

Log # TXX-90243
File # 919

July 10, 1990

William J. Cahill, Jr.
Executive Vice President

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NO. 50-445
SAFETY PARAMETER DISPLAY SYSTEM (SPDS)
AVAILABILITY TEST REPORT

- REF: 1) TU Electric letter logged TXX-89709 from Mr. W. J. Cahill, Jr.
to NRC, dated September 19, 1989
- 2) CPSES Safety Evaluation Report, Supplement 22 (SSER 22).
Section 22, Item I.D.2(4), dated January, 1990

Gentlemen:

In Reference 1), TU Electric committed to performing a thirty day test to determine SPDS availability within sixty days after Unit 1 fuel load. The purpose of this letter is to notify the NRC that the test is complete and that TU Electric was successful in achieving the 99% availability goal.

Enclosed is a copy of the test report. Included in the test report are brief descriptions of the logged SPDS downtimes. During the thirty day test run, several inconsistencies were noted between independent logs taken by different organizations, such as missing log entries. Based on these inconsistencies, TU Electric has enhanced existing procedures to better assess SPDS availability. Specific details are described in the enclosed test report.

Sincerely,

William J. Cahill, Jr.

By: 
D. S. Marshall
Generic Licensing Manager

VPC/vld
Enclosure

c - Mr. R. D. Martin, Region IV
Resident Inspectors, CPSES (3)

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ENCLOSURE TO TXX-90243
(72 PAGES)

TU ELECTRIC
DESIGN ENGINEERING ORGANIZATION

ENGINEERING REPORT
SPDS AVAILABILITY TEST

ER-IC-019

REV 0

9 July 1990

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ABSTRACT

Comanche Peak Steam Electric Station (CPSES) has demonstrated that 99% availability of the Safety Parameter Display System (SPDS) was maintained during a continuous 30 day, 720 hour period, thus fulfilling the commitment to the Nuclear Regulatory Commission (NRC) as specified in the Safety Evaluation Report (SER) Supplement 22 Section 22.

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ATTACHMENTS

Attachment A	-	EGT-342A Test Summary
Attachment B	-	STA-622, Rev. 1, "Administrative Control of the ERF Computer"
Attachment C	-	CPSES ERF Status Log
Attachment D	-	Technical Evaluations
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Attachment F	-	EGT-342A, Rev. 1, "SPDS Availability Test" (without attachments)
Attachment G	-	Log of Work Orders Processed Through MMCP (Maintenance Management Computer Program)
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INTRODUCTION

This report has been issued to demonstrate 99% availability of the Safety Parameter Display System (SPDS). After evaluation of EGT-342A test data sheets, test results, test logs, test summary, Instrumentation and Controls Maintenance's downtime logs and operator inputs, the SPDS was found to be available 99.56% of the 720 hour test period.

This report provides a history of the regulatory commitment for achieving and maintaining a goal of 99% availability, a description of the design methods used for meeting the 99% availability goal, a discussion of programs which can provide data for a long term continuous availability evaluation, and the test evaluation.

AVAILABILITY COMMITMENT

In Amendment 27 to the CPSES FSAR, CPSES committed to the intent of NUREG 0696 "Functional Criteria for Emergency Response Facilities". As part of that commitment, they sought to provide the Safety Parameter Display System (SPDS) displays to the control room, TSC and EOF. With the commitment for the SPDS displays, as used in the control room, came the requirement to design the displays with an availability goal of 99% during operation and, at least, 80% during cold shutdown.

NUREG 0737 Supplement 1, paragraphs 4.1a and 4.1b, require that the SPDS must aid operators in rapid, reliable determination of plant safety status. As reported in SSER 12 CPSES committed to a program consisting of;

- 1) software configuration control,
- 2) quality assurance plan,
- 3) factory acceptance tests,
- 4) site acceptance tests, and
- 5) verification and validation tests.

All parts of the program were designed to meet the intent of providing reliable hardware, software and data to the operators and other users of the SPDS. The only remaining commitment regarding reliability was to perform a 30 day availability test per the following excerpt from SSER 22 page 22-7:

In its SPDS safety analysis report submitted on July 31, 1989, the applicant committed to perform a 30 day availability test during low-power testing and maintenance of downtime information. In a letter dated September 19, 1989, the applicant committed to perform the test within 60 days after fuel loading, and make the test report available to the staff within 60 days of successful completion of the test. These commitments are sufficient to close the availability issue as described in SSER 12.

DESIGN FOR AVAILABILITY

The design goal for the CPSES SPDS system availability was to be greater than or equal to 99% during operation. The following design features and programs have been implemented to assure a greater potential of achieving and maintaining the SPDS availability goal.

Each unit's ERFCS/SPDS (SPDS is a subset of the ERFCS and henceforth within this report will be referred to as ERFCS/SPDS or SPDS) is designed in a redundant, dual computer configuration such that the failure of a single major component will not cause the ERFCS to be unavailable. In addition to redundant CPUs, other design features that enhance availability are;

- 1) commercial components are acquired from reputable vendors where possible,
- 2) uninterruptible power supplies provide all CPU and computer room power,
- 3) the environment in the computer room is strictly controlled by redundant HVAC and temperature/humidity monitoring computers which can alarm and shut down the computer if necessary,
- 4) a disc drive which is shared by each CPU is installed, in addition to the disc drives on each CPU, and
- 5) multiple or dual display units in each Emergency Facility are connected to both the "A" and "B" CPUs.

Each CPU's software is designed to drive the SPDS displays, although only one will control the displays at any given time. The software is designed to drive the backup CPU to take charge in the event of the failure of the primary CPU (known as failover).

Certain portions of SPDS displays are dynamically updated and thus a failure to update the displays cannot go unnoticed for a prolonged period of time. This design feature, along with other maintenance and problem reporting procedures, is relied upon for failure indication and documentation. The UNIT number, "1" in this case, is located in the lower left quadrant of the display and flashes intermittently as long as the display is being updated from the CPU. If the UNIT number stops flashing, the observation should be reported to Operations I&C Maintenance for investigation. The other information which is being updated on the display includes the date and time. By observing the date and time on the display in question an exact accounting of the anomaly can be recorded.

The CPUs monitor all equipment status and provide pertinent information via computer status screen about the following;

- 1) CPUs,
- 2) discs,
- 3) display terminals (ERF and SPDS),
- 4) printers,
- 5) communication links, and
- 6) data acquisition equipment.

In addition to these preventive and diagnostic design measures, CPSES has also implemented administrative measures which are necessary to maintain ERFCS/SPDS availability and reliability at its highest possible level. STA-622 Revision 1 "Administrative Control of the ERF Computer" was placed into effect on April 6, 1990. This procedure describes the administrative responsibilities associated with the operation, calibration and maintenance of the Emergency Response Facility (ERF) Computer.

THE AVAILABILITY TEST

Test Participants

The Operations (OPS) Performance and Test (P&T) Group were responsible for:

- 1) preparing the test,
- 2) collecting the test data,
- 3) reporting any problems found during the test,
- 4) maintaining a test log,
- 5) compiling a test data package, and
- 6) summarizing the test at the completion of the test.

All phases of activity were completed prior to generation of this report.

The OPS Instrumentation and Controls (I&C) Group is responsible, under STA-622, for:

- 1) monitoring the status of the ERF computer and notifying Technical Support of any problems identified,
- 2) notifying the shift supervisor of any activities or problems that would adversely affect the proper operation or availability of the ERF computer,
- 3) repairing computer system hardware failures, and
- 4) maintaining a system logbook containing sufficient information about system operation and history to allow unusual or undesirable events to be analyzed.

In addition to these responsibilities called out in STA-622 and referenced by the test EGT-342A, OPS I&C Maintenance was responsible for providing a copy of the OPS I&C Maintenance ERF computer system logbook to be attached to the Test Data Package.

Control Room personnel and other individuals could report problems to OPS I&C Maintenance via established trouble reporting methods such as work requests, Technical Evaluation (TE) forms or Operations Notification and Evaluation (ONE) forms.

Also per STA-422 the OPS Technical Support ERFCS System Engineer will be responsible for evaluating problems reported via TE and ONE forms. The ERFCS System Engineer may forward these reporting forms to Engineering for resolution and disposition.

All results from the test were copied to Engineering for evaluation. All TEs and ONE forms, initiated during the test, were forwarded to the Engineering ERFCS responsible engineer for disposition.

The Test Process

A copy of EGT-342A Revision 1 "SPDS Availability Test" is included in this report as Attachment A. Within the test the SPDS was considered unavailable, if;

- 1) the display parameters, the time and the UNIT-1 "1" were not continuously updating,
- 2) the critical SPDS screens as determined by Nuclear Engineering (Project Engineering) were not accessible,
- 3) the "SPDS Parameter Failure" message was displayed on any of the display screens,
- 4) OPS I&C Maintenance took the ERF out of service, or
- 5) problems, which effected the items 1 through 4 above, were reported to OPS I&C Maintenance.

The total time of any problem which met the above criteria was designated as downtime. The ratio of the uptime (duration of the test minus downtime) to the duration of the test period all multiplied by 100% would be the SPDS Availability. The following equation represents SPDS Availability for the test spanning 30 days:

$$\frac{(30 \text{ days} \times 24 \text{ hours}) - \text{downtime}}{30 \text{ days} \times 24 \text{ hours}} \times 100\% = \text{SPDS AVAILABILITY}$$

The Test was initiated by performing an initial data collection to validate that all SPDS screens satisfied the test criteria as described above. The 720 hour clock was started upon completion of this prerequisite data collection on April 10, 1990.

The Test Results

April 11

During the performance of the data collection steps the primary SPDS terminal key pad was not functioning. The data collection was performed using the alternate key pad on Control Board No. 6. The data collector prepared TE-PT-90-1184 documenting the discrepancy and forwarded it to Nuclear Engineering (Project Engineering). The ERFCS system engineer dispositioned the TE as a non-effect on the SPDS availability because (a) the critical SPDS displays were available in the control room and (b) the system performed according to design. This item was not entered in the ERF Status Log until April 20. April 18 entry also applies to this reported problem.

REFERENCES: Att.D, TE PT-90-1184
Att.E, EGT-342A, Pages 1 and 2
AVAILABILITY: No affect per TE PT-90-1184
DOWNTIME: 0:00:00

April 12

A work request was initiated to replace a hammer bank fan on the computer room printer. This problem again was determined to be outside the bounds of the SPDS Availability test and was handled as a normal hardware maintenance function. This item was not entered in the ERF Status Log until April 20.

REFERENCES: Att.C, ERF Status Log
Att. G, 'Log of Work Orders', Page
1, SEG-NUM C900003104
AVAILABILITY: No affect. Non-SPDS component
DOWNTIME: 0:00:00

OPS I&C Maintenance reported to the OPS P&T Group that the SPDS terminal in the Control Room was down for 30 minutes. A loss of high voltage to the CRT was the reason for being unavailable. This failure was not entered in the ERF Status Log.

REFERENCES: Att.E, EGT-342A Test Log, Page 2
AVAILABILITY: SPDS Displays not available in
control room.
DOWNTIME: 0:30:00

The primary SPDS keypad controller interface card was replaced under a work order beginning on April 18 (See April 11 entry above) and was returned to service April 19. This keypad was used for SPDS display access for the remainder of the test. This item was entered on ERF Status Log late on April 20.

REFERENCES: Att.C, ERF Status Log, 4/90, Page

1

Att.D. TE PT-90-1184

AVAILABILITY: No affect per TE PT-90-118

DOWNTIME: 0:00:00

The primary CPU "A" failed over to the backup CPU "B" at 11:00 and then failed back to normal operating configuration at 11:15. The time required to complete the failover process could be considered downtime as the screens would not be updated during the failovers.

REFERENCES: Att.E, EGT-342A Test Log, Pages 4
and 5

AVAILABILITY: SPDS Displays not available in control room during failover (approximately 1 minute)

DOWNTIME: 0:02:00

CPUs "A" and "B" failed due to a malfunction of a telephone multiplexer (mux) line. The mux line problem was promulgated to the backup computer upon failure of the primary computer and thus both computers went down at this time. After the telephone mux line was disconnected, the computers were rebooted but CPU "B" did not restart. After resetting the terminal concentrator on CPU "B" both systems came up in their normal operating configuration. The telephone mux line was disconnected and will not be reconnected until the source of the problem has been determined. The mux line served a redundant utility terminal which was not required for SPDS displays.

