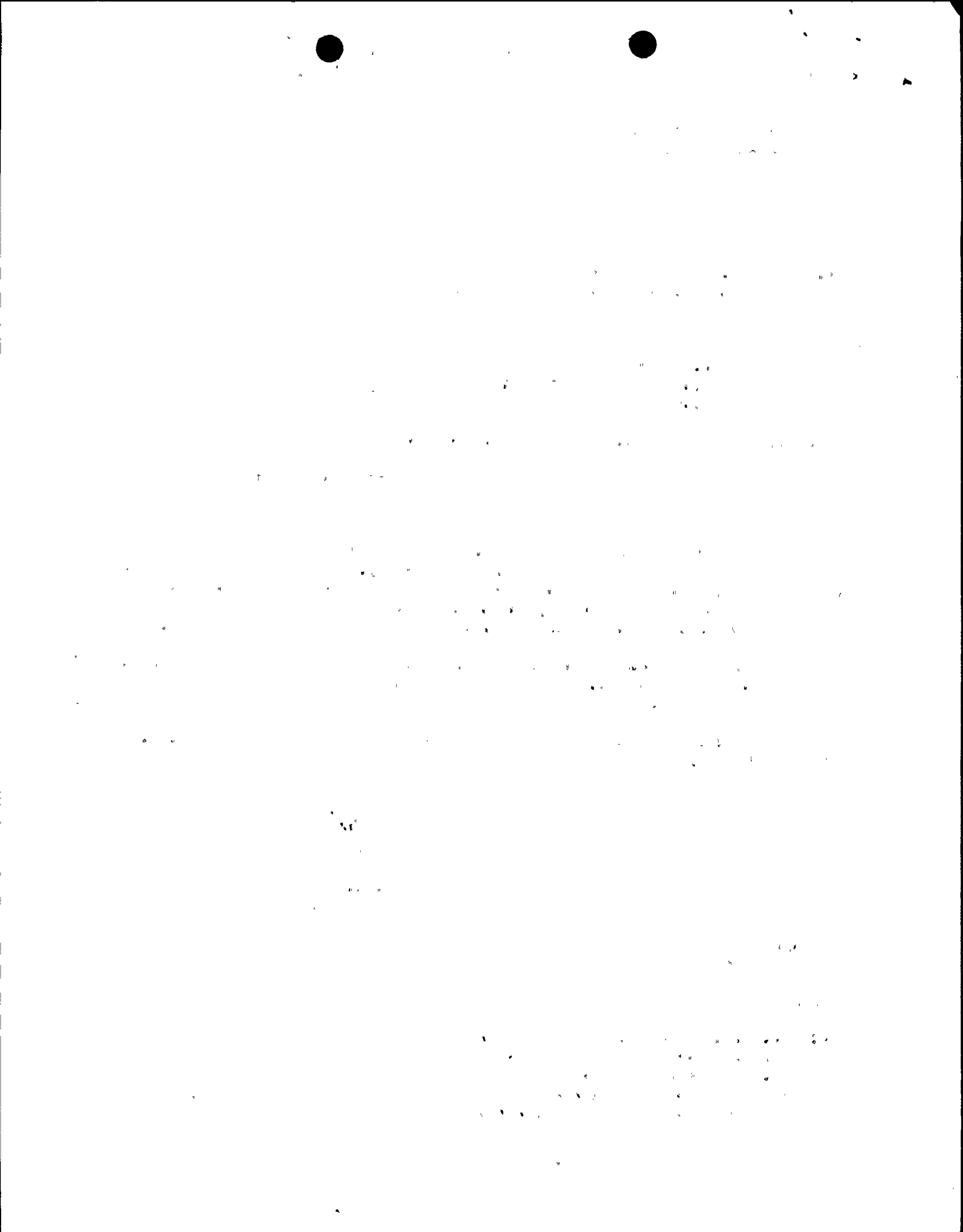
By   
\_\_\_\_\_  
J. J. Carey  
Senior Vice President

JGP/ijr  
NR/JGP/CRDR/SSR  
Attachments  
AR/NAR

cc: Mr. P. Tam, Project Manager (w/o/a)  
Mr. J. Beall, NRC Sr. Resident Inspector (w/a)  
Ms. A. Asars, NRC Resident Inspector (w/o/a)  
INPO Records Center (w/o/a)  
NRC Document Control Desk (w/o/a)

A003  
11





BVPS-2

PLANT/UNIT

- b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5732  
d) REVIEWED BY: John G. Proven e) DATE: 9-2-86  
DLC TECHNICAL COORDINATOR  
ET Eilmann 1968  
DLC REVIEW TEAM LEADER  
f) HED TITLE: OPERATORS CAN CHANGE SYSTEM IN USE  
WITHOUT KEY LOCK

g) ITEMS INVOLVED:

PLANT COMPUTER SYSTEM IN CR.

- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.k  
THERE IS A SET OF PUSHBUTTONS (TWO: A & B) ON THE  
COMPUTER KEYBOARD. THESE WILL CHANGE THE SYSTEM  
IN USE i.e. IF SYSTEM A IS IN USE, PUSHING THE "B" BUTTON  
WILL SWITCH TO THE PARALLEL SYSTEM WITH THE POTENTIAL  
FOR THE LOSS OF SOME DATA.  
i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1 B3-2

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

LOSS OF DATA FROM SYSTEM, PARTICULARLY VERY RECENT  
DATA.

k) REVIEW AND RECOMMENDATIONS:

THE NEED FOR SUCH A CAPABILITY IS OBVIOUS. ALTHOUGH IT OPENS UP THE POTENTIAL FOR ABUSE. THIS COULD TAKE THE FORM OF OPERATORS SWITCHING SYSTEMS WHEN THEY DO NOT BELIEVE WHAT THEY SEE ON THE SYSTEM THEY ARE USING. IT IS RECOMMENDED THAT THIS FEATURE BE KEYLOCKED.

THE REVIEW TEAM INDICATES THAT PROCEDURE FOR PROPER USE OF THESE RESET BUTTONS WILL BE IN THE NEW OPERATIONS MANUAL. IF THIS FUNCTION WAS KEYLOCKED, IT WOULD CREATE THE POSSIBILITY THAT MORE USEABLE DATA COULD BE LOST THAN IF IT WAS NOT KEYLOCKED. NO FURTHER ACTION IS RECOMMENDED.

*[Signature]* 9/10/86  
HUMAN FACTORS SPECIALIST DATE

*Ernie L. Elman* 10/8/86  
DLC REVIEW TEAM LEADER DATE

*John G. Proven* 9-11-86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree with RT. Administrative controls will provide a procedure to indicate proper operation of reset buttons to the operators

*[Signature]* for 10/8/86  
DLC ENGINEERING MANAGER DATE

*JGP for R.F. Martin* 10/8/86  
DLC REG. AFFAIRS MANAGER DATE

*Coill for TPN* 10/8/86  
DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5133  
 d) REVIEWED BY: John G. Proven e) DATE: 9-24-86  
 DLC TECHNICAL COORDINATOR  
J. J. Gilman  
 DLC REVIEW TEAM LEADER

f) HED TITLE: VB PROCESS CRT USES DOUBLE HEIGHT/SINGLE WIDTH CHARACTERS

## g) ITEMS INVOLVED:

PLANT COMPUTER SYSTEM IN CR  
 VERTICAL BOARD CRTs (UTILITY CRT)

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.2c, 6.7.2.2d

THE 2X HEIGHT/1X WIDTH FORMAT USED ON THE UTILITY CRT VIOLATES THE MINIMUM REQUIREMENT FOR CHARACTER WIDTH/HEIGHT RATIO AND CHARACTER STROKE WIDTH/HEIGHT RATIO. (SEE MEASUREMENTS SECTION OF SURVEY B1.1-9)

## i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM T.P. 7.1 B1.1-9

## j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:

INABILITY TO READ DISPLAYED DATA  
 INACCURACY IN READING DISPLAYED DATA

k) REVIEW AND RECOMMENDATIONS:

THE STROKE WIDTH/HEIGHT RATIO IS CLOSE TO THE CRITERIA OF 10% (BEING 6.25%). THE CHARACTER WIDTH/CHARACTER HEIGHT RATIO IS LESS CLOSE TO THE CRITERIA OF 60% (BEING 37%). SINCE THIS DATA DISPLAYED ON THE UTILITY CRT IS NOT AS CRITICAL AS THAT DISPLAYED ON THE ALARM CRTs, OPERATORS WOULD GENERALLY HAVE TIME TO WALK CLOSER TO THE CRT IF THEY HAD DIFFICULTY READING IT. THE CHARACTERS ARE READABLE WHILE STANDING AT THE BENCHBOARD IN FRONT OF THE CRT. IF THE CHARACTERS WERE MADE DOUBLE WIDE IN ADDITION TO DOUBLE HIGH THERE WOULD BE TOO LITTLE ROOM TO DISPLAY THE DATA. IF THE CHARACTERS WERE MADE 1X HEIGHT, THEY WOULD BE MORE DIFFICULT TO READ. FOR THESE REASONS, NO ACTION IS RECOMMENDED.

RT = Concurs

*[Signature]* 10/21/86  
HUMAN FACTORS SPECIALIST DATE  
*[Signature]* 10/21/86  
DLC REVIEW TEAM LEADER DATE  
*[Signature]* 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

*[Signature]* 12-17-86  
DLC ENGINEERING MANAGER DATE  
*[Signature]* 12/17/86  
DLC REG. AFFIARS MANAGER DATE  
*[Signature]* 12/17/86  
DLC OPERATIONS MANAGER DATE



b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5134

d) REVIEWED BY: John G. Proven  
DLC TECHNICAL COORDINATOR  
JGP/ETE (name)  
DLC REVIEW TEAM LEADER

e) DATE: 10/22/86

f) HED TITLE: PRESENTATION MODE FUNCTION KEY IS  
NOT CLEARLY LABELED

g) ITEMS INVOLVED:  
 PLANT COMPUTER SYSTEM IN C.R.  
 KEYBOARD CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.5 d(3)  
 FUNCTION CONTROL KEYS SHOULD BE CLEARLY LABELED TO INDICATE THEIR FUNCTION TO THE OPERATOR. THE PRESENTATION MODE KEY FOR A HORIZONTAL BAR DISPLAY IS LABELED "BAR" WHILE AN ADJACENT KEY FOR A VERTICAL BAR DISPLAY IS LABELED "VERT BAR".

i) DATA COLLECTION DESCRIPTION:  
 CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP 7.1 B3-8

j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:  
 DELAY IN OBTAINING INFORMATION FROM PCS THROUGH  
 CONFUSION OF PRESENTATION MODE KEY FUNCTION.

k) REVIEW AND RECOMMENDATIONS:

THIS PRESENTATION MODE KEY ("BAR") SHOULD BE RELABELED TO COMMUNICATE ITS FUNCTION TO THE OPERATOR MORE CLEARLY. IF THE VERTICAL BAR GRAPH KEY IS LABELED "VERT BAR", THE HORIZONTAL BAR GRAPH KEY SHOULD BE LABELED "HORIZ BAR". AS IT IS, THE "BAR" KEY COULD BE CONFUSED WITH THE VERTICAL BAR FUNCTION.

RT Review Concurs

RT Agrees with DLC Management position 12/2/86  
96P

|                           |          |
|---------------------------|----------|
| <del>J. P. Thomas</del>   | 11/18/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| J. Elman                  | 12/2/86  |
| DLC REVIEW TEAM LEADER    | DATE     |
| John G. Bowen             | 1/18/86  |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Disagree for 2 reasons

1. VERT. BAR is identified implying the other should be horizontal.
2. Both graphs display the same information
3. No safety significance involved.

Therefore No Action required and key label will not be changed.

|                              |          |
|------------------------------|----------|
| R. F. Kappa for J. P. Thomas | 12/02/86 |
| DLC ENGINEERING MANAGER      | DATE     |
| R. E. Martin / E. E.         | 12/2/86  |
| DLC REG. AFFAIRS MANAGER     | DATE     |
| Conill for TPN               | 12/2/86  |
| DLC OPERATIONS MANAGER       | DATE     |

b) ORIGINATOR: R. KAYE c) HED NO.: 2 CIC-5135

d) REVIEWED BY: John G. Proven e) DATE: 10/27/86

DLC TECHNICAL COORDINATOR

JGP/ETE/Man  
DLC REVIEW TEAM LEADER

f) HED TITLE: VIEWING ANGLE FOR TABLE A PCS CRT IS TOO LARGE (SITTING)

g) ITEMS INVOLVED:

PLANT COMPUTER SYSTEM IN C.R.