REFERENCES: Att.E, EGT-342A Test Log,
4/21/90, 9:57 Page 6

5/14/90, 14:00 Page 15

Att.C, ERF Status Log, 4/90, Page 1

AVAILABILITY: SPDS Displays not available when CPUs not operating (locked-up).

DOWNTIME: 1:11:00

May 6

The printer in the Technical Support Center was not available to obtain the "Computer Status" screen printout due to performance of maintenance activities on the TSC floors. As a result OPS P&T issued TE PT-90-1516 for resolution and a determination of availability. The TE was dispositioned as a non-effect on SPDS availability because (a) the printer is an extra peripheral device (SEIKO Hard Copier) used for hard copy output of display screens, (b) the SEIKO Hardcopier is not a part of the SPDS display system, and (c) the "Computer Status" screen was requested by Project Engineering I&C to be used for substantiation of findings during testing.

REFERENCES: Att.D, TE PT-90-1516
Att.E, EGT-342A Page 11
AVAILABILITY: No affect per TE PT-90-1516
DOWNTIME: 0:00:00

May 8

One of the Chromatics terminals in the EOF was not operating due to a blown fuse. No affect on SPDS availability.

REFERENCES: Att.C, ERF Status Log, 5/90, Page
1
AVAILABILITY: No affect. Alternate Chromatics
terminals were available in the
EOF.
DOWNTIME: 0:00:00

May 9

Chromatics terminal in the TSC would not download. No effect on SPDS availability.

REFERENCES: Att.C, ERF Status Log, 5/90, Page
1
AVAILABILITY: No affect. Other Chromatics
terminals were available in the
TSC.
DOWNTIME: 0:00:00

May 10

All displays flashed to "NO DATA" (indication that the CPU was not transmitting to the terminals) for approximately 30 seconds and then returned to normal for approximately 2.5 minutes. This process was then repeatedly executed. The terminal concentrators were reset with no resolution of the problem. The "A" CPU was taken out of service and the "B" CPU ran well with no display failures. The "A" CPU was rebooted and then failover to the "A" CPU was performed. All operation was resumed under the normal operational configuration.

REFERENCES: Att.C, ERF Status Log, 5/90, Page 1
Att.E, EGT-342A Test Log, Pages 13 and 14.
Att.G, 'Log of Work Orders', Pages 5-8, Work Order #C900003447
AVAILABILITY: SPDS Displays not available due to lack of data and because computers were down.
DOWNTIME: 1:23:00

May 10

Submultiplexor 3 on multiplexor 4 in cabinet CP1-ECPRCR-23 had a -7.5V reference voltage which was fluctuating. This specific multiplexor had been indicating an out of service condition intermittently throughout the test period. On "Computer Status" screen printouts the submux was shown to be out-of-service on April 17, 18, 26 and 30 and May 10, 11, 12 and 13. This failure caused the loss of 5 analog inputs which were inputs to SPDS parameters. These inputs were redundant and the SPDS parameters were listed as "SUSPECT" on SPDS screens. Had both A and B train inputs been lost, an "SPDS PARAMETER FAILURE" message would have been generated and the SPDS would have been considered unavailable. System operated as designed and there was no affect on SPDS availability.

REFERENCES: Att.C, ERF Status Log, 5/90, Page 1
Att.G, 'Log of Work Orders', Page 1, SEG-NUM C900003143
AVAILABILITY: No affect. Redundant inputs were available on the ERF.
DOWNTIME: 0:00:00

May 10 Th. Unit 1 Computer Room line printer was not operating properly due to a hardware problem. The paper puller motor was found to be bad. No affect on SPDS availability.

REFERENCES: Att C, ERF Status Log, 5/90, Page 1
AVAILABILITY: No affect. The line printer is not a component necessary for SPDS operation.
DOWNTIME: 0:00:00

May 10 Data collection officially concluded.

TOTAL DOWNTIME:(3:06)

The Availability Calculation

Using the method of calculating "% Availability" as described earlier in this report, we find the availability to be :

$$\frac{\text{DURATION OF TEST} - \text{DOWNTIME}}{\text{DURATION OF TEST}} \times 100\% = \text{SPDS AVAILABILITY}$$
$$\frac{720:00 - 3:06}{720:00} \times 100\% = 99.56\%$$

CONCLUSIONS AND RECOMMENDATIONS

The test was completed successfully and the calculated availability exceeded the goal of 99%. The system was operating correctly and maintenance issues had been resolved. After the 30 day availability test's results have been analyzed, Engineering concludes that :

1. The system is operating as designed;
2. The redundant design features of the computers and the display terminals reduced "SPDS unavailability" and were a key factor in limiting the amount of downtime when there was a fatal error; and
3. The fatal system failures tended to be CPU/software oriented communication problems.

Based upon the above observations, Engineering recommends that the source of the CPU/software oriented communication problems be verified and corrected. It appears that the terminal concentrator (communications interface between CPU and display terminals) software should be reviewed for possible error correction. The telephone mux line problem (noise on the line in conjunction with terminal concentrator problems) can be resolved by using a line conditioned for data transmission. TE IC-90-1995 has been generated to verify the problem and determine possible resolutions of the intermittent communications problems.

The SPDS Availability Test was conducted under a controlled reporting environment established by EGT-342A, which was specifically written for the collection of SPDS Availability data. However, as a result of this test, Engineering has observed the following programmatic weaknesses:

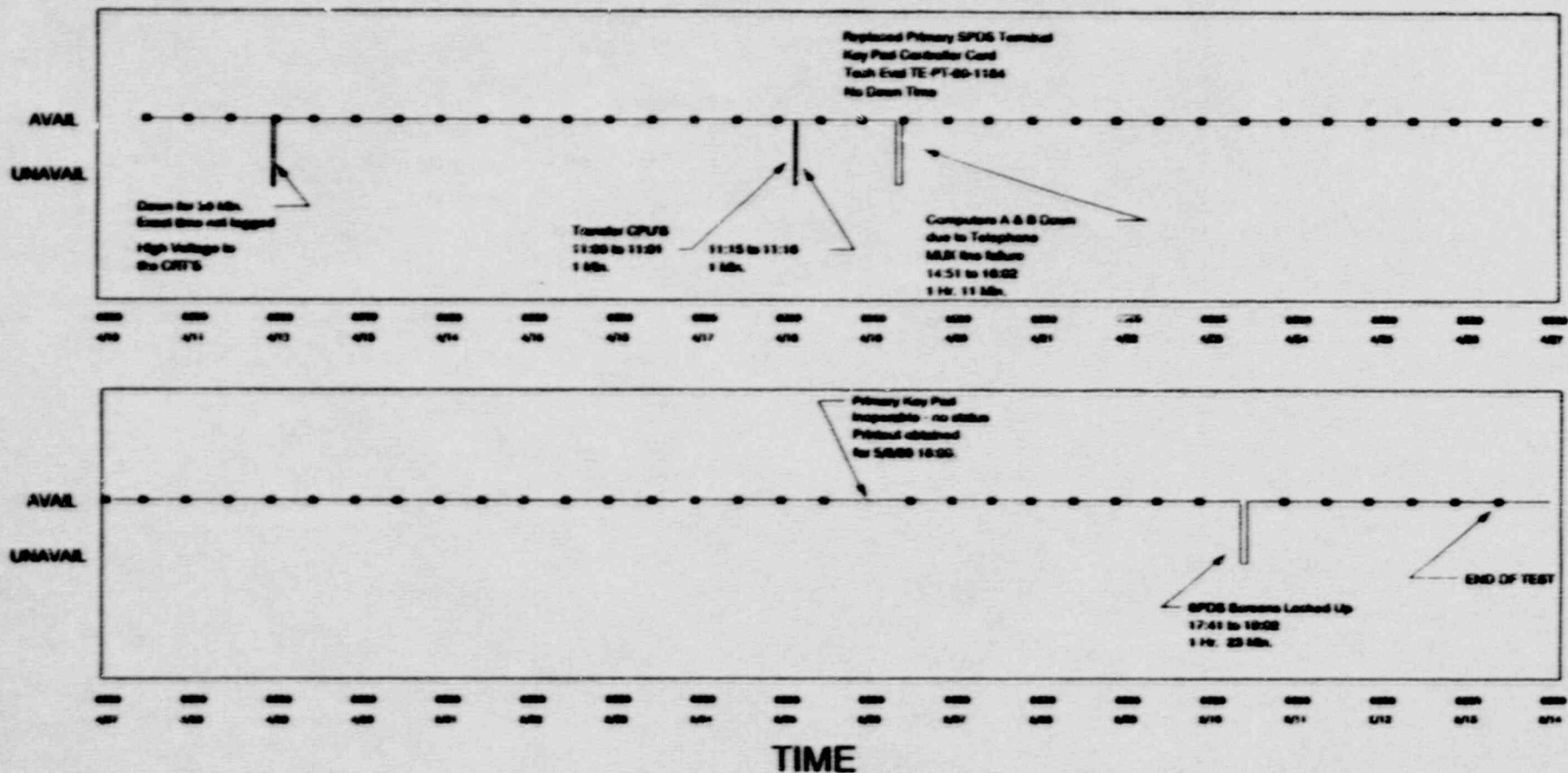
1. Some non-fatal problems were not reported on the ERF Status Log;
2. Some problems were not logged until work orders had been issued;
and
3. All problems were reported by testing or maintenance personnel.
All problems which were worked via a work order were verified via the MMCP report provided in appendix G.

The above problems were evaluated and STA-622 "Administrative Control of the ERF Computer" has been enhanced to ensure that SPDS Availability can be better assessed.

SPDS AVAILABILITY TEST - EGT-342A

CHRONOLOGICAL ACCOUNT

STATUS



■ Data Not Taken per step 11.1 of EGT-342A Rev. 1

Total Down Time = 3 Hr. 6 Min.

% Avail. = $\frac{720 \text{ Hr} - 3.1 \text{ Hr}}{720 \text{ Hr}} \times 100\% = 99.58\%$

ATTACHMENT A

EGT-342A TEST SUMMARY

TEST SUMMARY
ECT-342A REV. 1

SPDS Availability Test

Page 1 of 3

1.0 OBJECTIVES

- 1.1 The test objective is to provide data for Project Engineering to demonstrate 99% availability of the Safety Parameters Display System (SPDS) during a continuous 30 day, 720 hour period. Operational Availability(%) is defined as follows:

$$[(720 - \text{Downtime}) / 720] \times 100.$$

Downtime is any length of time the data system is unavailable (when the reactor is above cold shutdown status). The following screens will be selected during the performance of this test:

TOP LVL - OPERATION

- ERG SUM -
LOCA/LOSC, SGTR, SG ISOL, FOLDOUT
- RVLIS -
DISPLAY
- SPDS TRS -
RCS TRS -
RCS, PRESS TEMP, TEMP 1&2, TEMP 3&4
- SG TRS -
MSL PRESS, SG NR LVL, SG WR LVL, STM
FLOW, FW FLOW, AFW FLOW
- CNTMT TRS -
CNTMT LPR, CNTMT HHT
- OTHER TRS -
NIS, RAD MON, TANK LVLS

2.0 ACCEPTANCE/REVIEW CRITERIA AND ACHIEVED RESULTS

2.1 Acceptance Criteria

None

2.2 Review Criteria

- 2.2.1 Project Engineering has reviewed the test data and determined the SPDS system to be considered 99.0% "Available" for a 720 hour (30 day) duration.

TEST SUMMARY
EGT-342A REV. 1

SPDS Availability Test

Page 2 of 3

2.3 Achieved Results

2.3.1 The Review Criteria were satisfied as stated in section 2.2. The following table lists the SPDS down times logged during the performance of the test per STA-622:

Date Noticed:	Problem:	Down From:	Down To:	Down Time:
4-12-90	High voltage to the CRT's.			30 Min. **
4-18-90	Transfer of CPU's	11:00	11:01	1 Min. **
4-18-90	Transfer of CPU's	11:15	11:16	1 Min. **
4-19-90	Computers A & B went down due to a telephone mux line failure.	14:51	16:02	1 Hr. 11 Min.
4-19-90	Replaced primary SPDS terminal key pad controller card.	15:00	07:35	0 Min. *
4-20-90	Screens not updating values.	17:41	19:02	1 Hr. 23 Min.
Total down time.....				3 Hours 6 Min.

* Reference TE-PT-90-1184 for availability with respect to the primary SPDS key pad.

** Down time not addressed in the STA-622A Log.

From this table, the total time available can be represented in percent over the 30 day, 720 hour, period as follows:

(Note: 3 Hrs 6 Min. = 3.1 Hrs)

720 Hrs - 3.1 Hrs

----- x 100% = 99.56 %

720 Hrs

TEST SUMMARY
EGT-342A REV. 1

SPDS Availability Test

Page 3 of 3

3.0 PERFORMANCE SUMMARY

- 3.1 This test was performed to satisfy commitment No.23164. The purpose of the procedure is to satisfy the ERF SPDS availability criteria as stated in the PSAR response to NRC Action Plan, Section V "SAFETY PARAMETER DISPLAY SYSTEM" (See the DOCUMENTATION section of the TEST DATA PACKAGE).

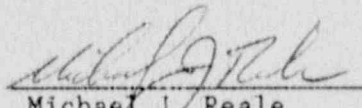
The test commenced on April 10, 1990. Logs were taken per Data Sheet 1 approximately every 12 hours for 34 days. All known down time and calculated percent availability can be found in the table below section 2.2, "Achieved Results."

During the performance of step 11.1 on April 11, 1990, it was noticed that the primary SPDS terminal key pad in the control room was not functioning. Logs were taken per Data Sheet 1 using the key pad on Control Room Control Board No. 6. Technical Evaluation PT-90-1184 was generated to document this discrepancy. The Technical Evaluation was dispositioned documenting the acceptance of the non-functioning primary SPDS key pad. On April 19, 1990, I&C Maintenance replaced a component in the primary terminal circuit and the key pad was utilized for log readings from that point in time.

On May 6, 1990, Technical Evaluation PT-90-1516 was generated to document the omission of sub-steps 11.1 d) & e). The printer in the Technical Support Center was not available to obtain the required "Computer Status" screen printout. This was due to performance of maintenance activities on the TSC floors. The Technical Evaluation was dispositioned with no impact on SPDS availability.

On May 9, 1990, Procedure Change Notice No. 1 was approved and issued for EGT-342A revision 1. This PCN was generated to enclose a copy of the ERF I&C maintenance log to assist Nuclear Engineering in determining percent availability.

On May 13, 1990, Data Logs were completed at the request of Project Engineering. The Review Criteria step was signed on May 16, 1990, signifying the acceptable performance of EGT-342A revision 1 (A letter from Project Engineering can be found in the CLOSURE LETTER section of the TEST DATA PACKAGE).


Michael J. Reale
(Test Engineer)

7-9-90
Date

ATTACHMENT B

STA-622, Revision 1

ADMINISTRATIVE CONTROL OF THE ERF COMPUTER

FOR INFORMATION

CPSES PROCEDURE CHANGE FORM

ONLY

DATE 07/03/90
 PCN STA-622-R1-1 ORIGINATOR Christopher A. Cote
 (PRINT NAME)
 S E C T I O N I
 PROCEDURE/FORM TITLE Administrative Control of the ERF Computer
 CHANGED PAGE NO'S: 2, 2.1, 3, 3.1
 CHANGE JUSTIFICATION
This PCN clarifies and provides examples for entries in the ERF
computer logbook. It also defines the responsibility to Operations
for ensuring that a check of the ~~system status of the~~ SPDS is performed
at least once per shift. CR. 7/3/90
 ORIGINATOR (SIGNATURE/DATE) *Christopher A. Cote* 7/3/90
 This change is to correct a typographical error only. YES
 If this change is to correct a typographical error only, a Technical
 Review need not be performed.
 TECHNICAL REVIEWER (SIGNATURE/DATE) *Like V. Lt* 7/3/90

SECTION III
 PROCEDURE CHANGE INTERIM APPROVAL
 THIS CHANGE [DOES] [DOES NOT] CHANGE THE INTENT OF THE PROCEDURE.
 (CIRCLE ONE)
 IF THE CHANGE DOES NOT CHANGE THE INTENT OF THE PROCEDURE AND THE CHANGE
 MUST BE INCORPORATED IMMEDIATELY, COMPLETE THIS SECTION, OTHERWISE ROUTE
 IN ACCORDANCE WITH SECTION III PRIOR TO IMPLEMENTATION.
 APPROVED _____ DATE _____
 QUALIFIED REVIEWER/TITLE
 APPROVED _____ DATE _____
 ON-DUTY SS OR UNIT SUPERVISOR OF AFFECTED UNIT
 REMARKS _____

SECTION III
 PROCEDURE CHANGE APPROVAL

REVIEW ORGANIZATION	APPROVED (YES/NO)	QUALIFIED REVIEWER INITIALS/DATE

 TRAINING/READING REQUIRED: YES _____ NO /
 IF YES, SPECIFY: _____
 SORC MEETING NO. (if applicable) EFFECTIVE DATE: 7-13-90
 APPROVED BY *MA* DATE 7-5-90
 (APPROVAL AUTHORITY)

STA-205-1
R-7

COMANCHE PEAK STEAM ELECTRIC STATION

STATION ADMINISTRATION MANUAL

QUALITY-RELATED

ADMINISTRATIVE CONTROL OF THE ERF COMPUTER

PROCEDURE NO. STA-622


REVISION NO. 1

SORC MEETING NO. 90-031 DATE: 2-9-90

EFFECTIVE DATE: 4-6-90

FOR
INFORMATION
ONLY

APPROVED BY:


VICE PRESIDENT, NUCLEAR OPERATIONS

DATE: 4-3-90

CPSES STATION ADMINISTRATION MANUAL		PROCEDURE NO. STA-622
ADMINISTRATIVE CONTROL OF THE ERF COMPUTER	REVISION NO. 1	PAGE 2 OF 4

1.0 PURPOSE

The purpose of this procedure is to describe the administrative responsibilities associated with the operation, calibration and maintenance of the Emergency Response Facility (ERF) Computer.

2.0 APPLICABILITY

This procedure applies to the Technical Support and Operations Departments whose integrated services are required to operate, calibrate and maintain the ERF Computer under all modes of operation.

3.0 REFERENCES

- 3.1 STA-302, "Station Records"
- 3.2 STA-716, "Design Modification Process"
- 3.3 TNE-M1-2950
- 3.4 EPP-201, "Assessment of Emergency Action Levels, Emergency Classification and Plan Activation"
- 3.5 ODA-301, "Operating Logs"
- 3.6 STA-606, "Work Requests and Work Orders"

4.0 DEFINITIONS

4.1 ERF Computer

This term refers to the system which supplies Safety Parameter Displays and displays of plant conditions to the Control Room, Technical Support Center (TSC) and Emergency Operations Facility (EOF). The system is composed of PRIME 750 computer systems, Validyne Engineering data acquisition equipment and Chromatics display equipment. This equipment is located in the Unit 1 & 2 Computer Rooms, the Cable Spreading Rooms, the Control Room, the TSC and the EOF.

5.0 RESPONSIBILITIES

5.1 I&C Manager

- 5.1.1 Responsible for controlling access to the programmer, system and maintenance consoles and the ERF Computer equipment cabinets located in the Unit 1 & 2 Computer Rooms and Cables Spreading Rooms of the Control Building.
- 5.1.2 Responsible for monitoring the status of the ERF Computer and notifying Technical Support of any problems identified.

7/2/90

CPSES STATION ADMINISTRATION MANUAL		PROCEDURE NO. STA-622
ADMINISTRATIVE CONTROL OF THE ERF COMPUTER	REVISION NO. 1	PAGE 2.1 OF 4
<p>5.1.3 Responsible for notifying the shift supervisor of any activities or problems that would adversely affect the proper operation or availability of the ERF Computer.</p> <p style="text-align: right;"><i>AK</i> 7/3/90</p>		

5.1.4 Responsible for repairing computer system hardware failures.

5.1.5 Responsible for performing preventive maintenance on the ERF Computer.

5.2 Manager, Technical Support

5.2.1 Responsible for maintaining administrative control of the ERF Computer software and database.

5.2.2 Responsible for establishing user access control to ERF Computer files.

5.2.3 Responsible for reviewing modifications to the ERF Computer before implementation.

5.2.4 Responsible for administering the performance of testing, as required, to verify software changes and ensure modifications do not adversely effect ERF Computer performance.

5.2.5 Responsible for maintaining this procedure current.

5.3 Manager, Operations

5.3.1 Responsible for ensuring that a check of Safety Parameter Display System (SPDS) is performed at least once per shift in accordance with ODA-301.

6.0 INSTRUCTIONS

6.1 Control of ERF Computer Database Updates

6.1.1 Technical Support shall maintain a current listing of the ERF Computer I/O List. (TNE-M1-2950).

6.1.2 All database updates to the ERF Computer I/O List will be processed through Technical Support and implemented by I&C.

6.2 Operation of the ERF Computer

6.2.1 I&C should maintain a system logbook containing sufficient information about system operation and history to allow unusual or undesirable events to be analyzed. Following are examples of entries in the logbook that should be made:

6.2.1.1 Any preventative or corrective work order maintenance on the ERF computer.

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<p>6.2.1.2 Any unusual system status or indication.</p> <p>6.2.1.3 Any administrative functions that are performed (e.g. history update, disk clean, system backup).</p> <p>6.2.1.4 Any changes to the database as a result of a Design Modification.</p> <p>6.2.1.5 Any ERF equipment that is out of service or is operating in a limiting condition.</p> <p>6.2.2 Shift Operations should perform a check of the SPDS at least once per shift in accordance with ODA-301. If during the check of the CRT display of the SPDS any abnormal conditions exist, Operations should contact I&C and initiate work in accordance with STA-606.</p> <p>6.2.3 Weekly, I&C will copy the accumulated Daily Historical Files from the disks to a magnetic tape for permanent record storage.</p> <p>6.2.4 All periods of unavailability will be kept to a minimum and the ERF Computer restored to an operational status by I&C.</p> <p>6.2.5 Contact Emergency Planning and refer to EPP-201 whenever the ERF is out of service.</p> <p style="text-align: right;">△ CSC 7/3/90</p>		

CPSES STATION ADMINISTRATION MANUAL		PROCEDURE NO. STA-622
ADMINISTRATIVE CONTROL OF THE ERF COMPUTER	REVISION NO. 1	PAGE 4 OF 4
<p>6.3 <u>Revisions to ERF Computer Software</u></p> <p>6.3.1 Any revision to the ERF Computer Software shall be treated as a station modification and shall be processed in accordance with Procedure STA-716.</p> <p>7.0 <u>FIGURES</u></p> <p>None</p> <p>8.0 <u>ATTACHMENTS</u></p> <p>None</p> <p>9.0 <u>RECORDS</u></p> <p>When completed, the following forms, reports, or other documents generated in response to this procedure shall be dispositioned in accordance with STA-302, "Station Records," which implements the requirements of the Records Management Program Manual.</p> <ul style="list-style-type: none">o Daily historical files (magnetic tapes)		

ATTACHMENT C

CPSES ERF STATUS LOG

CPSES

ERF

STATUS LOG

MONTH 4 YEAR 90PAGE 1 OF 1

FROM		TO		EQUIPMENT DOWN		COMMENTS
DATE	TIME	DATE	TIME	CPU / PERIPH	TAG NO.	
4/19	14:51	4/19	16:02	COMPUTER A+B		COMPUTER A+B WENT DOWN DUE TO MALFUNCTION ON
					CP2-E10ACR01	TELEPHONE MUX LINE
					CP3-E10ACR02	TELEPHONE MUX LINE
						DISCONNECTED, REBOOT
						COMPUTERS DID NOT
						COME UP RESET TERMINAL
						CONCENTRATOR ON "B"
						BOTH SYSTEMS COME
						UP "A" PRI "B" BACKUP
Late Entry				APR 14 20 90		
4/12	12:00			CP P. 1.01 Computer Room	CP1-FIDAC P. 02	Needs HARDWARE BANK EAM, W/R initiated
4/19	15:00	4/19	0735	SPDS 01 Keypad		Replaced Keypad Controller Interface Card under W/O