TABLE A CRT

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.3 C(1)(b)

THE VIEWING ANGLE SHOULD BE NO MORE THAN  $40^{\circ}$  BELOW THE OPERATOR'S HORIZONTAL LOS. THE TABLE A CRT IS  $43^{\circ}$  BELOW THE HORIZONTAL LOS.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP-7.1 B1.1-12



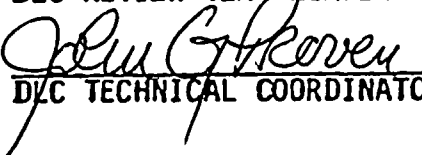
j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

FATIGUE FROM PROLONGED READING OF CRT  
ERRORS IN READING CRT TEXT

k) REVIEW AND RECOMMENDATIONS:

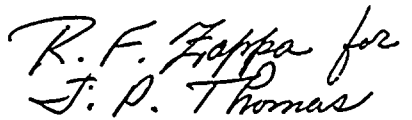

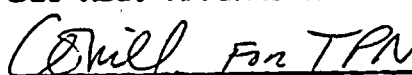
THE ANGLE IS ONLY 3° MORE THAN NUREG 0700 SPECIFIED LIMIT. THE SEAT TO BE USED IS ADJUSTABLE SO THAT IF AN OPERATOR FOUND READING THE CRT UNCOMFORTABLE, HE COULD LOWER THE SEAT. (ALL MEASUREMENTS WERE TAKEN WITH THE SEAT LEFT AT THE LEVEL AT WHICH IT WAS FOUND) FOR THESE REASONS, NO ACTION IS RECOMMENDED.

RT Review Concurs

|   |          |
|---|----------|
|  | 11/18/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
|   | 12/2/86  |
| DLC REVIEW TEAM LEADER  | DATE     |
|   | 11/18/86 |
| DLC TECHNICAL COORDINATOR   | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|  |          |
|--|----------|
|  | 12/02/86 |
| DLC ENGINEERING MANAGER  | DATE     |
|  | 12/2/86  |
| DLC REG. AFFAIRS MANAGER   | DATE     |
|  | 12/2/86  |
| DLC OPERATIONS MANAGER   | DATE     |

b) ORIGINATOR: R. KAYE c) HED NO.: 2V\*\*5736  
 d) REVIEWED BY: [Signature] e) DATE: 10/27/86  
 DLC TECHNICAL COORDINATOR  
[Signature]  
 DLC REVIEW TEAM LEADER

f) HED TITLE: VIEWING ANGLE FOR ALARM CRTS IS TOO LARGE

g) ITEMS INVOLVED:

PLANT COMPUTER SYSTEM IN C.R.  
 VERTICAL BOARD ALARM CRTS

h) PROBLEM DESCRIPTION AND O700 PARAGRAPH NUMBER: 6.7.2.3 d (1)(b)

VIEWING ANGLE FOR ALARM CRTS SHOULD NOT BE MORE THAN 20° ABOVE THE OPERATOR'S HORIZONTAL LINE OF SIGHT. THE THREE ALARM CRTS ARE 26°, 26°, AND 24° ABOVE THE OPERATOR'S HORIZONTAL LINE OF SIGHT FOR 95th PERCENTILE MALE. (34°, 34°, 32° FOR 5th PERCENTILE FEMALE)

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP 7.1 B.1.1-13

(SEE ADDITIONAL DRAWINGS IN MEASUREMENTS SECTION)

j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:

FATIGUE FROM PROLONGED READING OF CRTS.  
 ERRORS IN READING CRT DISPLAYED TEXT.

k) REVIEW AND RECOMMENDATIONS:

DETERMINE THE FEASIBILITY OF RELOCATING ALARM CRTs LOWER ON THE VERTICAL BOARD. AS THEY ARE, THE LETTER SIZE ALLOWS FOR THE ALARM CRTs TO BE EASILY READ BUT OPERATORS MUST TILT THEIR HEADS SLIGHTLY UPWARD.

RT Review indicates that relocation of CRT is not feasible

No Action Required

|                           |          |
|---------------------------|----------|
| <del>J. Vos</del>         | 11/18/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <i>E. Elmann</i>          | 12/2/86  |
| DLC REVIEW TEAM LEADER    | DATE     |
| <i>J. P. Rosen</i>        | 1/18/86  |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|                                     |          |
|-------------------------------------|----------|
| <i>R. F. Zappa for J. P. Thomas</i> | 12/02/86 |
| DLC ENGINEERING MANAGER             | DATE     |
| <i>RE Martin / ETC</i>              | 12/2/86  |
| DLC REG. AFFAIRS MANAGER            | DATE     |
| <i>Quill for TPN</i>                | 12/2/86  |
| DLC OPERATIONS MANAGER              | DATE     |

b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5737  
 d) REVIEWED BY: John G Proven e) DATE: 10/28/86  
 DLC TECHNICAL COORDINATOR  
JGP/EYEilman  
 DLC REVIEW TEAM LEADER

f) HED TITLE: VIEWING ANGLE (STANDING) IS TOO LARGE FOR  
TABLE A CRT.

g) ITEMS INVOLVED:

PLANT COMPUTER SYSTEM IN CR  
 TABLE A CRT.

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.3 d(1)(b)

VIEWING ANGLE FOR STANDING OPERATORS SHOULD NOT BE GREATER THAN  $40^\circ$  BELOW THE OPERATORS HORIZONTAL LINE OF SIGHT. THE VIEWING ANGLE FOR A STANDING 95TH PERCENTILE MALE IS  $60^\circ$  BELOW THE HORIZONTAL LOS.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP 7.1 B1.1-13

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

ERRORS IN READING CRT DISPLAYED TEXT  
 FATIGUE FROM PROLONGED READING OF CRT TEXT.

k) REVIEW AND RECOMMENDATIONS:

THIS DISCREPANCY COMES ABOUT TO A LARGE EXTENT FROM THE FACT THAT A 95TH PERCENTILE MALE WAS USED TO DETERMINE THE VIEWING ANGLE. THE ANGLE BECOMES RAPIDLY LESS AS ONE APPROACHES THE EYE HEIGHT OF A 5TH PERCENTILE FEMALE (44° BELOW HORIZONTAL LOS). THE MOST IMPORTANT POINT IS THAT THE OPERATOR HAS THE OPTION TO, AND WOULD NORMALLY SIT IN FRONT OF THIS DISPLAY. FOR THIS REASON, NO ACTION IS RECOMMENDED.

RT Concurs  
Console not designed as a  
sit/stand console.

|                           |          |
|---------------------------|----------|
| <i>[Signature]</i>        | 11/18/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <i>[Signature]</i>        | 12/2/86  |
| DLC REVIEW TEAM LEADER    | DATE     |
| <i>[Signature]</i>        | 11/18/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required.

|   |          |
|---|----------|
| <i>R. F. Zappa for<br/>J. P. Thomas</i> | 12/02/86 |
| DLC ENGINEERING MANAGER                 | DATE     |
| <i>R. E. Martin / etc</i>               | 12/2/86  |
| DLC REG. AFFIARS MANAGER                | DATE     |
| <i>Quill for TPN</i>                    | 12/2/86  |
| DLC OPERATIONS MANAGER                  | DATE     |



b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5138  
 d) REVIEWED BY: John G. Hansen e) DATE: 10/30/86  
 DLC TECHNICAL COORDINATOR  
JGP/ETE/Mann  
 DLC REVIEW TEAM LEADER  
 f) HED TITLE: RED ASTERISKS ARE USED FOR MISSING DATA  
IN P&IDs

g) ITEMS INVOLVED:  
 PLANT COMPUTER SYSTEM IN C.R.  
 CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.7 K(1),(2) & 6.7.2.7 L(1)

MISSING DATA VALUES ON P&IDs ARE INDICATED BY RED ASTERISKS, THIS VIOLATES THE CONVENTION WITHIN THE CONTROL ROOM FOR THE PROPER USE OF RED, AS THESE ARE NOT ALARM VALUES. THIS ALSO VIOLATES THE CONVENTION OF THE USE OF YELLOW FOR SUSPECT DATA WITHIN THE P&IDs. THE ASTERISKS REPRESENT (MORE THAN ANYTHING ELSE) BAD OR SUSPECT DATA,

i) DATA COLLECTION DESCRIPTION: THEREFORE THEY SHOULD BE YELLOW.

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP 7.1 B3-26, B3-27

j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:

MISINTERPRETATION OF RED ASTRISK "VALUES"  
 MISINTERPRETATION OF RED VALUES ON THE BALANCE OF THE SYSTEM & OTHER SYSTEMS

k) REVIEW AND RECOMMENDATIONS:

SINCE THE RED ASTERISKS REPRESENT A PROBLEM WITH THE DATA (ie IT IS MISSING) THEY SHOULD BE MADE YELLOW TO BE CONSISTENT WITH THE USE OF YELLOW FOR BAD DATA THROUGHOUT THE BALANCE OF THE PCS.

RT Review indicates that possibility of changing red to yellow should be investigated.

Further review by RT indicates that red asterisks are being eliminated. Missing Data will be represented by yellow asterisks  
JGP 12/10/86

~~J. P. Thomas~~ 11/18/86  
HUMAN FACTORS SPECIALIST DATE  
E. Elmann 12/2/86  
DLC REVIEW TEAM LEADER DATE  
J. G. Kroen 11/18/86  
DLC TECHNICAL COORDINATOR DATE

l) REVIEW AND DISPOSITION:

Agree with RT Recommendation

J. P. Thomas 12-17-86  
DLC ENGINEERING MANAGER DATE  
JGP / R. E. Martin 12/17/86  
DLC REG. AFFAIRS MANAGER DATE  
C. D. For TPN 12/17/86  
DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5139  
 d) REVIEWED BY: John G. Prewer e) DATE: 10/31/86  
 DLC TECHNICAL COORDINATOR  
JGP/ETE, (name)  
 DLC REVIEW TEAM LEADER  
 f) HED TITLE: TEXT LABELS IN PAIDS ARE YELLOW

g) ITEMS INVOLVED:

PLANT COMPUTER SYSTEM IN CR

CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.7 l(3)

TEXT LABELS IN PCS PAIDS ARE YELLOW. THIS VIOLATES THE CONVENTION WITHIN THE PCS THAT YELLOW IS USED FOR SUSPECT OR BAD DATA.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP 7.1 B3-27

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

MISINTERPRETATION OF YELLOW DATA IN BALANCE OF SYSTEM  
 & OTHER SYSTEMS

MISINTERPRETATION OF STATUS OF DATA WHEN IT IS LABELED  
 BY YELLOW TEXT

k) REVIEW AND RECOMMENDATIONS:

CHANGE THE COLOR OF TEXT LABELS ON PAIDS TO WHITE  
OR CYAN.

RT Concurs

~~\_\_\_\_\_~~ 11/18/86  
HUMAN FACTORS SPECIALIST DATE  
E. Eilmann 12/2/86  
DLC REVIEW TEAM LEADER DATE  
John G. Koren 11/18/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree. SUG - Computer integration Group  
is in the process of making this change.

R. F. Zuppa for  
J. P. Thomas 12/02/86  
DLC ENGINEERING MANAGER DATE  
R. E. Martin / ETC 12/2/86  
DLC REG. AFFAIRS MANAGER DATE  
C. O'Neil for TPN 12/2/86  
DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 201C-5140

d) REVIEWED BY: [Signature] e) DATE: 11/5/86

DLC TECHNICAL COORDINATOR

[Signature]  
DLC REVIEW TEAM LEADER

f) HED TITLE: PROMPTS AT BOTTOM OF DISPLAY

SCREEN ARE YELLOW

g) ITEMS INVOLVED:

PLANT COMPUTER SYSTEM IN CR  
CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.7 (3)

PROMPTS AT BOTTOM OF PLS DISPLAY SCREEN ARE YELLOW. THIS VIOLATES THE CONVENTION WITHIN THE PLS THAT YELLOW IS USED FOR SUSPECT OR BAD DATA.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP4.1 B3-27

j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:

MISINTERPRETATION OF YELLOW DATA IN BALANCE OF SYSTEM AND OTHER SYSTEMS.

k) REVIEW AND RECOMMENDATIONS:

CHANGE THE COLOR OF PROMPTS AT BOTTOM OF PAGE (ie "ENTER LOG NUMBER") FROM YELLOW TO WHITE OR ANOTHER ACCEPTABLE COLOR SUCH AS CYAN.

RT Review indicates that this condition need not be changed. Attention is drawn to the prompt and wording of prompts is such that possibility of confusion is minimal

No Action Recommended

|                           |          |
|---------------------------|----------|
| <del>_____</del>          | 11/18/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <u>J. Elman</u>           | 12/2/86  |
| DLC REVIEW TEAM LEADER    | DATE     |
| <u>John C. Raven</u>      | 11/18/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|                                   |          |
|-----------------------------------|----------|
| <u>R.F. Zappa for J.P. Thomas</u> | 12/02/86 |
| DLC ENGINEERING MANAGER           | DATE     |
| <u>R.G. Martin</u>                | 12/2/86  |
| DLC REG. AFFAIRS MANAGER          | DATE     |
| <u>Coill for TPN</u>              | 12/2/86  |
| DLC OPERATIONS MANAGER            | DATE     |

b) ORIGINATOR: D. Pilsitz c) HED NO.: 2V\*\*-5141

d) REVIEWED BY: [Signature] e) DATE: 10/7/86  
DLC TECHNICAL COORDINATOR

[Signature]  
DLC REVIEW TEAM LEADER

f) HED TITLE: Alarm messages appear on status  
cleared portion of CRT screen

g) ITEMS INVOLVED:  
Plant Computer System in Control Room  
Vertical board status CRTs

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.5 a(1)  
Alarm messages appear on "cleared" portion of  
the CRT screen in red where all messages should  
be green cleared alarm points.

i) DATA COLLECTION DESCRIPTION:  
Control Room Survey (R-403)  
Plant Computer System TP-7.1 B3-18

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
Operator confusion as to the status of the  
alarm (i.e. cleared or activated)

k) REVIEW AND RECOMMENDATIONS:

This is a problem with software. Computer technicians are aware of it. Resolution schedule is not definite at this time.