CPSES ERF STATUS LOG

MONTH 5 YEAR 90

PAGE 1 OF

FROM		TO		EQUIPMENT DOWN		COMMENTS
DATE	TIME	DATE	TIME	CPU / PERIPH	TAG NO.	
5/8/90	1051			SPDS-06	CPX-EISSPDS-06	BLOWN FUSE (AC)
5/9/90	1400			SPDS-05	CPX-EISSPDS-05	WONT DOWN-LOAD
5/10/90	1741	5/10/90 5/10/90	1902	ERF "A"	CPX-EISSPDS-01	DISPLAYS FLASH TO "NO DATA" FOR APPROX. 30 SEC. AB 5/10/90 FOR APPROX. 30 SEC. AND THEN RETURN AGAIN. RESET TC'S WITH NO RESULT. TOOK "A" DOWN & B RAN AS PRIMARY FINE REBOOTED "A" AND PERFORMED FALBAK TO RESUME NORMAL CONFIGURATION. AB 5/10/90 THEN RETURN AGAIN. RESET TC'S WITH NO RESULT. TOOK "A" DOWN & B RAN AS PRIMARY FINE REBOOTED "A" AND PERFORMED FALBAK TO RESUME NORMAL CONFIGURATION. ↓
						DISPLAYS FLASH TO "NO DATA" FOR APPROX. 30 SEC. AND THEN RETURN FOR APPROX. 2 1/2 MIN. THEN BACK AGAIN. RESET TERMINAL CONCENTRATORS WITH NO RESULT. TOOK "A" COMPUTER DOWN AS AN ERF. "B" COMPUTER RAN FINE WITH NO DISPLAY FAILURES. REBOOTED "A" AND PERFORMED "FALBAK" TO RESUME NORMAL COMPUTER CONFIGURATION.
5/10/90	1913			SUBMAX3 MUX4	CP1-ELPR-23 (RAN)	-7.5V RIEF VOLTAGE FLUCTUATING
5/10/90	1918			CP1 LINE PRINTER	CP1-EISDAP-02P	PAPER PULLER MOTOR BAD

ATTACHMENT D

TECHNICAL EVALUATIONS

TECHNICAL EVALUATION

Page 1 of 2
UNCLASSIFIED COPY NO. 036

I. Originator Name (Print) MIKE REALE			Signature/Date <i>Mike Reale</i> 4-11-90		TE NO. PT 90 1184	Org. PAT	Ext. 0865
Unit 1	System ERF	Component CPI-EISPD5-DIA	Room CR	Reference EGT-342A	Other W/R # 80804		

Detailed Description of Problem:

EGT-342A REQUIRES THE PERFORMANCE OF A 30 DAY "AVAILABILITY" TEST (COMMITMENT # 23164). DURING THE PERFORMANCE OF STEP II.1 (ON 4-11-90 AT 06:27) THE SPDS PRIMARY DISPLAY MONITOR KEY PAD ON CPI-EISPD5-DIA WOULD NOT FUNCTION THE CALL UP ANY SPDS SCREENS.

Proposed Solution:

STEP II.1 WAS COMPLETED VIA THE SPDS KEY PAD ON CONTROL BOARD 06. REQUEST NUCLEAR ENGINEERING TO EVALUATE THIS CONDITION. DOES THIS CONDITION RENDER THE SPDS SYSTEM "UN-AVAILABLE?"

Return copy of completed TE to originator? ☒ YES ☐ NO

Technical Support Engineering Review Required? ☐ YES ☒ NO If NO, indicate responsible organization.

Organization/Individual Responsible for Evaluation NUCLEAR ENGINEERING - GLEN HOLDEN

Supervisor (Print) <i>Billy D. Winters</i>	Signature <i>Billy D. Winters</i>	Date 4/11/90
---	--------------------------------------	-----------------

II. Engineering Assistance Required? ☐ YES ☐ NO If Yes, a priority must be assigned by Technical Support.

PRIORITY

III. TECHNICAL EVALUATION *See page 2*

NOT A DESIGN DOCUMENT

☒ Additional Page (s) Attached.

Technical Evaluation Performed By/Date

Glen Holden
Charles G. Holden 4/16/90

Technical Evaluation Reviewed By/Date

PRAVIN SHAH
Pravin Shah 4/17/90

STA-504-6
Page 1 of 1
R.1

The SPDS keypad failure was addressed by Work Request# 80804 per the "Other" block of Page 1 of this Technical Evaluation. The following paragraphs discuss the effect of the CP1-EISPDS-01A keypad failure on "SPDS Unavailability".

Per the ERFCS Functional Specifications CPES-I-1043, the following attributes were configured to provide redundancy with the SPDS display functions.

- To provide redundancy three(3) Chromatics CRTs are located in each unit's control room. SPDS displays can be accessed on any of the three, as well as, the CONRAC monitor at CB06.
- An SPDS console (one of three Chromatics terminals in the Control Room) consisting of a primary terminal, a work surface, and a secondary terminal are provided in the Control Room.
- A CONRAC monitor provided for each unit is located in CB06 and is capable of being slaved to the SPDS primary terminal. (It was being used as an SPDS console at the time of the finding by the Performance and Test Group.)
- The SPDS and Control Board display units are interfaced to function keypads which allow single input requests for SPDS displays.

In conclusion,

- a.) Because the ERFCS design was prepared to preclude the loss of SPDS displays, and
- b.) Because there was still easy access to the SPDS displays via CB06,

The failure of keypad CP1-EISPDS-01A does not constitute an "SPDS Unavailability".

NOT A DESIGN DOCUMENT

TECHNICAL EVALUATION					Required Completion Date: <i>5-10-90</i>	TE NO. <i>PT 90 1516</i>
I. Originator Name (Print) <i>MIKE REALE</i>			Signature/Date <i>[Signature]</i> <i>5-7-90</i>		Org. <i>P&T</i>	Ext. <i>0865</i>
Unit <i>1</i>	System <i>ERF</i>	Component	Room <i>TSC</i>	Reference <i>EGT-342A</i>	Other	
Detailed Description of Problem:						
<i>DURING THE PERFORMANCE OF EGT-342A, ON 5-6-90</i>						
<i>(12:00 HOURS DATA), STEPS 11.1 d) & e) WERE NOT</i>						
<i>COMPLETED. THE "COMPUTER STATUS" TERMINAL & PRINTER</i>						
<i>WERE NOT AVAILABLE.</i>						
Proposed Solution:						
<i>NUCLEAR ENGINEERING SHOULD EVALUATE THIS PROBLEM</i>						
<i>WITH RESPECT TO AVAILABILITY.</i>						
Return copy of completed TE to originator? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO						
Technical Support Engineering Review Required? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <small>If NO, indicate responsible organization.</small>						
Organization/Individual Responsible for Evaluation <i>NUCLEAR ENGINEERING - GLEN HOLDEN EXT. 6468</i>						
Supervisor (Print) <i>BILL WINTERS</i>			Signature <i>[Signature]</i>		Date <i>5-7-90</i>	
II. Engineering Assistance Required? <input type="checkbox"/> YES <input type="checkbox"/> NO <small>If Yes, a priority must be assigned by Technical Support.</small> PRIORITY _____						
III. TECHNICAL EVALUATION						
<i>See Page 2</i>						
<div style="border: 1px solid black; padding: 5px; display: inline-block;">NOT A DESIGN DOCUMENT</div>						
<input checked="" type="checkbox"/> Additional Page (s) Attached.						
Technical Evaluation Performed By/Date <i>Glen Holden</i> <i>Charles A Holden 5/16/90</i>				Technical Evaluation Reviewed By/Date <i>PRAVIN SHAM</i> <i>Pravin Sham 5/16/90</i>		

The ERF terminal and Seiko color copier being used to print the "Computer Status" screen were restored to service by OPS I&C Maintenance with no detriment to the SPDS. The following discussion addresses the failure with regard to "SPDS Unavailability".

- The process of printing the "Computer Status" screen was not followed to demonstrate "SPDS Availability"
- Steps 11.1.d & e of EGT-342A were placed in the test procedure to aid in the overall assessment of the effect of equipment failures on the "SPDS Availability"
- The color copier is not a required component for the SPDS terminal
- The TSC ERF terminals are interchangeable as SPDS terminals. Thus other terminals, which could display SPDS parameters, were available in the the TSC
- The CPSES ERF Status Log, the primary source of SPDS and ERF computer status, was not affected

Conclusion:

The failure of one of the TSC ERF terminals and the Seiko color copier did not impact the "SPDS Availability"

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ATTACHMENT E

SPDS AVAILABILITY TEST LOG

TEST LOG

Procedure No.: EGT-342A

Rev. 1

Page 1 of

Date / Time	REMARKS	Initials
4-10-90 1740	Obtained test copy. Verified Rev. 1 is latest test revision. Performed pre-test reference reviews. There are no reference revisions to Impact tests.	R
4-10-90 1805	Started Section 10.0.	R
4-10-90 1826	Completed Steps 10.1 through 10.5.	R
4-10-90 1834	Performed pre-test briefing. Present were Rich Remaley-Test Director, Tony Phelps - P+T, George Taylor - RC, Mike Niemeyer - US. Also Hall - STA. Received US (Niemeyer) permission to start Section 11.0. Commenced Section 11.0.	R
4-10-90 1839	Completed 1st set of readings for Step 11.1.	R
4-11-90 0632	COMPLETE 2nd set of data for Step 11.1. Found that the SPDS Control Panel in the Control Room did not function - had to use	cont.

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TEST LOG

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Rev. 1

Page 2 of

Date / Time	REMARKS	Initials
cont.	the key pad on CB-06 to change the SPDS screen. Technical Evaluation will follow. (TE ^{PT} -90-1184)	MGR
4-11-90 1812	Took set of data for step 11.1.	R
4-12-90 0730	Completed set of data for step 11.1. Used SPDS push buttons at Console instead of I-CB-06 SPDS push buttons.	ASH
4-12-90 1009	Rob Bishop (IBC) contacted Bill Winters and informed him that the SPDS terminal in Control Room was down for 30 minutes. A High Voltage ^{problem} to the CRT was the reason for being down.	ASH
4-12-90/19:12	completed set of data for step 11.1; used SPDS push buttons at console.	S

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TEST LOG

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Date / Time	REMARKS	Initials
4-2-90/06:53	Completed set of DATA FOR STEP 11.1 ; used SPDS Pushbuttons at Console	<u> </u>
4-13-90/18:05	Completed set of DATA FOR STEP 11.1 ; SPDS Pushbutton at console started working, used ICBO6 SPDS Pushbutton. Contacted I&C computer group. They have not yet worked on the Pushbuttons since it was first identified under TC # PT-90-1184 / work Request # 80804 Generated. I discussed/identified that the Pushbutton Pad had been Intermittently working and Not Presently Functioning	<u> </u>

N/A MGR 4-16-90

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TEST LOG

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Page 4 of

Date / Time	REMARKS	Initials
4-14-90 / 0655	Completed set of Data For Step	
	11.1, used SPDS Pushbuttons	
	AT 1CB06	ED
4-14-90 / 1850	Completed set of Data For Step	
	11.1, used SPDS Pushbuttons AT 1CB06	ED
4-15-90 / 0550	Completed data set for 11.1 -	
	used SPDS pad @ CB06.	REM
4-16-90 0640	COMPLETED DATA SET FOR STEP	
	11.1, USED SPDS PAD @ CB-06	UJR
4/16/90 1755	COMPLETED DATA SET FOR	
	STEP 11.1. USED SPDS	
	PAD AT CB-06.	J.P.
4-17-90 0655	COMPLETED DATA SET FOR STEP	
	11.1 - USED SPDS PAD @ CB-06	UJR
4/17/90 1845	COMPLETED DATA SET FOR	
	STEP 11.1 - USED SPDS	
	PAD AT CB-06	JP
4-18-90 0627	COMPLETED STEP 11.1 DATA SET FOR	
	SPDS AT CB-06	UJR
4/18/90 1330	IEC REPORTED THAT	