RT Review concurs. Review also indicates that this is a ~~to~~ recognized fault and being pursued by the vendor (RT recommends that this problem be resolved & corrected)

~~[Signature]~~  
HUMAN FACTORS SPECIALIST

11/18/86  
DATE

[Signature]  
DLC REVIEW TEAM LEADER

12/2/86  
DATE

[Signature]  
DLC TECHNICAL COORDINATOR

11/18/86  
DATE

1) REVIEW AND DISPOSITION:

Agree with RT Recommendation

R. F. [Signature] for

J. P. Thomas

DLC ENGINEERING MANAGER

12/02/86  
DATE

[Signature]  
DLC REG. AFFAIRS MANAGER

12/2/86  
DATE

[Signature] for TPN  
DLC OPERATIONS MANAGER

12/2/86  
DATE



b) ORIGINATOR: D. Pilsitz c) HED NO.: 2V\*\*-5142

d) REVIEWED BY: *[Signature]*  
DLC TECHNICAL COORDINATOR e) DATE: 10/7/86

*[Signature]*  
DLC REVIEW TEAM LEADER

f) HED TITLE: Columns of data on CRT are not  
always separated by one space

g) ITEMS INVOLVED:

Plant Computer System in Control Room  
 Vertical Board alarm CRTs

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.4 C(2)  
 Identification portion of alarm and status  
 CRT messages overlap at times with mark  
 numbers column.

i) DATA COLLECTION DESCRIPTION:

Control Room Survey (R-403)  
 Plant Computer System TP-7.1 B3-13

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

Possible misinterpretation of CRT message or difficulty  
 in reading the message which causes delayed response  
 by the operator.

k) REVIEW AND RECOMMENDATIONS:

Revise Software and abbreviation usage to accommodate for a space between data columns.

RT Concurs

~~J. P. Thomas~~ 11/18/86  
 HUMAN FACTORS SPECIALIST DATE  
 J. P. Thomas 12/2/86  
 DLC REVIEW TEAM LEADER DATE  
 J. P. Thomas 11/10/86  
 DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree with RT Recommendation. Messages have been reviewed and SOG Computer Integration Group is incorporating the revisions to the software.

R. F. Zappa for  
 J. P. Thomas 12/02/86  
 DLC ENGINEERING MANAGER DATE  
 R. E. Martin / ETC 12/2/86  
 DLC REG. AFFIARS MANAGER DATE  
 C. Willson for TPN 12/2/86  
 DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: D. Pilsitz c) HED NO.: 2V\*\*-5143

d) REVIEWED BY: John G. Perrey e) DATE: 10/7/86  
 DLC TECHNICAL COORDINATOR

JGP/ET Elman  
 DLC REVIEW TEAM LEADER

f) HED TITLE: Mark numbers are not consistently  
Left justified

g) ITEMS INVOLVED:

Plant Computer System in Control Room  
 Vertical Board alarm CRTs

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.4 g(1)

Mark numbers observed on Alarm CRT are  
 occasionally spaced one space to the right.

i) DATA COLLECTION DESCRIPTION:

Control Room Survey (R-403)

Plant Computer System TP-7.1 B3-15

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

May increase reading time, causing delay in operator  
 response to the alarmed condition.

k) REVIEW AND RECOMMENDATIONS:

Revise Software To ensure that all mark numbers are properly left justified

RT Review indicates that mark numbers do not have a dedicated field but are part of the description field.

No Change is Recommended

~~J. P. Thomas~~ 11/18/86  
HUMAN FACTORS SPECIALIST DATE

*E. E. Eubank* 12/2/86  
DLC REVIEW TEAM LEADER DATE

*John G. Proven* 11/18/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Change Required

*R. F. Fappo for J. P. Thomas* 12/02/86  
DLC ENGINEERING MANAGER DATE

*R. E. Martin* 12/2/86  
DLC REG. AFFIARS MANAGER DATE

*Will for TPN* 12/2/86  
DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: D. Pilsitz c) HED NO.: 2V\*\*-5144

d) REVIEWED BY: [Signature] e) DATE: 10/7/86  
DLC TECHNICAL COORDINATOR

[Signature]  
DLC REVIEW TEAM LEADER

f) HED TITLE: Annunciator visual tile and alarm  
CRT legends not consistent

g) ITEMS INVOLVED:

Plant Computer System in Control Room

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.6.3.3 a 6.7.2.4.e(2)

Abbreviations and acronyms used in annunciator tiles and CRT Messages are not consistent in their useage. An example being the word storage which was abbreviated sto, stG, stor.

i) DATA COLLECTION DESCRIPTION:

Control Room Survey (R403)  
Plant Computer System TP-7.1

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

Inability to locate a control or delay in response time due to a mismatch in terminology used between the annunciator tiles, CRT messages and labels on Main control boards.

k) REVIEW AND RECOMMENDATIONS:

ESSEX recommends developing a constrained language and abbreviations dictionary to be used consistently in developing annunciator tile engravings and CRT messages.

RT Concurs

RT Review indicates that said dictionary will be included in OM Chap 48.

~~\_\_\_\_\_ 11/18/86~~  
HUMAN FACTORS SPECIALIST DATE  
~~\_\_\_\_\_ 12/2/86~~  
DLC REVIEW TEAM LEADER DATE  
John G. Koven 11/18/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree with RT recommendation.  
Standard abbreviations list has been developed and used to review and establish consistency between annunciator tiles & CRT Messages.

R. F. Zappa for  
J. P. Thomas 12/02/86  
DLC ENGINEERING MANAGER DATE  
P. L. Martin / ETC 12/2/86  
DLC REG. AFFIARS MANAGER DATE  
C. Mull for TPN 12/2/86  
DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5201d) REVIEWED BY: John G Proven e) DATE: 9-12-86

DLC TECHNICAL COORDINATOR

E. Elmann  
DLC REVIEW TEAM LEADERf) HED TITLE: OPERATORS CAN REBOOT SYSTEM WITH  
A POSSIBILITY OF LOSS OF SOME DATA / REBOOT SWITCH IS NOT LABELED

g) ITEMS INVOLVED:

ERT/SPDS SYSTEM IN C.R.h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.1a

THERE IS A PUSHBUTTON THAT IS ACCESSIBLE ON THE COMPUTER KEYBOARD THAT WILL SHUT DOWN THE SYSTEM AND REBOOT IT. ANY TREND DATA GATHERED PREVIOUSLY WOULD BE LOST. THIS BUTTON IS NOT LABELED

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1 B3-2

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

LOSS OF DATA

k) REVIEW AND RECOMMENDATIONS:

THE NEED FOR THIS CAPABILITY IS WELL UNDERSTOOD. IT DOES, HOWEVER, OPEN UP THE POTENTIAL FOR INCORRECT USE OF THIS FUNCTION. THIS COULD BE THROUGH OPERATORS REBOOTING THE SYSTEM WHEN IT IS NOT NECESSARY WITH A SUBSEQUENT LOSS OF DATA, OR BECAUSE THE SWITCH IS NOT LABELED, IT COULD BE ACTUATED BY MISTAKE. IT IS RECOMMENDED THAT THIS SWITCH SHOULD BE KEYLOCKED AND LABELED.

R.T. Recommendation:

IDENTIFY SWITCH FUNCTION ON INSIDE OF COVER SO NOT NORMALLY VISIBLE. OPERATOR WILL SEE LABEL WHEN OPERATING SWITCH. LABEL ONLY CRT'S WHERE SWITCH IS FUNCTIONAL

~~J. J. Jones~~ 10/21/86  
HUMAN FACTORS SPECIALIST DATE

J. J. Edmann 10/21/86  
DLC REVIEW TEAM LEADER DATE

John G. Proven 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree with R.T.

R. F. Hoppa  
for J. P. Thomas 11/7/86  
DLC ENGINEERING MANAGER DATE

J. P. R. Hactin 11/7/86  
DLC REG. AFFIARS MANAGER DATE

Bill on TPN 11/7/86  
DLC OPERATIONS MANAGER DATE



b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5202

d) REVIEWED BY: John G. Proven e) DATE: 8-20-86  
DLC TECHNICAL COORDINATOR

J. Edman  
DLC REVIEW TEAM LEADER

f) HED TITLE: COMPUTER DIALOGUE CONTAINS INFORMATION WHICH IS NOT CLEARLY DEFINED FOR OPERATORS

g) ITEMS INVOLVED:  
ERF/SPDS TERMINAL SCREEN  
OPERATOR/COMPUTER DIALOG (ERROR PROMPTS)

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.2 a (1) & (4) 6.7.2 b a & b  
PROMPTS ON PCS TERMINAL SCREEN (OPERATOR'S TERMINAL) INCLUDE ABBREVIATIONS (OR PORTIONS OF) WHICH ARE OF NO VALUE TO OPERATORS, ie (QU, ETI) GIVES DATA FILE QUERIED. ANOTHER EXAMPLE: ER LPLV, .LT. 2X LV

i) DATA COLLECTION DESCRIPTION: TOO ERS  
THIS INFORMATION IS NOT FULLY UNDERSTOOD EVEN BY A COMPUTER TECHNICIAN, AND IS OF QUESTIONABLE VALUE TO OPERATORS.

CONTROL ROOM SURVEYS (R403)  
COMPUTER SYSTEM TP-7.1 B3-6#9

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
DELAY IN INTERPRETATION OF ERROR MESSAGES.

k) REVIEW AND RECOMMENDATIONS:

REMOVE INFORMATION FROM ERROR PROMPTS THAT IS NOT OF DIRECT USE TO OPERATORS ON OPERATORS TERMINAL.

RT Recommendation:

Agreed that a list of attributes + codes be included in the operations manual. RT discussion indicates that messages will become less frequent as system is debugged but list is more of value to operators

*[Signature]* 10/21/86  
HUMAN FACTORS SPECIALIST DATE

*[Signature]* 10-21-86  
DLC REVIEW TEAM LEADER DATE

*[Signature]* 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree with RT Recommendation

*[Signature]*  
for *[Signature]* 11/07/86  
DLC ENGINEERING MANAGER DATE

*[Signature]* 11/7/86  
DLC REG. AFFIARS MANAGER DATE

*[Signature]* 11/7/86  
DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5203  
d) REVIEWED BY: John G. Groven e) DATE: 8-20-86  
DLC TECHNICAL COORDINATOR  
J. E. Elnor  
DLC REVIEW TEAM LEADER

f) HED TITLE: ABBREVIATIONS ARE USED FREQUENTLY IN  
OUTPUT TEXT

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM  
ABBREVIATIONS IN OUTPUT TEXT.

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.2 c(3)

ABBREVIATIONS TYPICALLY USED IN NUCLEAR POWER PLANTS  
ARE USED FREQUENTLY IN CRT OUTPUT AND IN PRINTER  
OUTPUT. ie "PRZR," "NORM," "SW," "REURC" etc

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (RA03)  
COMPUTER SYSTEM TP 7.1 B3-15



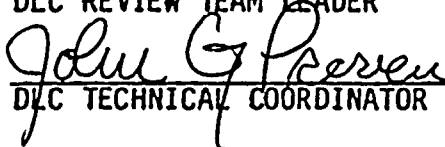
j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

MISUNDERSTANDING OF OUTPUT TEXT.

k) REVIEW AND RECOMMENDATIONS:

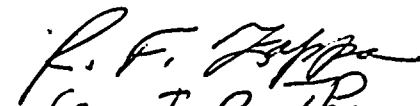


ABBREVIATIONS USED TO DESCRIBE COMPONENTS, ITEMS, STATE/VALUES etc ARE USED FREQUENTLY IN NUCLEAR POWER PLANTS AND ARE EXPECTED AND GENERALLY UNDERSTANDABLE TO OPERATORS. FOR THIS REASON, NO ACTION IS RECOMMENDED.

RT CONCURS.

|  |          |
|--|----------|
|  | 10/21/86 |
| HUMAN FACTORS SPECIALIST   | DATE     |
|  | 10-21-86 |
| DLC REVIEW TEAM LEADER   | DATE     |
|  | 10/21/86 |
| DLC TECHNICAL COORDINATOR  | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required.

|  |          |
|--|----------|
|  | 11/07/86 |
| for J. P. Thomas   | DATE     |
| DLC ENGINEERING MANAGER  | DATE     |
|  | 11/7/86  |
| DLC REG. AFFIARS MANAGER   | DATE     |
|  | 11/7/86  |
| DLC OPERATIONS MANAGER   | DATE     |

- b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5204
- d) REVIEWED BY: John G. Pevon  
DLC TECHNICAL COORDINATOR e) DATE: 8-20-86
- J. E. Brennan  
DLC REVIEW TEAM LEADER
- f) HED TITLE: ERF/SPDS SYSTEM DOES NOT NORMALLY DISPLAY THE FILE(S) BEING PROCESSED
- g) ITEMS INVOLVED:  
ERF/SPDS SYSTEM  
DISPLAY CONTENT
- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.3 c  
PLANT COMPUTER SYSTEM DISPLAY DOES NOT NORMALLY DISPLAY THE NAME OF THE FILE(S) BEING PROCESSED.
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1 B3-19
- j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:  
DELAY IN UNDERSTANDING OF PRESENTED DATA BY OPERATORS

k) REVIEW AND RECOMMENDATIONS:

THE DISPLAY SCREEN SHOULD INCLUDE THE DATA FILE IN USE. THIS COULD BE PRESENTED AT THE BOTTOM OF THE SCREEN WITH THE OTHER GENERAL INFO. LISTED THERE, ie PAGE NO., DISPLAY MODE ETC. IT IS, (FILE NAME) HOWEVER, QUESTIONABLE AS TO WHETHER OR NOT THIS INFORMATION IS USEFUL TO OPERATORS.

RT REVIEW INDICATES THAT SYSTEM IS NOT FILE ORIENTED SO CRITERIA IS OF NO CONCERN. NO ACTION IS RECOMMENDED

~~10/28~~ 10/21/86  
HUMAN FACTORS SPECIALIST DATE

~~Et Edmund~~ 10-21-86  
DLC REVIEW TEAM LEADER DATE

Phil G Proven 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

R. F. Zappa  
for J. P. Thomas 11/07/86  
DLC ENGINEERING MANAGER DATE

GP/RF Martin 11/7/86  
DLC REG. AFFAIRS MANAGER DATE

Bill For TPN 11/7/86  
DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 200-5205

d) REVIEWED BY: John G. Kroen  
DLC TECHNICAL COORDINATOR e) DATE: 8-20-86

J. Edman  
DLC REVIEW TEAM LEADER

f) HED TITLE: ERF/SPDS SYSTEM DOES NOT STORE A SEQUENTIAL FILE OF OPERATOR ENTRIES

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM

OPERATOR/COMPUTER DIALOGUE

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.3e

PLANT COMPUTER SYSTEM DOES NOT STORE A SEQUENTIAL FILE OF OPERATOR ENTRIES

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R 403)

COMPUTER SYSTEM TP 7.1 B3-21

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

DELAY IN EFFICIENT USE OF COMPUTER CAPABILITIES

k) REVIEW AND RECOMMENDATIONS:

IF SEQUENCES OF ENTRIES WERE COMPLEX ENOUGH TO WARRANT IT, THE COMPUTER SYSTEM SHOULD HAVE THE CAPABILITY <sup>TO STORE AND DISPLAY</sup> A SEQUENTIAL LIST OF SUCH ENTRIES. THE SYSTEM AT BUPS-2 IS SIMPLE AND STRAIGHT FORWARD ENOUGH WITH ITS EXTENSIVE USE OF DEDICATED PUSHBUTTONS SO THAT SUCH A CAPABILITY IS NOT SEEN AS NECESSARY.

RT: CONCURS

~~John~~ 10/21/86  
HUMAN FACTORS SPECIALIST DATE

*E. E. E. E.* 10.21.86  
DLC REVIEW TEAM LEADER DATE

*John G. Proven* 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

*R. F. Zappa*  
for *J. P. Thomas* 11/07/86

DLC ENGINEERING MANAGER DATE

*JGP/RE Martin* 11/7/86  
DLC REG. AFFIARS MANAGER DATE

*Conill for TPN* 11/7/86  
DLC OPERATIONS MANAGER DATE



b) ORIGINATOR: R. KAYE c) HED NO.: 2012-5206

d) REVIEWED BY: *John G. Brown* e) DATE: 8-27-86  
 DLC TECHNICAL COORDINATOR  
*St. Elman*  
 DLC REVIEW TEAM LEADER

f) HED TITLE: KEY RESISTANCE FOR NUMERIC KEYS IS LESS THAN THE MINIMUM RESISTANCE SPECIFIED BY THE GUIDELINES

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM IN C.R.

KEYBOARD CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.4 e(2)

GUIDELINES SPECIFY A MINIMUM RESISTANCE OF 3.5 OZ FOR NUMERIC KEYS. RESISTANCE AS MEASURED RANGED FROM 1.5003 → 2.25 OZ FOR THE NUMERIC PORTION OF THE KEYBOARD IN THE CR.

i) DATA COLLECTION DESCRIPTION:


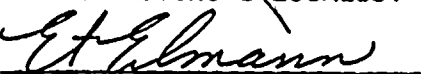
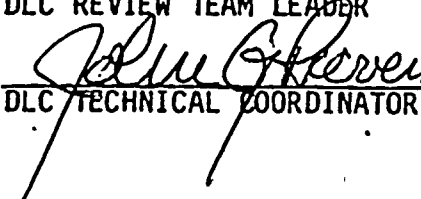
CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP 7.1 B1.1-2

j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:

ENTRY OF INCORRECT DATA  
 DELAY IN ENTRY OF CORRECT DATA

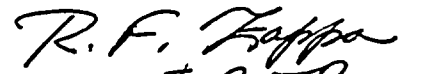


k) REVIEW AND RECOMMENDATIONS:

THE SPRINGS SUPPORTING THE NUMERIC KEYS SHOULD BE REPLACED WITH SLIGHTLY STIFFER ONES WHICH WILL CONFORM TO THE GUIDELINE SPECIFICATION OF 3.5 OZ RESISTANCE. RT Review indicates that long lists of numbers are NOT entered using the numeric keypad. ANY ENTRY errors are easily corrected & therefore NO ACTION is Recommended

 10/21/86  
HUMAN FACTORS SPECIALIST DATE  
 10.21.86  
DLC REVIEW TEAM LEADER DATE  
 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

 for J.P. Thomas 11/07/86  
DLC ENGINEERING MANAGER DATE  
 11/7/86  
DLC REG. AFFIARS MANAGER DATE  
 for TPN 11/7/86  
DLC OPERATIONS MANAGER DATE

- b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5207
- d) REVIEWED BY: John Gleason e) DATE: 8-26-86  
DLC TECHNICAL COORDINATOR
- St. Libman  
DLC REVIEW TEAM LEADER
- f) HED TITLE: KEYBOARD SLOPE IS LESS THAN THE SPECIFIED MINIMUM
- 

## g) ITEMS INVOLVED:

ERF/SPDS TERMINALS IN C.R.

KEYBOARD CHARACTERISTICS

h) PROBLEM DESCRIPTION AND O700 PARAGRAPH NUMBER: 6.7.1.4g

KEYBOARD SLOPE IS APPROXIMATELY  $13^{\circ}$  FROM HORIZONTAL  
GUIDELINE LIMITS ALLOW FOR BETWEEN 15 AND 20 DEGREES.

## i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1

## j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:



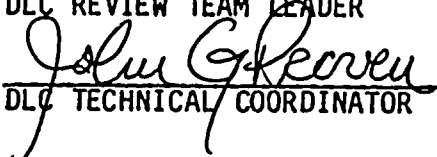
WITH USE OVER TIME, ERRORS AND FATIGUE  
WILL OCCUR.

k) REVIEW AND RECOMMENDATIONS:

THIS HED WAS ALSO WRITTEN AGAINST THE PLANT  
COMPUTER SYSTEM AND RESOLVED, DATE OF HED: 3/26/85.



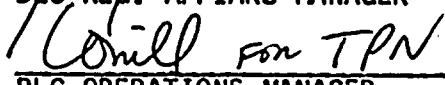
HED # 201C-0301  
(NO ACTION WAS RECOMMENDED BECAUSE KEYBOARD IS  
ONLY USED FOR SHORT DURATION)

RT: CONCURS

|  |          |
|--|----------|
|  | 10/21/86 |
| HUMAN FACTORS SPECIALIST   | DATE     |
|  | 10-21-86 |
| DLC REVIEW TEAM LEADER   | DATE     |
|  | 10/21/86 |
| DLC TECHNICAL COORDINATOR  | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|  |          |
|--|----------|
|  | 11/07/86 |
| for J. P. Thomas   | DATE     |
| DLC ENGINEERING MANAGER  | DATE     |
|  | 11/7/86  |
| DLC REG. AFFIARS MANAGER   | DATE     |
|  | 11/7/86  |
| for TPN  | DATE     |
| DLC OPERATIONS MANAGER   | DATE     |

- b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5208
- d) REVIEWED BY: John C. Brown  
DLC TECHNICAL COORDINATOR e) DATE: 7-29-86
- J. P. Gilman  
DLC REVIEW TEAM LEADER
- f) HED TITLE: ABBREVIATIONS DISPLAYED ARE NOT THE SAME AS THE LABELS ON SOME DEDICATED FUNCTION KEYS
- g) ITEMS INVOLVED:  
ERF/SAS SYSTEM IN CR  
DISPLAY CONTENT
- h) PROBLEM DESCRIPTION AND O700 PARAGRAPH NUMBER: 6.7.1.5b  
ABBREVIATIONS DISPLAYED ON CRT AS TITLES AND INDICATIONS OF PRESENTATION MODE IN USE ARE NOT ALWAYS THE SAME AS THE LABELS ON THE ASSOCIATED KEYS.
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP71 B3-30
- j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:  
DELAY IN INTERPRETATION OF DISPLAYS  
INCREASED TIME TO LEARN/USE SYSTEM

k) REVIEW AND RECOMMENDATIONS:

FOR THE PRESENTATION MODE KEYS, THE FIELD SIZE ON THE CRT SCREEN SHOULD BE INCREASED TO ALLOW FOR THE ENTIRE PRESENTATION KEY LABEL TO BE DISPLAYED IN FULL.

THE LABELS ON DEDICATED KEYS AND THEIR ASSOCIATED DISPLAYS ON THE CRT SHOULD BE REVIEWED IN CONJUNCTION WITH THE GENERAL REVIEW OF THE USE OF ABBREVIATIONS IN THE CONTROL ROOM. (SEE EXAMPLES OF PRESENT STATUS ON ATTACHED PAGE)

RT: Review indicates that the labels on the CRT screens should be adjusted to make them more consistent. Eliminate abbreviations on display for presentation mode key. For Function Select Pushbuttons, revise titles of displays to make more consistent with PBs

|                           |          |
|---------------------------|----------|
| <del>John C. Pover</del>  | 10/18/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <del>John C. Pover</del>  | 10.21.86 |
| DLC REVIEW TEAM LEADER    | DATE     |
| John C. Pover             | 10/21/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Agree with RT Recommendation

|                                 |          |
|---------------------------------|----------|
| R. F. Zappa<br>for J. P. Thomas | 11/07/86 |
| DLC ENGINEERING MANAGER         | DATE     |
| J.P. Martin                     | 11/7/86  |
| DLC REG. AFFAIRS MANAGER        | DATE     |
| Conill for TPN                  | 11/7/86  |
| DLC OPERATIONS MANAGER          | DATE     |

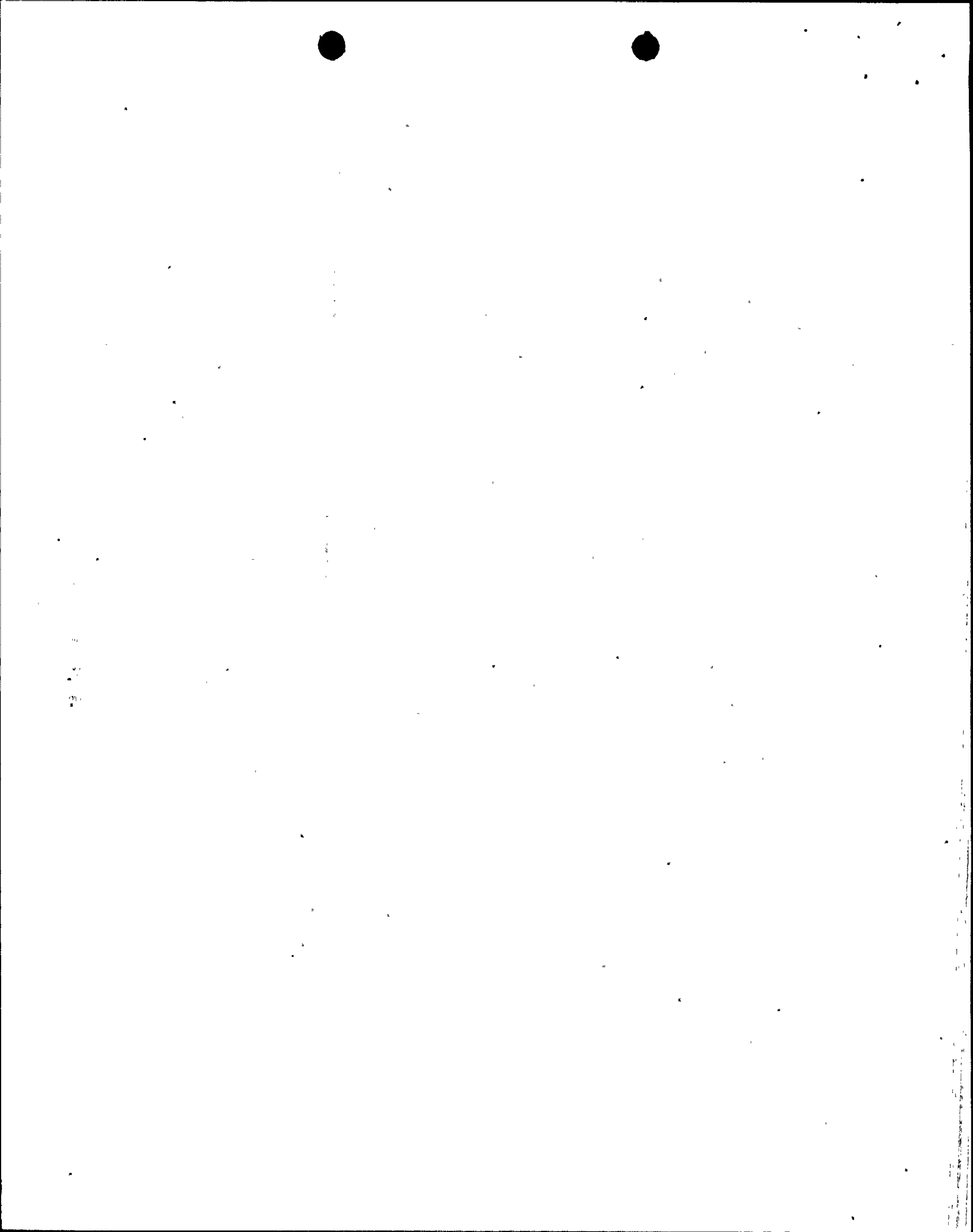
(PRESENTATION MODE KEYS)

| FUNCTION KEY | ABBREVIATION ON DISPLAY |
|--------------|-------------------------|
| AN           | ALP                     |
| ANLG TRND    | ATR                     |
| VERT BAR     | VBR                     |
| BAR          | HBR                     |
| DGTL TRND    | DTR                     |
| P+ID         | PID                     |