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TEST LOG

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Date / Time	REMARKS	Initials
	THE ERF WAS	
	DOWN FOR 1 MINUTE	
	AT 1100 HRS ON	
	A TRANSFER FROM	
	CPU A TO CPU B	
	AND DOWN 1 MINUTE	
	AT 1115 HOURS ON	
	A RETRANSFER	
	FROM CPU B TO	
	CPU A. (PLANT MODE 2)	JP
4/18/90 1800	COMPLETED DATA SET	
	FOR STEP 11.1 - USED	
	SPDS PAD AT C306	JP
4-19-90 0610	UNABLE TO PERFORM STEP 11.1	
	AT THIS TIME DUE TO THE	
	PERFORMANCE OF AN ISU	
	TEST - ALL CONTROL ROOM	
	PERSONNEL BUSY. I WILL TRY	
	LATER.	HGR
	N/A	

4/19/90
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TEST LOG

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Date / Time	REMARKS	Initials
4-19-90 0827	Completed step 11.1 @ SPDS PRIMARY Terminal Pad. ISC has replaced a Component in the Key Pad Circuit	MJR
4/20/90 0643	COMPLETED STEP 11.1 @ SPDS PRIMARY TERMINAL PAD.	MAB
* LATE ENTRY FOR 4-19-90 / 1802	Completed step 11.1 AT SPDS	
4-20-90 / 1745	PRIMARY Terminal Pad	
4-20-90 / 1800	COMPLETED STEP 11.1 AT SPDS PRIMARY Terminal Pad.	
4/21/90 / 0:12	COMPLETED STEP 11.1 @ SPDS PRIMARY TERMINAL PAD	MAB
4/21/90 / 09:57	LATE ENTRY (4/20/90 - 16:03) SPDS WAS NOT AVAILABLE FROM 14:41 TO 16:03 DUE TO NOISE INTERFERENCE WITH THE SPDS TERMINAL LOCATED IN THE I&C DEPARTMENT. THE TERMINAL WAS ISOLATED AND SPDS PLACED BACK IN SERVICE @ 16:03. (Ref Log 5-14-90/1400)	MAB
4-21-90 / 18:20	Completed step 11.1 AT SPDS	

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TEST LOG

Procedure No.: E6T-342A Rev. 1

Page 2 of

Date / Time	REMARKS	Initials
4-21-90 / 18:20	Primary Terminal Pad	<u> </u>
4-22-90 0800	Completed data set @ Primary SPDS Terminal Pad	<u>MGR</u>
4-22-90 1849	Completed data set @ CB-06 in conjunction with RO F. Sutherland	<u>MJ</u>
4-23-90 0619	COMPLETED DATA SET AT PRIMARY SPDS PAD	<u>MGR</u>
4-23-90 1849	Completed data set at primary SPDS Pad	<u>MJ</u>
4-24-90 4-25-90 0625	Completed data Set at primary SPDS Pad in the Control Room	<u>MGR</u>
4-24-90 1851	Completed data set at primary SPDS pad	<u>MJ</u>
4-25-90 0625	COMPLETE DATA SET AT PRIMARY SPDS TERMINAL Per Step 11.1	<u>MGR</u>
4-25-90 / 17.50	Completed step 11.1 ^{AT 04-25-90} SPDS Primary Terminal Pad	<u> </u>

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TEST LOG

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Page 2 of

Date / Time	REMARKS	Initials
4-26-90 11:40	Completed data set at Primary SPDS Pad per step 11.1	MGR
4-26-90 / 1750	Completed step 11.1 at SPDS Primary Terminal Pad	MGR
4-27-90 / 07:16	COMPLETED STEP 11.1 @ SPDS PRIMARY TERMINAL	MGR
4-27-90 / 18:10	Completed ^{STEP 11.1} step 11.1 at SPDS Primary Terminal Pad	MGR
4-28-90 / 7:01	COMPLETED STEP 11.1 @ SPDS PRIMARY TERMINAL	MGR
4-28-90 / 18:15	Completed step 11.1 at SPDS Primary Terminal Pad	MGR
4-29-90 06:30	COMPLETED DATA SET PER STEP 11.1 @ SPDS PRIMARY TERMINAL	MGR
4-30-90 0632	COMPLETED DATA SET PER STEP 11.1 @ SPDS PRIMARY TERMINAL	MGR
4-30-90 1852	Completed inspection of SPDS per Data step 11.1 @ primary terminal as of yet, printout of computer	MGR

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TEST LOG

Procedure No.: FGT-342A Rev. 1

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Date / Time	REMARKS	Initials
4-30-90 1652 cont.	status of TSC terminal not accomplished. TSC terminal is not in correct operating mode. Waiting for I & C to return call about appropriate commands for terminal initialization. Computer status at main SPDS terminal in control room is normal.	MW
4-30-90 1810	After successful reinitialization of TSC terminal C6C-4 completed Data set computer system status printout	MW
5-1-90 0618	COMPLETED DATA SET AT THE PRIMARY SPDS TERMINAL IN THE CONTROL ROOM. I WAS NOT ABLE TO GET THE "COMPUTER STATUS" PRINTOUT IN THE TSC - TERMINAL WAS NOT AVAILABLE. CONTACTED I & C DEPT FOR RE-INITIALIZATION.	MW

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TEST LOG

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Date / Time	REMARKS	Initials
5-1-90 1439	GENERATED "COMPUTER STATUS"	
	PRINTOUT FROM THE TSC AFTER	
	THE TERMINAL WAS RE-INITIALIZED	MGR
5-1-90 2359	Completed Data set printout at	MW
	primary SPDS terminal. Per step	
	11.1. Write a note to post at this	
	STE's desk as reminder of testing's	
	more desired time.	
5-2-90 0830	COMPLETE SPDS DATA SHEET 1	
	AT PRIMARY SPDS TERMINAL	
	IN CONTROL ROOM. PRINTER	
	IN TSC WAS OUT OF PAPER -	
	CONTACTED I & C TO REFILL.	MGR
5-2-90 0934	OBTAINED 0600 DATA PRINTOUT	
	FROM TSC PRINTER.	MGR
5/2/90 1312	Completed step 11.1 and DATA	
	SHEET 1 for evening 5/2.	
5-3-90 0630	COMPLETED DATA SET AND	
	TSC PRINTOUT FOR 5-3 AM SHIFT.	MGR

MGR 5-3-90

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TEST LOG

Procedure No.: EGT-342A

Rev. 2

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Date	Time	REMARKS	Initials
5/3/90	1423	Completed step 11.1 for 5/3 PM	MA
5/4/90	7:00	COMPLETED STEP 11.1 FOR 5/4 AM	MAG
5/4/90	18:10	COMPLETED STEP 11.1 AT SPDS PRIMARY Terminal Pad	MA
5/5/90	18:18	COMPLETED STEP 11.1 FOR 5/5 PM	MA
5/6/90	1638	Completed step 11.1 for 5/6/90 at main SPDS terminal	MA
5/6/90	1830	(REF LOG ENTRY 5-7-90 1837) ⁵⁻⁷⁻⁹⁰ COMPLETED STEP 11.1 WITH THE EXCEPTION OF OF THE T.S.C. PRINT OUT OF THE "COMPUTER STATUS" SCREEN. THE T.S.C. TERMINAL AND PRINTER WERE NOT OPERABLE.	MA
5-7-90	1644	COMPLETED DATA SET AT PRIMARY SPDS TERMINAL - NOT ABLE TO OBTAIN PRINTOUT AT TSC. TERMINAL INITIALIZING.	MA

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TEST LOG

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Date / Time	REMARKS	Initials
5-7-90 09:36	COMPLETED PRINTOUT OF "COMPUTER STATUS" SCREEN IN TSC	MGR
5-7-90 15:37	REF. LOG ENTRY (5-6-90 18:30) GENERATED TECH. EVAL. 20-7-90 ⁵⁻⁷⁻⁹⁰ PT-90-1101516. SENT THE TECH. EVAL. TO NUCLEAR ENGINEERING FOR DISPOSITION.	MGR
5/7/90 1820 ^{JP 1820}	SHIFT SUPV. (APPLE) WILL NOT PERMIT PERFORMANCE OF SECTION 11.1 AT THIS TIME. S.P.D.S. IS QUESTIONABLE AT THIS TIME. I & C COMING TO INVESTIGATE. THE COMPUTER STATUS PRINT OUT WAS OBTAINED SATISFACTORILY.	
	J. Plan	

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Date	Time	REMARKS
5/7/90	1930	I & C INVESTIGATED THE SP 5/7/90 S.S. P.O. 2 AND FOUND NO PROBLEM. SECTION 11.1 WAS COMPLETED FOR ALL SCREENS. J. Plan
5/8/90	1800	COMPLETED STEP 11.1 FOR 5/8/90 1800 HRS. J. Plan
5/9/90	0635	COMPLETED DATA SET FOR STEP 11.1 FOR 5/9-90 AM M. J. Plan
5/9-90	1000	IMPLEMENTED DCN #1 INTO PROCEDURE FOLLOWING APPROVAL. M. J. Plan
5/9/90	1800	COMPLETED DATA SET FOR SECT. 11.1 FOR 5/9/90 P.M. J. Plan
5-10-90	0630	COMPLETED DATA SET FOR STEP 11.1 FOR 5-10-90 DATA M. J. Plan
5/10/90	1910	Commenced step 11.1; found that the primary SPDS terminal was frozen and not updating with time indicated as 17:41. AK
5/10/90	1930	IC Tech took down comp A and brought

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TEST LOG

Procedure No.: EGT-342A

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Date / Time	REMARKS	Initials
	ERF/SPDS back on comp B.	
	SPDS displays seem to be updating normally; began run performance of step 11.1.	<i>MA</i>
5/11/90 - 07:00	COMPLETED STEP 11.1 AT PRIMARY TERMINAL.	<i>MA</i>
5/11/90 - 18:10	Completed STEP 11.1 AT SPDS PRIMARY Terminal Pad	<i>MA</i>
5/12/90 - 07:31	COMPLETED STEP 11.1 AT PRIMARY TERMINAL	<i>MA</i>
5/12/90 - 18:12	Completed STEP 11.1 AT SPDS PRIMARY Terminal Pad	<i>MA</i>
5/13/90 1800	COMPLETED STEP 11.1 For 5/13/90 Pac.	<i>MA</i>
5-14-90 1300	TRANSMITTED THE FINAL DATA SHEETS TO NUC ENGR. (GLEN HOLDEN).	<i>MA</i>
5-14-90 1310	LATE ENTRY 8 DATA SET ON 5-13-90 (AM) WAS INADVERTENTLY MISSED. NO EQUIPMENT PROBLEMS WERE NOTED ON 5-13-90	<i>MA</i>

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TEST LOG

Procedure No.: EGT-342 ARev. 1Page 15 of

Date / Time	REMARKS	Initials
5-14-90 1310	LATE ENTRY:	
	DATA SET FOR 5-13-90 WAS	
	COMPLETED SATISFACTORY.	
	A TECH. EVAL. WAS NOT	
	GENERATED DUE TO THE	
	FACT THAT MAY 10, 1990,	
	AFTER THE 1800 HOUR DATA	
	SET, MARKED THE 30 DAY	
	AVAILABILITY RUN PERIOD.	
	ADDITIONAL DATA WAS TAKEN	
	AT THE REQUEST OF NUCLEAR	
	ENGINEERING.	MJR
5-14-90 1330	SIGNED STEP 11.1 TO SIGNIFY	
	THE COMPLETION OF OBTAINING	
	DATA FOR AVAILABILITY	MJR
5-14-90 1400	REF LOG ENTRY 4-21-90 / 09157.	
	PER THE OFFICIAL STA-622 LOG, THE	
	REF. ENTRY DOWN DATE & TIME:	
	ARE NOT CORRECT. THE DOWN	
	DATE AND TIME ARE 4-19-90	

14:51 to 16:02. MJR

OFFICIAL TEST COPY

TEST LOG

Procedure No.: EGT-392A Rev. 1

Page 16 of [illegible]

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ATTACHMENT F

EGT-342A, Revision 1
SPDS AVAILABILITY TEST

COMANCHE PEAK STEAM ELECTRIC STATION
TESTING MANUAL

SPDS AVAILABILITY TEST

PROCEDURE NO. EGT-342A

REVISION NO. 1

EFFECTIVE DATE: 4/10/90

APPROVED BY:

Jim Martin for
PERFORMANCE AND TEST MANAGER

DATE:

4/10/90

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1.0 PURPOSE

The purpose of this procedure is to satisfy ERF SPDS Availability criteria stated in the FSAR response to NRC Action Plan, Section V "SAFETY PARAMETER DISPLAY SYSTEM". This testing is outlined by Commitment #23164.