(FUNCTION SELECT PUSHBUTTONS)

| FUNCTION KEY      | TITLE OF DISPLAY            |
|-------------------|-----------------------------|
| POINT DETAILS     | POINT DEFINITION            |
| SPDS MAP MENU     | SPDS MAP                    |
| BEST VALUE/STATE  | DISPLAY/SUBSTITUTE VALUE    |
| POINT ON/OFF SCAN | SCAN POINT ON/OFF           |
| HANGE OF LIMITS   | DISPATCHING OPER PARAMETERS |

(FROM A SAMPLE)





b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5209

d) REVIEWED BY: John Glover  
DLC TECHNICAL COORDINATOR  
St. Edmund  
DLC REVIEW TEAM LEADER e) DATE: 8-22-86

f) HED TITLE: NUMERICAL DATA IS DISPLAYED USING AN EXCESSIVE NUMBER OF DECIMAL PLACES

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM IN C.R.  
DISPLAY CONTENT

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.6 C

IF SPACE PERMITS (i.e IF PORTION OF NUMBER TO THE LEFT OF THE DECIMAL IS TWO CHARACTERS OR LESS) THE TEMP. PRESS etc. VALUE WILL BE DISPLAYED TO FOUR DECIMAL PLACES. THIS EXCESS ACCURACY IS UNNECESSARY, AND CROWDS THE SCREEN.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1 B3-39

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

FATIGUE FROM CONTINUOUSLY READING OVERLOADED DISPLAYS.  
INCREASED TIME TO LOCATE/INTERPRET DATA.

k) REVIEW AND RECOMMENDATIONS:

DEVELOP THE LOGIC OF THE SOFTWARE SO THAT DISPLAYED VALUES WILL NOT EXCEED ONE OR TWO DECIMAL PLACES (TWO AT THE MOST) UNLESS THE PARAMETER DISPLAYED AND THE ACCURACY OF THE ASSOCIATED HARDWARE ALLOWS FOR SUCH A LEVEL OF ACCURACY. ie RAD WORTH (REACTIVITY) OR BORON CONCENTRATION etc.

RT: CONCURS

*[Signature]* 10/21/86  
HUMAN FACTORS SPECIALIST DATE

*[Signature]* 10-21-86  
DLC REVIEW TEAM LEADER DATE

*[Signature]* 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree with RT Recommendation

*[Signature]*  
for J. P. Thomas 11/07/86  
DLC ENGINEERING MANAGER DATE

*[Signature]* 11/7/86  
DLC REG/ AFFIARS MANAGER DATE

*[Signature]* For TPN 11/7/86  
DLC OPERATIONS MANAGER DATE

- b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5210
- d) REVIEWED BY: John G Proven e) DATE: 8-27-86  
DLC TECHNICAL COORDINATOR
- St. Elman  
DLC REVIEW TEAM LEADER
- f) HED TITLE: NO PROCEDURES HAVE BEEN WRITTEN FOR THE ERF/SPDS SYSTEMS
- g) ITEMS INVOLVED:  
ERF/SPDS TERMINALS IN C.R.
- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.8 a(1),(2),(3),(4),(5)  
NO PROCEDURES HAVE BEEN WRITTEN FOR THE ERF/SPDS SYSTEM
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1 BA-2
- j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
INABILITY TO ACQUIRE INFORMATION FROM SYSTEM  
INCORRECT USE OF SYSTEM

k) REVIEW AND RECOMMENDATIONS:

OPERATORS SHOULD BE SUPPLIED WITH A SET OF PROCEDURES AS SOON AS POSSIBLE.

RT: Review indicates that procedures are now available. This is a NON-HEED.  
See section 4 of the Operations Manual.

~~\_\_\_\_\_~~ 10/21/86  
HUMAN FACTORS SPECIALIST DATE

~~Et. Elmann~~ 10/21/86  
DLC REVIEW TEAM LEADER DATE

~~John G. Roover~~ 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

~~R.F. Kappa~~  
for J.P. Thomas 11/07/86  
DLC ENGINEERING MANAGER DATE

~~QGP/RF Martin~~ 11/7/86  
DLC REG. AFFIARS MANAGER DATE

~~Comill for TPN~~ 11/7/86  
DLC OPERATIONS MANAGER DATE

- b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5211
- d) REVIEWED BY: John G. Proven  
DLC TECHNICAL COORDINATOR e) DATE: 8-22-86
- Et. Elman  
DLC REVIEW TEAM LEADER
- f) HED TITLE: NO HARD-COPY OF CROSS-INDICES OF ACCESS  
CODES AND CORRESPONDING DATA DISPLAY FUNCTION  
DESCRIPTIONS IS - AVAILABLE
- g) ITEMS INVOLVED:  
ERF/SPDS SYSTEM IN C.R.  
USER INFORMATION
- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.8 b(2)  
THERE IS NO HARD-COPY OF DATA DISPLAY FUNCTION DESCRIPTION;  
REFERENCED AGAINST THEIR RESPECTIVE ACCESS CODES.
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP-7.1 B4-3
- j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
DELAY IN OBTAINING DATA EFFICIENTLY

k) REVIEW AND RECOMMENDATIONS:

A HARD-COPY OF A CROSS REFERENCE OF DATA DISPLAY FUNCTION DESCRIPTIONS AND THEIR CORRESPONDING ACCESS CODES SHOULD BE MADE AVAILABLE TO THE OPERATORS IN THE CONTROL ROOM.

RT: Review indicates that information will be included in Chapter 5 of the operations manual

|                           |                     |
|---------------------------|---------------------|
| <del>_____</del>          | <del>10/21/86</del> |
| HUMAN FACTORS SPECIALIST  | DATE                |
| <del>Et Gilman</del>      | <del>10-21-86</del> |
| DLC REVIEW TEAM LEADER    | DATE                |
| John G. Rosen             | 10/21/86            |
| DLC TECHNICAL COORDINATOR | DATE                |

1) REVIEW AND DISPOSITION:

Agree with RT Review + Recommendation

|                          |          |
|--------------------------|----------|
| R. F. Frappa             |          |
| for J. P. Thomas         | 11/07/86 |
| DLC ENGINEERING MANAGER  | DATE     |
| JGP/RE Martin            | 11/7/86  |
| DLC REG. AFFIARS MANAGER | DATE     |
| Conill for TPN           | 11/7/86  |
| DLC OPERATIONS MANAGER   | DATE     |

b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5212

d) REVIEWED BY: John Groven e) DATE: 8-21-86  
 DLC TECHNICAL COORDINATOR

J. E. Mann  
 DLC REVIEW TEAM LEADER

f) HED TITLE: ALPHA-NUMERIC CHARACTERS ON THE BAILEY LOSS  
TABLE TOP CRT HAVE ONLY 7 RESOLUTION ELEMENTS PER  
CHARACTER HEIGHT

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM IN CR.  
CRT SCREEN CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.1 f (4) 6.7.2.2g(2)  
 GUIDELINES STIPULATE A MINIMUM OF 10 RESOLUTION ELEMENTS PER  
 CHARACTER HEIGHT. THE BAILEY LOSS CRT UTILIZES 7 CHARACTERS  
 PER CHARACTER HEIGHT FOR ALPHA NUMERIC CHARACTERS.  
 (A 5X7 DOT MATRIX IS USED)

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP-7.1 B1.1-1.4

j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:

DELAY IN READING DATA  
DECREASED ACCURACY IN READING DATA

k) REVIEW AND RECOMMENDATIONS:

ALTHOUGH THE MAJORITY OF THE DISPLAY SCREENS UTILIZE A 5X7 MATRIX FOR DISPLAYING ALPHA-NUMERIC DATA, THE GROUP DISPLAYS DO USE A DOUBLE SIZED OR 10X14 MATRIX. THE 5X7 ALPHA NUMERIC CHARACTERS ARE GENERALLY READ WITH LITTLE OR NO DIFFICULTY. FOR THIS REASON, NO ACTION IS RECOMMENDED.

RT: CONCURS.

~~John G. Perren~~ 10/21/86  
HUMAN FACTORS SPECIALIST DATE

St. Gelman 10-21-86  
DLC REVIEW TEAM LEADER DATE

John G. Perren 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

R. F. Krappa  
for J. P. Thomas 11/27/86  
DLC ENGINEERING MANAGER DATE

JGP/RE Martin 11/7/86  
DLC REG. AFFAIRS MANAGER DATE

Conrad for TPN 11/7/86  
DLC OPERATIONS MANAGER DATE



b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5213  
d) REVIEWED BY: John G. Proven e) DATE: 8-27-86  
DLC TECHNICAL COORDINATOR  
Et Elman  
DLC REVIEW TEAM LEADER  
f) HED TITLE: CHARACTER WIDTH-TO-HEIGHT RATIO IS TOO  
SMALL

g) ITEMS INVOLVED:

ERF/SPDS TERMINALS IN C.R.  
CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.2c

THE WIDTH-TO-HEIGHT RATIO FOR CHARACTERS DISPLAYED ON THE CRT IS TOO SMALL. GUIDELINES SPECIFY A MINIMUM OF 60% FOR THIS RATIO. THE VALUE AS FOUND IS 50%.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

ERRORS IN INTERPRETING DATA.  
DELAY IN INTERPRETING DATA

k) REVIEW AND RECOMMENDATIONS:

SINCE THE RATIO IS ONLY 10% LESS THAN THE SPECIFIED MINIMUM, AND THE CHARACTERS AS OBSERVED ARE SHARP, CLEAR, AND EASY TO READ, NO ACTION IS RECOMMENDED.

RT: CONCURS.

|                           |          |
|---------------------------|----------|
| <del>_____</del>          | 10/21/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <i>Et Elmann</i>          | 10-21-86 |
| DLC REVIEW TEAM LEADER    | DATE     |
| <i>John G. Prover</i>     | 10/21/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|                          |          |
|--------------------------|----------|
| <i>R. F. Krappa</i>      |          |
| for <i>J. P. Thomas</i>  | 11/07/86 |
| DLC ENGINEERING MANAGER  | DATE     |
| <i>JOP/RE Maebin</i>     | 11/7/86  |
| DLC REG. AFFIARS MANAGER | DATE     |
| <i>Conill for TPN</i>    | 11/7/86  |
| DLC OPERATIONS MANAGER   | DATE     |

b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5214

d) REVIEWED BY: [Signature] e) DATE: 8-21-86  
 DLC TECHNICAL COORDINATOR

[Signature]  
 DLC REVIEW TEAM LEADER

f) HED TITLE: GRAPHIC LINES CONTAIN LESS THAN THE  
 REQUIRED NUMBER OF RESOLUTION ELEMENTS/INCH

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM IN C.R.  
 CRT SCREEN CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.2 e

THE CHILEY 1055 CRT UTILIZES APPROXIMATELY 38 RESOLUTION ELEMENTS PER INCH. GUIDELINES REQUIRE A MINIMUM OF 50 RESOLUTION ELEMENTS/INCH FOR DEPICTING GRAPHIC LINES.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP-7.1 B31.1-1.4

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

INABILITY TO INTERPRET GRAPHIC IMAGES

- LOSS OF TIME
- LOSS OF MEANING OF DATA

k) REVIEW AND RECOMMENDATIONS:

THE REQUIREMENT FOR GRAPHIC RESOLUTION SHOULD BE DETERMINED WITHIN THE CONTEXT OF THE SYSTEM AT BVPS-2. GRAPHIC DISPLAYS SEEM CLEAR ENOUGH AS THEY ARE; ANY RECOMMENDATIONS FOR CHANGE SHOULD BE MADE IN LIGHT OF THIS DETERMINATION.

RT review indicates that graphic resolution as it now exists is adequate.

No Action is Recommended

|                           |          |
|---------------------------|----------|
| <del>_____</del>          | 10/21/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <del>Ed Elmann</del>      | 10-21-86 |
| DLC REVIEW TEAM LEADER    | DATE     |
| <del>John G. Prever</del> | 10/21/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|                           |          |
|---------------------------|----------|
| <del>R. F. Gappa</del>    | 11/07/86 |
| for J. P. Thomas          | DATE     |
| DLC ENGINEERING MANAGER   | DATE     |
| <del>JGP/RFMartin</del>   | 11/7/86  |
| DLC REG. AFFIARS MANAGER  | DATE     |
| <del>Conill for TPN</del> | 11/7/86  |
| DLC OPERATIONS MANAGER    | DATE     |

- b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5215
- d) REVIEWED BY: John G. Proven e) DATE: 8-21-86  
 DLC TECHNICAL COORDINATOR
- J. Gilman  
 DLC REVIEW TEAM LEADER
- f) HED TITLE: TREND LINES OBSCURE OTHER TREND LINES

## g) ITEMS INVOLVED:

ERF/SPDS SYSTEM IN C.R.  
 CRT DISPLAY CHARACTERISTICS

## h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.4 a (1)

WHEN TREND LINES USE THE SAME AREA ON THE CRT SCREEN (THE SAME X,Y COORDINATES), ONE TREND LINE WILL DISAPPEAR AND ONLY THE OTHER WILL BE VISIBLE.

## i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP 7.1 B3-12

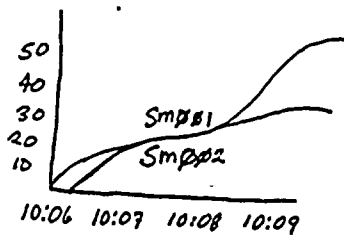
## j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

DELAY IN INTERPRETATION OF TREND DATA  
 MISINTERPRETATION OF TREND DATA

k) REVIEW AND RECOMMENDATIONS:

THIS PROBLEM COULD BE ALLEVIATED IN ONE OF THREE WAYS:

- ① WHEN TWO TREND LINES ARE SUPERIMPOSED, ONE COULD BE PLACED JUST ABOVE THE OTHER, OR
- ② WHILE THE TWO ARE SUPERIMPOSED, THE RESULTING LINE COULD BE FORMED FROM SMALL ALTERNATING SEGMENTS OF EACH COLOR CODE, OR
- ③ WHILE THE TWO LINES ARE SUPERIMPOSED, THEY COULD HAVE BOTH OF THEIR RESPECTIVE LABELS IN CLOSE PROXIMITY TO THE LINE. (ALTHOUGH SPACE MIGHT NOT ALWAYS ALLOW FOR THIS (EXAMPLE) IT COULD BE USED IN SOME INSTANCES)



\* Note: the lines and their respective labels are the same color as is presently the case

*[Signature]* 10/21/86  
 HUMAN FACTORS SPECIALIST DATE  
*[Signature]* 10-21-86  
 DLC REVIEW TEAM LEADER DATE  
*[Signature]* 10/21/86  
 DLC TECHNICAL COORDINATOR DATE

+) REVIEW AND DISPOSITION:

RT: Review indicates that it is useful to know that two lines are exactly in the same place. The value for each color is coded and displayed on the right side of the screen. No Action is recommended.

L) Review + Disposition

Agree No Action Required

R. F. Zappa  
 for J. P. Thomas 11/07/86  
 DLC ENGINEERING MANAGER DATE  
*[Signature]* 11/7/86  
 DLC REG. AFFIARS MANAGER DATE  
 Conill for TPN 11/7/86  
 DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5216

d) REVIEWED BY: John G. Proven  
DLC TECHNICAL COORDINATOR e) DATE: 8-22-86  
Et. Elmann  
DLC REVIEW TEAM LEADER

f) HED TITLE: NUMERICAL DESIGNATORS START WITH 0  
INSTEAD OF A "1" AS SPECIFIED IN THE GUIDELINES

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM TERMINALS IN CR  
CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.4 f (2)

GUIDELINES SPECIFY THAT NUMERICAL DESIGNATORS BEGIN WITH THE NUMBER "1" (NOT ZERO). THE MENUS IN THE PLANT COMPUTER SYSTEM START WITH 00, THEN 01, 02, etc.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1 B3-14


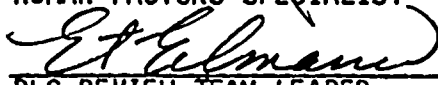
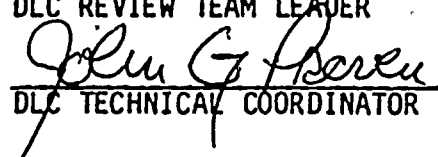
j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

DELAY IN INTERPRETATION OF MENU DATA

k) REVIEW AND RECOMMENDATIONS:

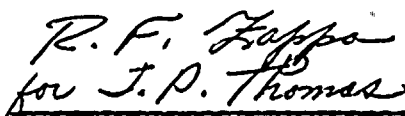


REVISE MENU FORMAT TO INCLUDE  
01 AS THE FIRST NUMERICAL SELECTION  
DESIGNATOR.

RT: Review indicates that zero (0) is only used  
as the numerical designator for the main menu  
this is useful because the default of no entry  
and pressing the execute key will also bring up  
the main menu. For this  
reason NO ACTION IS  
RECOMMENDED

|  |          |
|--|----------|
|  | 10/21/86 |
| HUMAN FACTORS SPECIALIST   | DATE     |
|  | 10-21-86 |
| DLC REVIEW TEAM LEADER   | DATE     |
|  | 10/21/86 |
| DLC TECHNICAL COORDINATOR  | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|  |          |
|--|----------|
|  | 11/07/86 |
| DLC ENGINEERING MANAGER  | DATE     |
|  | 11/7/86  |
| DLC REG. AFFIARS MANAGER   | DATE     |
|  | 11/7/86  |
| DLC OPERATIONS MANAGER   | DATE     |



- b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5217  
d) REVIEWED BY: John G Proven e) DATE: 8-22-86  
DLC TECHNICAL COORDINATOR  
E. Elmann  
DLC REVIEW TEAM LEADER  
f) HED TITLE: PERIODS NOT USED AFTER ITEM SELECTION  
DESIGNATORS IN MENUS

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM TERMINALS IN C.R  
CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.4 K

GUIDELINES STIPULATE THAT ITEM SELECTION DESIGNATORS MUST BE FOLLOWED BY A PERIOD. THE MENUS IN THE PLANT COMPUTER SYSTEM DO NOT HAVE PERIODS AFTER NUMERICAL SELECTION DESIGNATORS.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1 B3-16

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

DELAY IN INTERPRETATION OF DATA

k) REVIEW AND RECOMMENDATIONS:

REVISE MENU FORMAT TO INCLUDE PERIODS AFTER THE NUMERICAL SELECTION INDICATORS.

ie Ø1.

Ø2.

Ø3.

The review team does not view the lack of periods after numerical designators as a serious problem

No Action is Recommended

~~W. J. ...~~ 10/21/86  
 HUMAN FACTORS SPECIALIST DATE  
 E. J. Elmstrom 10.21.86  
 DLC REVIEW TEAM LEADER DATE  
 J. G. Proven 10/21/86  
 DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

R. F. Zappa  
 for J. P. Thomas 11/07/86  
 DLC ENGINEERING MANAGER DATE  
 J. G. P. Martin 11/7/86  
 DLC REG. AFFAIRS MANAGER DATE  
 Comell for TPN 11/7/86  
 DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5218

d) REVIEWED BY: John Groen e) DATE: 8-22-86  
DLC TECHNICAL COORDINATOR

Et Elman  
DLC REVIEW TEAM LEADER

f) HED TITLE: LISTS OF OPTIONS IN MENUS ARE NOT IN ORDER OF THEIR PROBABILITY OF SELECTION

g) ITEMS INVOLVED:

ERA/SPDS TERMINALS IN C.R.  
CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.5 d

GUIDELINES STIPULATE THAT LISTS OF OPTIONS BE PRESENTED ACCORDING TO THE PROBABILITY OF SELECTION OF EACH ITEM, THIS IS NOT THE CASE WITH THE MENUS USED IN THE PLANT COMPUTER SYSTEM.

i) DATA COLLECTION DESCRIPTION:

PHOTOS  
A38, C27, 28, 29

CONTROL ROOM SURVEY (R403)

COMPUTER SYSTEM TP 7.1 B3-19

j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:

DELAY IN LOCATING DESIRED OPTION FROM MENU

k) REVIEW AND RECOMMENDATIONS:

OPTIONS IN MENUS SHOULD BE REORDERED SO THAT THE OPTIONS MOST FREQUENTLY SELECTED WILL PRECEDE THOSE THAT ARE LESS FREQUENTLY SELECTED. ITEMS IN MENUS COULD BE RANKED BY OPERATORS IN TERMS OF THEIR FREQUENCY OF USE TO DETERMINE THIS ORDER.

RT: Review indicates that the options are broken up into logical groups. The most frequently used options have dedicated function keys. For these reasons no action is recommended

*[Signature]* 10/21/86  
HUMAN FACTORS SPECIALIST DATE

*[Signature]* 10-21-86  
DLC REVIEW TEAM LEADER DATE

*[Signature]* 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

*[Signature]*  
for *[Signature]* 11/07/86  
DLC ENGINEERING MANAGER DATE

*[Signature]* 11/7/86  
DLC REG. AFFIARS MANAGER DATE

*[Signature]* 11/7/86  
DLC OPERATIONS MANAGER DATE

- b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5219
- d) REVIEWED BY: [Signature] e) DATE: 6-27-86  
DLC TECHNICAL COORDINATOR
- [Signature]  
DLC REVIEW TEAM LEADER
- f) HED TITLE: CURSOR SELECTION OPERATION ON SPDS MENU DOES NOT OPERATE IN AN EXPECTED MANNER
- g) ITEMS INVOLVED:  
ERF/SPDS TERMINALS IN C.R.  
SPDS MAP MENU
- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2 5 L  
CURSOR CONTROLS DO NOT DIRECT CURSOR LOGICALLY IN SPDS MAP MENU.  
Photo B1
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1
- j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
DELAY IN ACQUIRING SPDS INFORMATION

k) REVIEW AND RECOMMENDATIONS:

MODIFY SPDS SOFTWARE SO THAT WHEN THE CURSOR CONTROLS ARE OPERATED, THE CURSOR MOVES IN THE DIRECTION OF THE ARROW ON THE CURSOR CONTROL KEYS. AS THE SYSTEM EXISTS NOW, THE CURSOR CONTROL LOGIC IS ASSOCIATED WITH A LINE SCHEME ON THE DISPLAY SO THAT, FOR INSTANCE, PRESSING THE LEFT ARROW KEY WILL RESULT IN THE CURSOR MOVING TO THE LAST POSITION ON THE PREVIOUS LINE WHICH AT TIMES IS UP AND TO THE RIGHT OF THE CURSOR'S PRESENT POSITION.

THE LOGIC OF THIS KIND OF CURSOR MOVEMENT IS UNDERSTANDABLE HOWEVER IT DOES NOT MAKE IMMEDIATE SENSE TO THE USER, IT DOES NOT CONFORM TO THE EXPECTED USE OF LEFT, RIGHT UP, DOWN CONTROLS.

BT: CONCURS. 'Modify so that cursor movement is more logical and more easily understood by operators

1) REVIEW AND DISPOSITION:

Agree with RT Recommendation

|                           |          |
|---------------------------|----------|
| <i>[Signature]</i>        | 10/21/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <i>[Signature]</i>        | 10-21-86 |
| DLC REVIEW TEAM LEADER    | DATE     |
| <i>[Signature]</i>        | 10/21/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

|                            |          |
|----------------------------|----------|
| <i>R. F. Gappa</i>         |          |
| for <i>J. P. Thomas</i>    | 11/07/86 |
| DLC ENGINEERING MANAGER    | DATE     |
| <i>[Signature]</i>         | 11/7/86  |
| DLC REG. AFFIARS MANAGER   | DATE     |
| <i>[Signature]</i> for TPN | 11/7/86  |
| DLC OPERATIONS MANAGER     | DATE     |

b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5220

d) REVIEWED BY: John G. Proven e) DATE: 8-22-86  
 DLC TECHNICAL COORDINATOR

E. Gilman  
 DLC REVIEW TEAM LEADER

f) HED TITLE: HIGHLIGHTING METHODS ASSOCIATED WITH  
 EMERGENCY CONDITIONS ARE ALSO USED IN ASSOCIATION  
 WITH NORMAL CONDITIONS

g) ITEMS INVOLVED:

ERF/SPDS TERMINALS IN CR  
 CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.7 b (2)  
WHITE LETTERS ON RED IS USED IN ASSOCIATION WITH  
 EMERGENCY CONDITIONS. IT IS ALSO USED TO INDICATE  
 NORMAL FUNCTIONING OF THE COMPUTER SYSTEM. (NODE ID.  
 NUMBERS IN "DEMILX") PHOTOS A28, A29 & C1

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP 7.1 B3-24

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

DELAY IN INTERPRETATION OF EMERGENCY CONDITIONS

k) REVIEW AND RECOMMENDATIONS:

THE WHITE TEXT ON THE RED BACKGROUND OF THE DEMUX DISPLAYS IS IDENTICAL TO THE WHITE ON RED USED TO DEPICT ALARM CONDITIONS ON OTHER DISPLAYS. SINCE THE DEMUX DISPLAYS ARE NECESSARY FOR OPERATORS, THE USE OF AN ALTERNATIVE COLOR SCHEME SHOULD BE INVESTIGATED.