2.0 APPLICABILITY

This procedure is applicable to ERF SPDS Unit 1 system and will be performed during Modes 1, 2, 3 or 4.

3.0 TEST SUMMARY

3.1 Test Objectives

- 3.1.1 The test objective is to provide data for Nuclear Engineering to demonstrate 99% availability during a continuous 30 day, 720 hour period. Operational Availability(%) is defined as:

$$[(720 - \text{Downtime}) / 720] \times 100.$$

Downtime is any length of time the data system is unavailable (when the reactor is above cold shutdown status). The following screens will be selected during the performance of this test:

TOP LVL - OPERATION

- ERG SUM -

LOCA/LOSC, SGTR, SG ISOL, FOLDOUT

- RVLIS -

DISPLAY

- SPDS TRS -

RCS TRS -

RCS, PRESS TEMP, TEMP 1&2, TEMP 3&4

SG TRS -

MSL PRESS, SG NR LVL, SG WR LVL, STM FLOW,
FW FLOW, AFW FLOW

CNTMT TRS -

CNTMT LPR, CNTMT HHT

OTHER TRS -

NIS, RAD MON, TANK LVLS

OFFICIAL TEST COPY

CPSES TESTING MANUAL		PROCEDURE NO. EGT-342A
SPDS AVAILABILITY TEST	REVISION 1	PAGE 3 OF 31

3.2 Test Method

3.2.1 Prior to entering section 11.0 and starting the 30 day, 720 hour clock, a prerequisite must be satisfied in that all SPDS screens will be validated against the criteria stated in step 5.5. Once this prerequisite is satisfied, the clock will start. The SPDS screens will be evaluated twice every 24 hours at approximately 0600 hours and 1800 hours. Each SPDS screen will be reviewed looking for conditions which would render the system UNAVAILABLE. The Computer Status Screen will be printed at the Technical Support Center. Each screen viewing will be performed using the official Control Room SPDS monitor in the control room. Each performance of step 11.1 will be documented on Data Sheet 1 and forwarded to Nuclear Engineering for evaluation.

NOTE: The definition of AVAILABILITY can be found in step 5.5.

4.0 ACCEPTANCE AND REVIEW CRITERIA

4.1 Acceptance Criteria

None

4.2 Review Criteria

4.2.1 Nuclear Engineering has reviewed the test data and determined the SPDS system to be considered 99% "Available" for a 720 hour (30 day) duration.

Initials

Date

5.0 DEFINITIONS

5.1 SPDS - Safety Parameters Display System

5.2 ERG SUM - Emergency Response Group Summary

5.3 ERFCS - Emergency Response Facilities Computer System

5.4 SAS - Safety Assessment System

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CPSES TESTING MANUAL		PROCEDURE NO. EGT-342A
SPDS AVAILABILITY TEST	REVISION 1	PAGE 4 OF 31

5.5 SPDS AVAILABILITY - (determined by evaluation):

Display parameters, the Time and the Unit-1 "1" (located in lower left corner of each screen) are continuously updating.

Ability to access the critical SPDS system screens as determined by Nuclear Engineering.

"SPDS Parameter Failure" not displayed on any of the critical screens.

Scheduled outages to perform preventive maintenance on SPDS system power supplies for no more than the allowable time (7 hours - 12 minutes).

6.0 REFERENCES

6.1 FSAR - NRC Action Plan Section V "SAFETY PARAMETER DISPLAY SYSTEM"

6.2 CPSES-I-1043 Rev. 0 - Functional Requirements Specifications for Emergency Response Facility Computer System.

6.3 Commitment Tracking #23164 - Perform a 30 day availability test to quantify SPDS availability.

6.4 TSL-89168 June 9, 1989 - NRC Exit Meeting Minutes "NRC Audit of SPDS Implementation."

6.5 NUREG-0696 Functional Criteria for Emergency Response Facilities.

6.6 "Administrative Control of the ERF Computer", STA-622



7.0 TEST EQUIPMENT

None

8.0 SPECIAL CONDITIONS

This test will run for a minimum of 30 days during which time all maintenance activities associated with ERF will be documented in the Test Log and forwarded to Nuclear Engineering for evaluation.

[Signature] 1 4/10/90
SS or US Date

9.0 PRECAUTIONS AND LIMITATIONS

9.1 Precautions

None

9.2 Limitations

None

OFFICIAL TEST COPY

CHANGE #1 MRL 4-30-90
(IMPLEMENTED ON 5-12-90 by MRL)

10.0 PREREQUISITES

NOTE: Quality Assurance should be contacted at least 24 hours prior to performance of the initial pre-test briefing in order to plan surveillance activities that may be done during this test.

- 10.1 The Shift Supervisor or Unit Supervisor has given permission to commence the prerequisites section of this test.

Edmund Hanf 14/10/90
SS or US Date

- 10.2 The Temporary Modification Log has been reviewed and found not to preclude the satisfactory conduct of this test.

R 14-10-90
Initials Date

- 10.3 There are no outstanding clearances that may preclude the satisfactory conduct of this test.

R 14-10-90
Initials Date

- 10.4 The plant is in Mode 1, 2, 3 or 4.

R 14-10-90
Initials Date

- 10.5 Select each SPDS screen as shown in figures 1 through 21 and perform the following:

- Verify each screen is updating the time, Unit-1 "1" and displayed parameters.
- Verify each screen is free of "SPDS Parameter Failure" messages.
- Printout the "Computer Status" screen.
- Forward a copy of Data Sheet 1 and "Computer Status" screen printout to Nuclear Engineering for evaluation.

If not able to perform any of the above, generate a Technical Evaluation and forward to Nuclear Engineering for review.

R 14-10-90
Initials Date

- 10.6 The Shift Supervisor or Unit Supervisor has given permission to commence the instructions section of this test.

OFFICIAL TEST COPY

MAJ 14/10/90
SS or US Date

11.0 INSTRUCTIONS

- NOTE 1) Data acquisition will continue until notice to terminate data collection from Nuclear Engineering has been received.
- 2) Step 11.1 is to be performed at the official Control Room SPDS monitor.
- 3) "Computer Status" Screen printouts may be done in the TSC.

11.1 Select each SPDS screen, at approximately 0600 and 1800 hours each day, as shown in figures 1 through 21 and perform the following:

- a) Verify each screen is updating the time, Unit-1 "1" and displayed parameters.
- b) Verify each screen is free of "SPDS Parameter Failure" messages.
- c) Record any SPDS maintenance/downtime in the test log and forward the documentation to Nuclear Engineering for evaluation.
- d) Printout the "Computer Status" screen.
- e) Forward a copy of Data Sheet 1 and "Computer Status" screen printout to Nuclear Engineering for evaluation.

If not able to perform any of the above, generate a Technical Evaluation and forward to Nuclear Engineering for review.

11.2 See Page 6.1

12.0 RESTORATION:

None

13.0 COMPUTATIONS

None

14.0 ATTACHMENTS

- 14.1 Attachment 1, Data Sheet 1 - SPDS Data Log Sheet
- 14.2 Attachment 2, Figure 1 - SPDS Display: TOP LVL - OPERATION
- 14.3 Attachment, Figure 2 - SPDS Display: TOP LVL - ERG SUM - LOCA/LOSC
- 14.4 Attachment 4, Figure 3 - SPDS Display: TOP LVL - ERG SUM - SGTR
- 14.5 Attachment 5, Figure 4 - SPDS Display: TOP LVL - ERG SUM - SG ISOL

Initials

Date

MJR 15-14-90



OFFICIAL TEST COPY

11.2 Enclose a photo copy of the I&C maintenance ERF computer system logbook (maintained per STA-622). Photo Copied pages of the logbook should cover at least the duration of this test (ie. from start date to finish date.) and be attached to the Test Data Package.

MAR 15-15-90
Initials Date

1

OFFICIAL TEST COPY

CPSES TESTING MANUAL		PROCEDURE NO. EGT-342A
SPDS AVAILABILITY TEST	REVISION 1	PAGE 7 OF 31
<p>14.6 Attachment 6, Figure 5 - SPDS Display: TOP LVL - ERG SUM - FOLDOUT</p> <p>14.7 Attachment 7, Figure 6 - SPDS Display: TOP LVL - RVLIS - DISPLAY</p> <p>14.8 Attachment 8, Figure 7 - SPDS Display: TOP LVL - SPDS TRS - RCS TRS - RCS</p> <p>14.9 Attachment 9, Figure 8 - SPDS Display: TOP LVL - SPDS TRS - RCS TRS - P-T CURVE</p> <p>14.10 Attachment 10, Figure 9 - SPDS Display: TOP LVL - SPDS TRS - RCS TRS - TEMP 1&2</p> <p>14.11 Attachment 11, Figure 10 - SPDS Display: TOP LVL - SPDS TRS - RCS TRS - TEMP 3&4</p> <p>14.12 Attachment 12, Figure 11 - SPDS Display: TOP LVL - SPDS TRS - SG TRS - MSL PRESS</p> <p>14.13 Attachment 13, Figure 12 - SPDS Display: TOP LVL - SPDS TRS - SG TRS - SG NR LVL</p> <p>14.14 Attachment 14, Figure 13 - SPDS Display: TOP LVL - SPDS TRS - SG TRS - SG WR LVL</p> <p>14.15 Attachment 15, Figure 14 - SPDS Display: TOP LVL - SPDS TRS - SG TRS - STM FLOW</p> <p>14.16 Attachment 16, Figure 15 - SPDS Display: TOP LVL - SPDS TRS - SG TRS - FW FLOW</p> <p>14.17 Attachment 17, Figure 16 - SPDS Display: TOP LVL - SPDS TRS - SG TRS - AFW FLOW</p> <p>14.18 Attachment 18, Figure 17 - SPDS Display: TOP LVL - SPDS TRS - CNTMT TRS - CNTMT LPR</p> <p>14.19 Attachment 19, Figure 18 - SPDS Display: TOP LVL - SPDS TRS - CNTMT TRS - CNTMT HHT</p> <p>14.20 Attachment 20, Figure 19 - SPDS Display: TOP LVL - SPDS TRS - OTHER TRS - NIS</p> <p>14.21 Attachment 21, Figure 20 - SPDS Display: TOP LVL - SPDS TRS - OTHER TRS - RAD MON</p> <p>14.22 Attachment 22, Figure 21 - SPDS Display: TOP LVL - SPDS TRS - OTHER TRS - TANK LVLS</p> <p>15.0 <u>DOCUMENTATION</u></p> <p>15.1 Preparation and processing of the completed test package shall be accomplished in accordance with STA-683. When completed, forward the test package for retention in station records.</p>		

OFFICIAL TEST COPY

ATTACHMENT G

Log of Work Orders Processed Through MMCP
(Maintenance Management Computer Program)

MAINTENANCE HISTORY SUMMARY REPORT #1
CALIBRATION/COMPLETION DATE REPORT

RANGE? TYPE

NOTE NO INPUT FOR A TYPE DFFAULTS TO ALL*

UNIT : CPI CPX

SYSTEMS : ERF

SELECT DATE TYPE : COMP : 04/10/90 05/10/90

TAG NUMBER(S) :