RT: CONCUR

~~\_\_\_\_\_~~ 10/21/86  
HUMAN FACTORS SPECIALIST DATE  
G. E. Elman 10.21.86  
DLC REVIEW TEAM LEADER DATE  
John G. Rosen 10/21/86  
DLC TECHNICAL COORDINATOR DATE

l) REVIEW AND DISPOSITION:

Agree with RT Recommendation  
Overall color scheme is being reviewed  
by DLC & SWEC to eliminate  
inconsistencies.

R. F. Zappa  
for J. P. Thomas 11/07/86  
DLC ENGINEERING MANAGER DATE  
JCP / R.F. Maester 11/7/86  
DLC REG. AFFAIRS MANAGER DATE  
Bill For TPN 11/7/86  
DLC OPERATIONS MANAGER DATE



b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5221

d) REVIEWED BY: John G. Proven e) DATE: 8-22-86

DLC TECHNICAL COORDINATOR

H. J. Elman  
DLC REVIEW TEAM LEADER

f) HED TITLE: THERE IS NO INDICATION OF THE REMAINING SUPPLY OF RECORDING MATERIALS ON PRINTERS.

g) ITEMS INVOLVED:

ERF/SPDS SYSTEM IN C.R.  
PRINTER CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.3.1 e(2)

THERE IS NO INDICATION OF THE REMAINING SUPPLY OF RECORDING MATERIALS ON PRINTERS. THE GUIDELINES STIPULATE THAT THERE SHOULD BE AN INDICATION OF THE SUPPLY OF THESE MATERIALS.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R 403)  
COMPUTER SYSTEM TP 7.1 B3-31

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

LOSS OF PRINTED DATA.  
DELAY IN UTILIZATION OF PRINTED DATA

k) REVIEW AND RECOMMENDATIONS:

CREATE A VISIBLE LOG SHEET THAT WILL SHOW WHEN PAPER AND/OR INK WAS REPLACED FOR EACH PRINTER.

OR

A PROCEDURE SHOULD BE PUT IN PLACE WHICH WOULD PROVIDE THAT LEVELS OF NECESSARY RECORDING MATERIALS ARE CHECKED AND/OR REPLACED PERIODICALLY.

RT: review indicates that an individual is on duty to periodically maintain printers.

Fail over capability to another printer exists through which a print command will automatically transfer. No further action is recommended.

|                           |          |
|---------------------------|----------|
| <i>[Signature]</i>        | 10/21/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <i>[Signature]</i>        | 10-22-86 |
| DLC REVIEW TEAM LEADER    | DATE     |
| <i>[Signature]</i>        | 10/21/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|                          |          |
|--------------------------|----------|
| <i>[Signature]</i>       | 11/07/86 |
| DLC ENGINEERING MANAGER  | DATE     |
| <i>[Signature]</i>       | 11/7/86  |
| DLC REG. AFFIARS MANAGER | DATE     |
| <i>[Signature]</i>       | 11/7/86  |
| DLC OPERATIONS MANAGER   | DATE     |

- b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5222
- d) REVIEWED BY: John G. Groven e) DATE: 8-22-86  
DLC TECHNICAL COORDINATOR
- J. E. Eblum  
DLC REVIEW TEAM LEADER
- f) HED TITLE: THERE ARE NO INSTRUCTIONS FOR RELOADING PAPER RIBBON AND INK ON PRINTERS
- g) ITEMS INVOLVED:  
ERF/SPDS SYSTEM IN C.R  
PRINTER CHARACTERISTICS
- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.3.1 e (3)  
THERE ARE NO INSTRUCTIONS FOR RELOADING PAPER, RIBBON AND INK ON PRINTERS. GUIDELINES STIPULATE THAT SUCH INSTRUCTIONS SHOULD BE ATTACHED TO PRINTER.
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R 403)  
COMPUTER SYSTEM TP 7.1 B3-31
- j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
LOSS OF PRINTED DATA  
DELAY IN PERFORMING OTHER DUTIES:

k) REVIEW AND RECOMMENDATIONS:

MAKE AN INSTRUCTION PLATE THAT INCLUDES DIRECTIONS FOR REPLACING/RELOADING PAPER, RIBBON, AND INK AND ATTACH THIS TO THE PRINTERS IN THE CR.

RTI Review indicates that individual is responsible for maintenance of printers (see HED 201C-5221)

No further action is recommended

~~JDA~~ 10/21/86  
HUMAN FACTORS SPECIALIST DATE

J. Elmann 10-21-86  
DLC REVIEW TEAM LEADER DATE

John E. Brown 10/21/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

R. F. Gappa  
for J. P. Thomas 11/07/86  
DLC ENGINEERING MANAGER DATE

J.P. / R.F. Martin 11/7/86  
DLC REG. AFFAIRS MANAGER DATE

Quill for TPN 11/7/86  
DLC OPERATIONS MANAGER DATE

- b) ORIGINATOR: R. KAYE c) HED NO.: 2010-5223
- d) REVIEWED BY: John G. Brown  
DLC TECHNICAL COORDINATOR e) DATE: 9-2-86  
H. J. Elman  
DLC REVIEW TEAM LEADER
- f) HED TITLE: THE GRAPHS USED DO NOT MAKE NUMBERED  
GRIDS MORE BOLD THAN UNNUMBERED GRIDS.
- g) ITEMS INVOLVED:  
ERF/SPDS SYSTEM IN C.R  
CRT DISPLAY CHARACTERISTICS
- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.3.3 (1)  
GRAPHS SHOULD BE CONSTRUCTED SO THAT NUMBERED GRIDS  
ARE BOLDER THAN UNNUMBERED GRIDS, THE ERF GRAPHS  
UTILIZE GRIDS OF THE SAME DEGREE OF BOLDNESS.
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R405)  
COMPUTER SYSTEM T.P. 7.1 B3-35
- j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:  
DELAY IN INTERPRETING GRAPHS  
ERRORS IN INTERPRETING GRAPHS

k) REVIEW AND RECOMMENDATIONS:

GRAPHS ARE MORE EASILY AND ACCURATELY INTERPRETED WHEN THE NUMBERED GRIDS ARE MADE BOLDER THAN THE GRIDS BETWEEN THEM. THE SOFTWARE SHOULD BE MODIFIED TO USE THIS ENHANCEMENT TECHNIQUE.

RT: Review indicates that this is not misleading to the operator, displays are understandable. Also change is not feasible.

No Action is recommended

|                           |                    |
|---------------------------|--------------------|
| <del>T. J. Joss</del>     | <del>12/3/86</del> |
| HUMAN FACTORS SPECIALIST  | DATE               |
| <i>G. Gluman</i>          | 10-21-86           |
| DLC REVIEW TEAM LEADER    | DATE               |
| <i>J. G. Jensen</i>       | 10/21/86           |
| DLC TECHNICAL COORDINATOR | DATE               |

1) REVIEW AND DISPOSITION:

No Action is Required

|                          |                 |
|--------------------------|-----------------|
| <i>R. F. Fappa</i>       | <i>11/07/86</i> |
| for <i>J. P. Thomas</i>  | DATE            |
| DLC ENGINEERING MANAGER  | DATE            |
| <i>JGP/RE Martin</i>     | <i>11/7/86</i>  |
| DLC REG. AFFAIRS MANAGER | DATE            |
| <i>Conill for TPN</i>    | <i>11/7/86</i>  |
| DLC OPERATIONS MANAGER   | DATE            |

- b) ORIGINATOR: R. KAYE c) HED NO.: 2CC-5224
- d) REVIEWED BY: John G. Proven  
DLC TECHNICAL COORDINATOR e) DATE: 8-22-86
- Et Elmura  
DLC REVIEW TEAM LEADER
- f) HED TITLE: THERE IS NO BREAKUP OF DATA INTO GROUPS  
WHEN LONG COLUMNS OF DATA ARE PRESENTED
- g) ITEMS INVOLVED:  
ERF/SPDS SYSTEM IN C.R.  
CRT DISPLAY CHARACTERISTICS
- h) PROBLEM DESCRIPTION AND O700 PARAGRAPH NUMBER: 6.7.3.3 d.2  
DISPLAYS THAT INCLUDE LONG COLUMNS OF DATA  
DO NOT BREAK DATA INTO UNITS. THIS DATA SHOULD  
BE PRESENTED IN GROUPS OF FIVE (FIVE LINES).
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R 403)  
COMPUTER SYSTEM TP 7.1 B3-35
- j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
DELAY IN INTERPRETING DATA.  
MISINTERPRETATION OF DATA

k) REVIEW AND RECOMMENDATIONS:

REVISE SOFTWARE SO THAT WHEN DATA LISTS ARE LONG, THE LINES OF DATA ARE PRESENTED IN GROUPS OF FIVE.

RT: Review indicates that digital trend displays are scanned ~~and~~ <sup>90°</sup> vertically rather than horizontally and each value not evaluated point by point. Comparative evaluations over time are made. For point details, a space between every 1/2 inch line would inhibit the ability to display all necessary values.

No Action Recommended

|                           |          |
|---------------------------|----------|
| <i>[Signature]</i>        | 10/13/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <i>[Signature]</i>        | 10/21/86 |
| DLC REVIEW TEAM LEADER    | DATE     |
| <i>[Signature]</i>        | 10/21/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

No Action Required

|                                       |          |
|---------------------------------------|----------|
| <i>[Signature]</i><br>for J.P. Thomas | 11/07/86 |
| DLC ENGINEERING MANAGER               | DATE     |
| <i>[Signature]</i>                    | 11/7/86  |
| DLC REG. AFFAIRS MANAGER              | DATE     |
| <i>[Signature]</i> FOR TPN            | 11/7/86  |
| DLC OPERATIONS MANAGER                | DATE     |



- b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5225
- d) REVIEWED BY: [Signature]  
DLC TECHNICAL COORDINATOR e) DATE: 10/30/86
- [Signature]  
DLC REVIEW TEAM LEADER
- f) HED TITLE: THE USE OF AMBER (YELLOW) IS INCONSISTENT WITH THE USE OF YELLOW IN OTHER COMPUTER SYSTEMS IN THE CONTROL ROOM
- g) ITEMS INVOLVED:  
ERF/SPDS IN C.R. (SPDS ONLY)  
CRT DISPLAY CHARACTERISTICS
- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.5.1.6 d(2), 6.7.2.7 k(1)  
6.7.2.7 l(3)  
THE SPDS SYSTEM USES YELLOW AS A COLOR CODE FOR NORMAL DATA. OTHER SYSTEMS USE YELLOW AS A CODE FOR SUSPECT DATA OR AS A LOW LEVEL ALARM CONDITION
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R 403)  
COMPUTER SYSTEM TP 7.1 B3-2, B3-26, B3-27
- j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
MISINTERPRETATION OF SPDS "NORMAL" DATA  
MISINTERPRETATION OF SUSPECT OR LOW LEVEL ALARM DATA ON OTHER COMPUTER BASED SYSTEMS

k) REVIEW AND RECOMMENDATIONS:

GREEN SHOULD BE SUBSTITUTED FOR AMBER (YELLOW) ON THE SPDS WHERE YELLOW IS USED TO DEPICT NORMAL CONDITIONS. CARE SHOULD BE TAKEN SO THAT THE GREEN USED IS BRIGHT ENOUGH TO BE EASILY READ. IF THIS CANNOT BE DONE, WHITE WOULD BE AN ACCEPTABLE ALTERNATIVE.

RT Review indicates that green is preferred and white is an acceptable alternative

~~J. P. Brown~~ 11/18/86  
HUMAN FACTORS SPECIALIST DATE

*E. Elmann* 12/2/86  
DLC REVIEW TEAM LEADER DATE

*J. P. Brown* 11/18/86  
DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

See attached Review & Disposition

*J. P. Brown* 12-17-86  
DLC ENGINEERING MANAGER DATE

*J. P. Martin* 12/17/86  
DLC REG. AFFAIRS MANAGER DATE

*Chill Fr TPN* 12/17/86  
DLC OPERATIONS MANAGER DATE

1. Review and Dispositon for HED 2CIC-5225

DLC Management has decided not to proceed with the implementation of any color code designation changes to the SPDS at this time because changing the quality codes along with the colors of the (W) SPDS may affect the licensability of the SPDS. Such a change does not enhance the SPDS quality code and color designation.

A review of the control room color code applications including the PCS, ERFCs, DRMS and the SPDS result in the identification of only one HED, the use of amber to represent normal conditions on the SPDS.

Additionally, a similar condition currently exists on BV-1 and has been identified to the NRC in the BVPS-1 Control Room Design Review Report. BV-1 has not indicated any intention to change the SPDS nor has justification been provided for not changing the BV-1 SPDS. The NRC has not provided any indication to BV-1 relative to the acceptability of the existing BV-1 SPDS conditon. Because a change to the BV-2 SPDS will almost certainly result in a requirement to change the BV-1 SPDS and the simulator, DLC has decided that any changes will be jointly developed by BV-1 and BV-2 personnel to ensure that the operation of both units is mutually enhanced by the change.