SYSTEM	TAG NUM	COMP-DATE	CALI-DATE	SEC-NUM	ACTIVITY DESCRIPTION ACTIVITY COMMENTS
ERF	CP1-ECPCR-23	05/02/90	/ /	C900003143	<p>TROUBLESHOOT</p> <p>*PROBLEM OBSERVED/WORK REQUESTED: TROUBLESHOOT PROBLEM IN RACK AD. ORIGINATOR: ROB BISHOP DATE REPORTED: 04/11/90</p> <p>*AS FOUND CONDITION: RACK AD OUT-OF-SERVICE DUE TO -7.5 VDC REF. VOLTAGE READING LOW.</p> <p>*CORRECTIVE ACTION TAKEN: TROUBLESHOOT AND FOUND FAULTY AB295-Q2. REPLACED AB295-Q2 IN RACK AD.</p> <p>*AS LEFT CONDITION: FULLY OPERATIONAL -7.5VDC REF READS -7.475(GOOD) NO PTR REQUIRED.</p> <p>*PROBABLE CAUSE OF PROBLEM/FAILURE: FAULTY AB295-Q2- NORMAL USE.</p> <p>WORK COMPLETE 04-27-90 MMCP-900615-JOWERS IC-9003400</p>
CP1-EIDACP-01		04/19/90	/ /	C900002727	<p>PERFORM CALBRT</p> <p>*PROBLEM OBSERVED/WORK REQUESTED: SOFTWARE CURVE FIT, CALBRT. IS REQUIRED TO BE PERFORMED ON 2 COMPUTER POINTS, P2601A AND T0622A. P2601A IS IN CABINET CP1-ECPCR-26 AND T0622A IS IN CABINET CP1-ECPCR-23 (Q CODE ... SEISMIC CAT I AND II)</p> <p>ORIGINATOR: ROB BISHOP DATE REPORTED: 04/04/90</p> <p>*AS FOUND CONDITION: POINT ID'S P2601A AND T0622A WERE SHOWN 'IN CALIBRATION' WHEN CALLED FOR WITH POINT REC.</p> <p>*CORRECTIVE ACTION TAKEN: RAN CALBRT SOFTWARE SURVE FIT.</p> <p>*AS LEFT CONDITION: BOTH POINTS WERE READING CURRENT PLANT CONDITIONS NO PTR REQUIRED.</p> <p>*PROBABLE CAUSE OF PROBLEM/FAILURE: OVERLAY OF PREVIOUS DATABASES DUE TO HISTORY RETRIEVAL.</p> <p>WORK COMPLETE 900418 MMCP-900522-LASLY IC-9007526</p>
CP1-EIDACP-02P		04/27/90	/ /	C900003104	<p>REWORK AS NEEDED</p> <p>*PROBLEM OBSERVED/WORK REQUESTED: HAMMER BARK BLOWER MOTOR FAULTY. REWORK/REPLACE AS NECESSARY.</p> <p>ORIGINATOR: R. BISHOP X0325 DATE REPORTED: 04/16/90</p> <p>*AS FOUND CONDITION:</p>

Page 2
Att. G

Page 3
Att. G

SYSTEM	TAG NUM	COMP-DATE	CALI-DATE	SEC-NUM	ACTIVITY DESCRIPTION ACTIVITY COMMENTS
					BLOWER NOT OPERATING. *CORRECTIVE ACTION TAKEN: REPLACED BLOWER. *AS LEFT CONDITION: BLOWER OPERATING NORMALLY. NO PTR REQUIRED. *PROBABLE CAUSE OF PROBLEM/FAILURE: AGE WORK COMPLETE 04-25-90 MMCP-900529-JOWERS IC-9003237
ERF	JB1542270	04/16/90	/ /	C900000948	IMPLEMENT NCR 89-11231 ITEM/DISC: WEIDMULLER TERMINAL BLOCK PROBLEM OBSERVED/WORK REQUESTED IMPLEMENT NCR 89-11231, REPLACE TERMINAL BLOCKS AND REQORK CABLE EQ146330A. X-5642 (Q)1-7802/802'D ORIGINATOR: CARL POINDEXTER DATE REPORTED: 1/20/90 PLANNER: MIKE HESTER WORK PERFORMED/PROBABLE CAUSE AS FOUND CONDITION: WITH SAME GRAY TERM BLOCKS. STEP 3 / JB158840 - NCR-89-11231 - ES100 STEP 3.1.2. 2. PLUG WAS ALREADY INSTALLED. CLOSE NIPPLE, COUPL- ING & PLUG. CORRECTIVE ACTION TAKEN: JB158860 R&R (8) SPARE TERMINAL BLOCKS, ALL WIRES SPARED JB15563G R&R (12) SPARE TERMINAL BLOCKS, ALL WIRES SPARED 1 END. JB158840 R&R(15) TERMINAL BLOCKS & 2 ENDS CUT DAMAGE D WIRE (SPARES) & TAPED UP PER NCR-89-11231. JB1542270 R&R 05 TERM BLOCK PER MSE-G0-1203 LIFT & LAND WIRES. AS LEFT CONDITION: WITH ALL BLACK TERMINAL BLOCKS. NO PTR REQUIRED. PROBABLE CAUSE OF PROBLEM/FAILURE: N/A. WORK COMPLETED BY: CLARK, P. 04/07/90 WORK SUP: CAUCHRON, D. #125 04/09/90 SANDERS MICHELLE TA-424 X-5289 ENTERED MMCP 05/22/90

EI

PROGRAM MS155015
RUN DATE 06/25/90

COMPLETION DATE REPORT
DATE RANGE: 04/10/90 TO 05/10/90

RUN 1 APR 68 10
PAGE 3

SYSTEM	TAG NUM	COMP-DATE	CALI-DATE	SFG-NUM	ACTIVITY DESCRIPTION	ACTIVITY COMMENTS
					TRANSMITTAL EM90-00810	

ADDITIONAL DOCUMENTS USED:
DUG E1-0607, DCA 70689 R/3, DCA 21301 R/3

Page 4
Att. G.

CORRECTIVE MAINTENANCE
WORK ORDER

Page 1 of 4

Work Order #: WR00022236

Priority: 12

Work Order #: C900003447

Scheduled Date: 05/07/90

Rev #: 0

Responsible Organization: ICC 1&C COMPUTER GROUP

Component Quality: 0 Safety Class: NA Seis. Cat: II Work Order Type: NQ

Tag #: CP1-EISPD5-01A

Item/Desc: CHROMATICS SPDS KEY PAD

Unit: CP1

System: E1

Train: N

Bldg/Elev: CB932

Room: 135

PROBLEM OBSERVED/WORK REQUESTED

SPDS SCREEN GOES BLANK, THEN COMES UP WITH LOSS OF
DATA AND THEN WILL COME BACK. THIS HAS BEEN REPEATE
D THREE TIMES IN ABOUT FIFTEEN MINUTES.

*Misplaced
in system.
Needed to be
under computer.
Chgt 6/26/90*

Originator: RON GIBBS

Date Reported: 05/07/90

Conditional Release (Y/N):

Each Spec (Y/N): N Start (Time: Date:) Req'd Cmpl: / /

***** CONDITIONS REQUIRED TO PERFORM WORK *****

Unit Mode: 16

System: E1

Equipment: OU

Special: _____

***** SPECIAL INSTRUCTIONS *****

Permits: RWP: Y (N) # _____

Confined Space Entry: Y (N) # _____

FIRE: Y (N) # _____

Combustible Loading: Y (N) # _____

Clearance: N # _____

Cleanliness Class: N/A Housekeeping Zone: IV

PTR Req'd: Y (N) # _____

NFRDS Components: N

Failure: Y N

***** APPROVAL/AUTHORIZATION TO START WORK *****

Quality Control

Authorized Nuclear Insp.

1&C COMPUTER GROUP

Shift Supervisor

Work Order Issued To (PRINT)

N/A

N/A

N/A

N/A

N/A

N/A

Date: / /

Date: / /

Date: 5/7/90

Date: 5/2/90

Date: 5/7/90

Revisions	1	2	3	4	5	6
ICC						
QC						
ANII						
OPER(asappl)						

***** ACCEPTED FOR OPERATION *****

Shift Supervisor

Date: / /

***** POST WORK REVIEWS *****

1&C COMPUTER GROUP

C

NII

TECHNICAL SUPPORT

Drumfitter

N/A

Date: 05/14/90

Date: / /

Date: / /

Date: / /

STA-516-1 R1 04/07/90

ag Comments:

CHROMATICS SPDS KEYPAD

***** WORK PLAN *****

MANPOWER ESTIMATES

enter actual # men and hours worked)

# MEN	RES	HOURS WORKED	REM %
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
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92	92	92	92
93	93	93	93
94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99
100	100	100	100

Est.	Act.	Est.	Act.
2/2	CG1	5.0/4.0	0.010

[illegible]

MEASURING AND TEST EQUIPMENT

M&TE TAG # CAL DUE M&TE TAG # CAL DUE

mm/dd/yy mm/dd/yy

NA 1 1 1 1

DATE	TIME	LOCATION	WIND DIRECTION	WIND SPEED	SEA STATE	WAVE PERIOD	WAVE HEIGHT	WAVE LENGTH	WAVE ENERGY	WAVE POWER	WAVE FORCE	WAVE PRESSURE	WAVE MOMENTUM	WAVE TENSION	WAVE STRESS	WAVE STRAIN	WAVE DEFORMATION	WAVE DAMAGE	WAVE LOSS	WAVE REPAIR	WAVE MAINTENANCE	WAVE INSPECTION	WAVE MONITORING	WAVE RECORDING	WAVE ANALYSIS	WAVE REPORTING	WAVE DOCUMENTATION	WAVE ARCHIVING	WAVE PRESERVATION	WAVE RESTORATION	WAVE REPLACEMENT	WAVE REMEDIATION	WAVE RECONSTRUCTION	WAVE REPAIRS	WAVE MAINTENANCE	WAVE INSPECTION	WAVE MONITORING	WAVE RECORDING	WAVE ANALYSIS	WAVE REPORTING	WAVE DOCUMENTATION	WAVE ARCHIVING	WAVE PRESERVATION	WAVE RESTORATION	WAVE REPLACEMENT	WAVE REMEDIATION	WAVE RECONSTRUCTION	WAVE REPAIRS
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Project Name	Project Number	Project Status	Project Description	Project Manager	Project Lead	Project Sponsor
Project A	12345	In Progress	Project A Description	John Doe	Jane Smith	Bob Johnson
Project B	67890	Completed	Project B Description	John Doe	Jane Smith	Bob Johnson
Project C	11111	On Hold	Project C Description	John Doe	Jane Smith	Bob Johnson
Project D	22222	Planned	Project D Description	John Doe	Jane Smith	Bob Johnson
Project E	33333	Cancelled	Project E Description	John Doe	Jane Smith	Bob Johnson

DATE	TIME	LOCATION	REMARKS	WIND	WAVE	SEA
11/11/11	14:00	1000000	1000000	1000000	1000000	1000000

DESCRIPTION OF THE PROPERTY	DATE OF ACQUISITION	DATE OF SALE	DATE OF TRANSFER	DATE OF REDEMPTION	DATE OF EXPIRATION	DATE OF CANCELLATION	DATE OF REDEMPTION	DATE OF EXPIRATION	DATE OF CANCELLATION
	/	/					/	/	

[illegible]

DATE	DESCRIPTION	AMOUNT	BALANCE
1/1/01	OPENING BALANCE		100.00
1/15/01	PAYROLL	50.00	50.00
2/1/01	RECEIVED	25.00	75.00
2/15/01	PAYROLL	50.00	25.00
3/1/01	RECEIVED	25.00	50.00
3/15/01	PAYROLL	50.00	0.00
3/31/01	CLOSING BALANCE		0.00