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- b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5226
- d) REVIEWED BY: John C. Proven e) DATE: 10/30/86  
 DLC TECHNICAL COORDINATOR
- JGP/ETETmann  
 DLC REVIEW TEAM LEADER
- f) HED TITLE: NO INDICATION OF CHANGES IN SYSTEM FUNCTIONING ARE GIVEN BY ERF/SPDS
- g) ITEMS INVOLVED:  
ERF/SPDS IN CONTROL ROOM  
COMPUTER/OPERATOR DIALOGUE
- h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.6 i  
SYSTEM DOES NOT GIVE OPERATOR ANY KIND OF MESSAGE WHEN THE STATUS OF THE SYSTEM FUNCTIONING CHANGES
- i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP 7.1 B3-23
- j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:  
DELAY IN TAKING MEASURES TO CORRECT SYSTEM FAILURE.  
LOSS OF DATA FROM FAILED SYSTEM.

k) REVIEW AND RECOMMENDATIONS:

MODIFY ERE/SPDS SOFTWARE SO THAT WHEN THE STATUS OF THE SYSTEM CHANGES, A MESSAGE TO THIS EFFECT APPEARS ON THE CRT SCREEN. ANOTHER ALTERNATIVE WOULD BE TO USE AN ANNUNCIATOR WINDOW THAT SAYS "ERE/SPDS SYSTEM TROUBLE" AS IS DONE WITH THE PLANT COMPUTER SYSTEM.

RT Review indicates that this is not an HED as 2 annunciator windows exist, one for each CPU

NO ACTION REQUIRED

|                           |          |
|---------------------------|----------|
| <del>_____</del>          | 11/18/86 |
| HUMAN FACTORS SPECIALIST  | DATE     |
| <i>J. Elman</i>           | 12/2/86  |
| DLC REVIEW TEAM LEADER    | DATE     |
| <i>J. Otkoven</i>         | 11/18/86 |
| DLC TECHNICAL COORDINATOR | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action

|                                    |          |
|------------------------------------|----------|
| <i>R.F. Zappa for J. P. Thomas</i> | 12/02/86 |
| DLC ENGINEERING MANAGER            | DATE     |
| <i>R. E. Martin</i>                | 12/2/86  |
| DLC REG. AFFIARS MANAGER           | DATE     |
| <i>Conill for TPN</i>              | 12/2/86  |
| DLC OPERATIONS MANAGER             | DATE     |

b) ORIGINATOR: R. KAYE c) HED NO.: 2 CIC-5227

d) REVIEWED BY: John G. Poreen e) DATE: 10/31/86  
 DLC TECHNICAL COORDINATOR

JGP/ET Eilmann  
 DLC REVIEW TEAM LEADER

f) HED TITLE: VIEWING ANGLE FOR TABLE A ERF/SPDS CRT  
IS TOO LARGE (SITTING)

g) ITEMS INVOLVED:

ERF/SPDS IN C.R.

TABLE A ERF/SPDS CRT

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.3 c (1)(b)

THE VIEWING ANGLE SHOULD BE NO MORE THAN  $40^{\circ}$  BELOW THE OPERATORS HORIZONTAL L.O.S. THE TABLE A ERF/SPDS CRT IS  $43^{\circ}$  BELOW THE HORIZONTAL L.O.S.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)

COMPUTER SYSTEM TP-7.1 B1.1-12



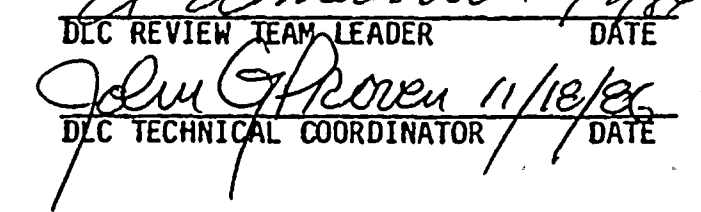
j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

FATIGUE FROM PROLONGED READING OF CRT  
 ERRORS IN READING CRT TEXT

k) REVIEW AND RECOMMENDATIONS:




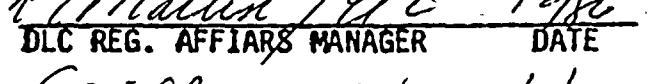
THE ANGLE IS ONLY 3° MORE THAN NUREG 0700 SPECIFIED LIMIT. THE SEAT TO BE USED IS ADJUSTABLE SO THAT IF AN OPERATOR FOUND READING THE CRT UNCOMFORTABLE, HE COULD LOWER THE SEAT. (ALL MEASUREMENTS WERE TAKEN WITH THE SEAT LEFT AT THE LEVEL AT WHICH IT WAS FOUND) FOR THESE REASONS, NO ACTION IS RECOMMENDED.

RT CONCURS

|  |          |
|--|----------|
|  | 11/18/86 |
| HUMAN FACTORS SPECIALIST   | DATE     |
|  | 12/2/86  |
| DLC REVIEW TEAM LEADER   | DATE     |
|  | 11/18/86 |
| DLC TECHNICAL COORDINATOR  | DATE     |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|  |          |
|--|----------|
|  |          |
|  | 12/02/86 |
| DLC ENGINEERING MANAGER  | DATE     |
|  | 12/2/86  |
| DLC REG. AFFAIRS MANAGER   | DATE     |
|  | 12/2/86  |
| DLC OPERATIONS MANAGER   | DATE     |



b) ORIGINATOR: R. KAYE c) HED NO.: 2C1C-5228

d) REVIEWED BY: John G. Proven e) DATE: 10/31/86  
 DLC TECHNICAL COORDINATOR

JGP/ET Eilmann  
 DLC REVIEW TEAM LEADER

f) HED TITLE: VIEWING ANGLE (STANDING) IS TOO LARGE  
FOR TABLE A ERF/SPDS CRT

g) ITEMS INVOLVED:

ERF/SPDS IN C.R.

TABLE A ERF/SPDS CRT

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.3 d(1)(b)

VIEWING ANGLE FOR STANDING OPERATORS SHOULD NOT BE GREATER THAN  $40^{\circ}$  BELOW THE OPERATOR'S HORIZONTAL LINE OF SIGHT. THE VIEWING ANGLE FOR A STANDING 95th PERCENTILE MALE IS  $60^{\circ}$  BELOW THE HORIZONTAL L.O.S.

i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)

COMPUTER SYSTEM TP-7.1 B1.1-13

j) SPECIFIC HUMAN ERRORS(s) OR EQUIPMENT DESIGN PROBLEM:

ERRORS IN READING CRT DISPLAYED TEXT  
 FATIGUE FROM PROLONGED READING OF CRT TEXT

k) REVIEW AND RECOMMENDATIONS:

THIS DISCREPANCY COMES ABOUT TO A LARGE EXTENT FROM THE FACT THAT A 95TH PERCENTILE MALE WAS USED TO DETERMINE THE VIEWING ANGLE. THE ANGLE BECOMES RAPIDLY LESS AS ONE APPROACHES THE EYE HEIGHT OF A 5TH PERCENTILE FEMALE (44° BELOW HORIZONTAL LOS). THE MOST IMPORTANT POINT IS THAT THE OPERATOR HAS THE OPTION TO, AND WOULD NORMALLY SIT IN FRONT OF THIS DISPLAY. FOR THIS REASON, NO ACTION IS RECOMMENDED.

RT Concurs Noting that the console was not designed as a sit/stand console.

|                           |                     |
|---------------------------|---------------------|
| <del>W. A. ...</del>      | <del>11/18/86</del> |
| HUMAN FACTORS SPECIALIST  | DATE                |
| <i>J. G. ...</i>          | 12/2/86             |
| DLC REVIEW TEAM LEADER    | DATE                |
| <i>R. G. ...</i>          | 11/18/86            |
| DLC TECHNICAL COORDINATOR | DATE                |

1) REVIEW AND DISPOSITION:

Agree No Action Required

|                          |          |
|--------------------------|----------|
| <i>R. F. Frappa for</i>  |          |
| <i>J. P. Thomas</i>      | 12/02/86 |
| DLC ENGINEERING MANAGER  | DATE     |
| <i>R. E. Martin</i>      | 12/2/86  |
| DLC REG. AFFAIRS MANAGER | DATE     |
| <i>Conill for TPN</i>    | 12/2/86  |
| DLC OPERATIONS MANAGER   | DATE     |

b) ORIGINATOR: R. KAYE c) HED NO.: 2CIC-5229

d) REVIEWED BY: J.G. Proven e) DATE: 11/5/86  
 DLC TECHNICAL COORDINATOR

JGP/ETE/Manin  
 DLC REVIEW TEAM LEADER

f) HED TITLE: PORTIONS OF SPDS HEADING IS YELLOW

g) ITEMS INVOLVED:

SPDS IN C.R.  
 CRT DISPLAY CHARACTERISTICS

h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.2.7 (3)  
 PORTIONS OF SPDS DISPLAY HEADINGS ARE YELLOW (ie SPDS, DAY & TIME). THIS VIOLATES THE CONVENTION FOR THE USE OF YELLOW IN OTHER COMPUTER SYSTEMS (ie AS A DESIGNATION FOR SUSPECT DATA OR LOW LEVEL ALARM CONDITIONS).

i) DATA COLLECTION DESCRIPTION:  
CONTROL ROOM SURVEY (R403)  
COMPUTER SYSTEM TP4.1 B3-27

j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:  
MISINTERPRETATION OF YELLOW DATA IN BALANCE OF SYSTEM AND OTHER SYSTEMS.

CHANGE THE YELLOW PORTION OF SPDS HEADINGS TO WHITE OR ANOTHER ACCEPTABLE COLOR SUCH AS CYAN.

RT Review indicates that yellow day time is a trip time. Normal day & time is displayed in cyan. Use of yellow for "SPDS" is not a problem & therefore

No Action is Recommended

~~T. Von~~ 11/18/86  
 HUMAN FACTORS SPECIALIST DATE

J. Elmann 12/2/86  
 DLC REVIEW TEAM LEADER DATE

John G. Raven 11/18/86  
 DLC TECHNICAL COORDINATOR DATE

1) REVIEW AND DISPOSITION:

Agree No Action Required

R. F. Krappa for  
 J. P. Thomas 12/02/86  
 DLC ENGINEERING MANAGER DATE

R. E. Martin / ETE 12/2/86  
 DLC REG. AFFAIRS MANAGER DATE

Conrad for TPN 12/2/86  
 DLC OPERATIONS MANAGER DATE

b) ORIGINATOR: R. KAYE c) HED NO.: 2 CIC-5230  
 d) REVIEWED BY: [Signature] e) DATE: 10/22/86  
 DLC TECHNICAL COORDINATOR  
[Signature]  
 DLC REVIEW TEAM LEADER

f) HED TITLE: PRESENTATION MODE KEY IS NOT CLEARLY  
 LABELED

## g) ITEMS INVOLVED:

ERF/BPDS CONSOLE IN C.R.

KEYBOARD CHARACTERISTICS

## h) PROBLEM DESCRIPTION AND 0700 PARAGRAPH NUMBER: 6.7.1.5 d(3)

FUNCTION CONTROL KEYS SHOULD BE CLEARLY LABELED TO INDICATE THEIR FUNCTION TO THE OPERATOR. THE PRESENTATION MODE KEY FOR A HORIZONTAL BAR DISPLAY IS LABELED "BAR" WHILE AN ADJACENT KEY FOR A VERTICAL BAR DISPLAY IS LABELED "VERT BAR".

## i) DATA COLLECTION DESCRIPTION:

CONTROL ROOM SURVEY (R403)  
 COMPUTER SYSTEM TP9,1 B3-8

## j) SPECIFIC HUMAN ERRORS(S) OR EQUIPMENT DESIGN PROBLEM:

DELAY IN OBTAINING INFORMATION FROM ERF THROUGH  
 CONFUSION OF PRESENTATION MODE KEY FUNCTION

k) REVIEW AND RECOMMENDATIONS:

THE "BAR" PRESENTATION MODE KEY SHOULD BE RELABELED TO MORE ADEQUATELY COMMUNICATE ITS FUNCTION TO THE OPERATOR. IF THE VERTICAL BAR GRAPH KEY IS LABELED "VERT BAR", THE HORIZONTAL BAR GRAPH KEY SHOULD BE LABELED "HORIZ BAR". AS IT IS, THE "BAR" KEY COULD BE CONFUSED WITH THE VERTICAL BAR FUNCTION.

RT Review Concurs

RT Agrees with DLC Management Position 12/2/86 JGP.

|                              |          |
|------------------------------|----------|
| <del>T. J. [Signature]</del> | 11/18/86 |
| HUMAN FACTORS SPECIALIST     | DATE     |
| [Signature]                  | 12/2/86  |
| DLC REVIEW TEAM LEADER       | DATE     |
| [Signature]                  | 11/18/86 |
| DLC TECHNICAL COORDINATOR    | DATE     |

1) REVIEW AND DISPOSITION:

Disagree for 3 reasons.

1. Vert Bar is identified implying the other should be horizontal.
2. Both graphs display the same information
3. No safety significance involved

Therefore No Action is required and key label will not be changed.

|                                  |          |
|----------------------------------|----------|
| R.F. [Signature] for J.P. Thomas | 12/02/86 |
| DLC ENGINEERING MANAGER          | DATE     |
| [Signature]                      | 12/2/86  |
| DLC REG. AFFIARS MANAGER         | DATE     |
| [Signature] for TPN              | 12/2/86  |
| DLC OPERATIONS MANAGER           | DATE     |