姓名	性别	年龄	职业	住址	联系电话	电子邮箱	备注
张三	男	35	教师	北京市海淀区中关村大街100号	13910101234	zhangsan@163.com	
李四	女	28	医生	北京市朝阳区建国路100号	13910105678	lisi@163.com	
王五	男	45	工程师	上海市浦东新区世纪大道100号	13910109012	wangwu@163.com	
赵六	女	30	会计	广州市天河区珠江新城100号	13910103456	zhaoliu@163.com	
孙七	男	25	学生	北京市昌平区回龙观镇100号	13910107890	sunqi@163.com	
周八	女	38	公务员	深圳市福田区福田街道100号	13910102345	zhouba@163.com	
吴九	男	42	律师	上海市黄浦区南京东路100号	13910106789	wujiu@163.com	
郑十	女	33	记者	北京市朝阳区三里屯100号	13910100123	zhengshi@163.com	
冯十一	男	27	程序员	北京市海淀区中关村大街100号	13910104567	fengshi@163.com	
陈十二	女	31	设计师	北京市朝阳区建国路100号	13910108901	chenshi@163.com	
林十三	男	40	销售经理	上海市浦东新区世纪大道100号	13910103210	linshi@163.com	
周十四	女	29	产品经理	广州市天河区珠江新城100号	13910107654	zhoushi@163.com	
吴十五	男	36	运营专员	北京市昌平区回龙观镇100号	13910102109	wushi@163.com	
郑十六	女	34	市场专员	深圳市福田区福田街道100号	13910106018	zhengshi@163.com	
冯十七	男	26	数据分析师	上海市黄浦区南京东路100号	13910105197	fengshi@163.com	
陈十八	女	32	人力资源	北京市朝阳区三里屯100号	13910104286	chenshi@163.com	
林十九	男	41	财务总监	北京市海淀区中关村大街100号	13910103375	linshi@163.com	
周二十	女	30	法务专员	北京市朝阳区建国路100号	13910102464	zhoushi@163.com	
吴二十一	男	37	行政专员	上海市浦东新区世纪大道100号	13910101553	wushi@163.com	
郑二十二	女	28	客服专员	广州市天河区珠江新城100号	13910100642	zhengshi@163.com	
冯二十三	男	39	销售专员	北京市昌平区回龙观镇100号	13910109731	fengshi@163.com	
陈二十四	女	35	市场专员	深圳市福田区福田街道100号	13910108820	chenshi@163.com	
林二十五	男	27	数据分析师	上海市黄浦区南京东路100号	13910107909	linshi@163.com	
周二十六	女	33	人力资源	北京市朝阳区三里屯100号	13910107098	zhoushi@163.com	
吴二十七	男	43	财务总监	北京市海淀区中关村大街100号	13910106187	wushi@163.com	
郑二十八	女	31	法务专员	北京市朝阳区建国路100号	13910105276	zhengshi@163.com	
冯二十九	男	29	行政专员	上海市浦东新区世纪大道100号	13910104365	fengshi@163.com	
陈三十	女	36	客服专员	广州市天河区珠江新城100号	13910103454	chenshi@163.com	
林三十一	男	28	销售专员	北京市昌平区回龙观镇100号	13910102543	linshi@163.com	
周三十二	女	39	市场专员	深圳市福田区福田街道100号	13910101632	zhoushi@163.com	
吴三十三	男	30	数据分析师	上海市黄浦区南京东路100号	13910100721	wushi@163.com	
郑三十四	女	37	人力资源	北京市朝阳区三里屯100号	13910109810	zhengshi@163.com	
冯三十五	男	25	财务总监	北京市海淀区中关村大街100号	13910108909	fengshi@163.com	
陈三十六	女	32	法务专员	北京市朝阳区建国路100号	13910108098	chenshi@163.com	
林三十七	男	40	行政专员	上海市浦东新区世纪大道100号	13910107187	linshi@163.com	
周三十八	女	29	客服专员	广州市天河区珠江新城100号	13910106276	zhoushi@163.com	
吴三十九	男	38	销售专员	北京市昌平区回龙观镇100号	13910105365	wushi@163.com	
郑四十	女	34	市场专员	深圳市福田区福田街道100号	13910104454	zhengshi@163.com	
冯四十一	男	26	数据分析师	上海市黄浦区南京东路100号	13910103543	fengshi@163.com	
陈四十二	女	33	人力资源	北京市朝阳区三里屯100号	13910102632	chenshi@163.com	
林四十三	男	41	财务总监	北京市海淀区中关村大街100号	13910101721	linshi@163.com	
周四十四	女	30	法务专员	北京市朝阳区建国路100号	13910100810	zhoushi@163.com	
吴四十五	男	37	行政专员	上海市浦东新区世纪大道100号	13910109909	wushi@163.com	
郑四十六	女	28	客服专员	广州市天河区珠江新城100号	13910109098	zhengshi@163.com	
冯四十七	男	39	销售专员	北京市昌平区回龙观镇100号	13910108187	fengshi@163.com	
陈四十八	女	35	市场专员	深圳市福田区福田街道100号	13910107276	chenshi@163.com	
林四十九	男	2					

Nome do candidato(a)	Nome do(a) pai(mãe)	Nome do(a) filho(s)	Nome do(a) pai(mãe)	Nome do(a) filho(s)	Nome do(a) pai(mãe)	Nome do(a) filho(s)
	/	/		/		/

姓名	性别	年龄	职业	住址	联系电话	电子邮箱	备注
张三	男	35	教师	北京市海淀区中关村大街100号	13910123456	zhangsan@163.com	
李四	女	28	医生	北京市朝阳区建国路123号	13801012345	lisi@126.com	
王五	男	42	工程师	上海市浦东新区世纪大道100号	13601712345	wangwu@126.com	
赵六	女	30	会计	广州市天河区珠江新城100号	13502012345	zhaoliu@163.com	
孙七	男	25	程序员	深圳市南山区科技园100号	13403012345	sunqi@126.com	
周八	女	38	律师	北京市东城区东直门100号	13904012345	zhouba@163.com	
吴九	男	45	经理	上海市静安区南京西路100号	13605012345	wujiu@126.com	
郑十	女	32	设计师	广州市海珠区江南大道100号	13506012345	zhengshi@163.com	
冯十一	男	27	销售	深圳市龙岗区布吉100号	13407012345	fengshi@126.com	
陈十二	女	33	护士	北京市西城区金融街100号	13908012345	chenshi@163.com	
林十三	男	40	教授	上海市徐汇区衡山路100号	13609012345	linshi@126.com	
周十四	女	29	文员	广州市白云区白云大道100号	13510012345	zhoushi@163.com	
吴十五	男	36	司机	深圳市南山区西丽100号	13411012345	wushi@126.com	
郑十六	女	31	翻译	北京市昌平区回龙观100号	13912012345	zhengshi@163.com	
冯十七	男	26	实习生	上海市虹口区四川北路100号	13613012345	fengshi@126.com	
陈十八	女	34	培训师	广州市天河区体育西路100号	13514012345	chenshi@163.com	
林十九	男	41	顾问	深圳市南山区蛇口100号	13415012345	linshi@126.com	
周二十	女	37	分析师	北京市西城区三里河100号	13916012345	zhoushi@163.com	
吴二十一	男	24	助理	上海市浦东新区川沙100号	13617012345	wushi@126.com	
郑二十二	女	39	主管	广州市天河区珠江新城100号	13518012345	zhengshi@163.com	
冯二十三	男	23	实习生	深圳市龙岗区布吉100号	13419012345	fengshi@126.com	
陈二十四	女	35	经理	北京市昌平区回龙观100号	13920012345	chenshi@163.com	
林二十五	男	43	教授	上海市徐汇区衡山路100号	13621012345	linshi@126.com	
周二十六	女	30	文员	广州市白云区白云大道100号	13522012345	zhoushi@163.com	
吴二十七	男	28	司机	深圳市南山区西丽100号	13423012345	wushi@126.com	
郑二十八	女	32	翻译	北京市昌平区回龙观100号	13924012345	zhengshi@163.com	
冯二十九	男	25	实习生	上海市虹口区四川北路100号	13625012345	fengshi@126.com	
陈三十	女	36	培训师	广州市天河区体育西路100号	13526012345	chenshi@163.com	
林三十一	男	44	顾问	深圳市南山区蛇口100号	13427012345	linshi@126.com	
周三十二	女	38	分析师	北京市西城区三里河100号	13928012345	zhoushi@163.com	
吴三十三	男	27	助理	上海市浦东新区川沙100号	13629012345	wushi@126.com	
郑三十四	女	40	主管	广州市天河区珠江新城100号	13530012345	zhengshi@163.com	
冯三十五	男	29	实习生	深圳市龙岗区布吉100号	13431012345	fengshi@126.com	
陈三十六	女	37	经理	北京市昌平区回龙观100号	13932012345	chenshi@163.com	
林三十七	男	46	教授	上海市徐汇区衡山路100号	13633012345	linshi@126.com	
周三十八	女	31	文员	广州市白云区白云大道100号	13534012345	zhoushi@163.com	
吴三十九	男	30	司机	深圳市南山区西丽100号	13435012345	wushi@126.com	
郑四十	女	33	翻译	北京市昌平区回龙观100号	13936012345	zhengshi@163.com	
冯四十一	男	26	实习生	上海市虹口区四川北路100号	13637012345	fengshi@126.com	
陈四十二	女	38	培训师	广州市天河区体育西路100号	13538012345	chenshi@163.com	
林四十三	男	47	顾问	深圳市南山区蛇口100号	13439012345	linshi@126.com	
周四十四	女	39	分析师	北京市西城区三里河100号	13940012345	zhoushi@163.com	
吴四十五	男	31	助理	上海市浦东新区川沙100号	13641012345	wushi@126.com	
郑四十六	女	41	主管	广州市天河区珠江新城100号	13542012345	zhengshi@163.com	
冯四十七	男	32	实习生	深圳市龙岗区布吉100号	13443012345	fengshi@126.com	
陈四十八	女	42	经理	北京市昌平区回龙观100号	13944012345	chenshi@163.com	
林四十九	男	48	教授				

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Account Name	Account Number	Account Type	Account Balance	Account Status	Account Owner	Account Address	Account City	Account State	Account Zip
Account Name	Account Number	Account Type	Account Balance	Account Status	Account Owner	Account Address	Account City	Account State	Account Zip

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SPARE PARTS AND SPECIAL TOOLS

Quantity	(enter actual used and cross out any not used)	Parts Staged
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Est. / Act	U/I	TSN	QAT	Description	Y/N
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CORRECTIVE MAINTENANCE
WORK ORDER

Print Date: 05/07/90
Wg #: CP1-EISPD5-01A

Page 3 of 4
Work Order #: C900003447
Rev #: 0

***** PROCEDURES/INSTRUCTIONS *****
ICA-102

WORK INSTRUCTIONS

STEPS

RESP ORG PERFORMED NA

LANNER JEFF GILLUM
SPECIFICATION REVIEW Q2G050790

TROUBLESHOOT CP1-EISPD5-01A IN ACCORDANCE WITH
ICA-102. DOCUMENT ON STA-606-12.

RETURN TO I&C PLANNING FOR FURTHER INSTRUCTIONS
AS REQUIRED.

CORRECTIVE MAINTENANCE
WORK ORDER

Page 8
Att. G

Print Date: 05/07/90
Log #: CP1-EISPD5-01A

Page 4 of 4
Work Order #: C900003447
Rev #: 0

***** WORK PERFORMED / PROBABLE CAUSE *****
Found Condition: FULLY OPERATIONAL.

Corrective Action Taken: NONE.

Left Condition: FULLY OPERATIONAL.

Probable Cause Of Problem/Failure: TERMINAL CONCENTRATOR.
Work Order C900003530 (WR# 81167) initiated to troubleshoot Terminal Concentrators
Munfitchum 5/14/90.

Duration (Est./Act.) 9.0 / 4.0

Work Completed By: [Signature] M2093

Work Supervisor: Munfitchum TU 0027

Date: 5/8/90 5/14/90
5/14/90

ATTACHMENT H

Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

CPSES - Comanche Peak Steam Electric Station
CPU - Central Processing Unit
EGT - Engineering Test
EOF - Emergency Operations Facility
ERF - Emergency Response Facility
ERFCS - Emergency Response Facility Computer System
FSAR - Final Safety Analysis Report
I&C - Instrumentation and Controls
MMCP - Maintenance Management Computer Program
Mux - Multiplexer
NRC - Nuclear Regulatory Commission
ONE - Operational Notification and Evaluation
OPS - Operations
P&T - Performance and Test
SER - Safety Evaluation Report
SPDS - Safety Parameter Display System
SSER - Supplement to Safety Evaluation Report
STA - Station Administrative procedure
TE - Technical Evaluation
TSC - Technical Support Center