

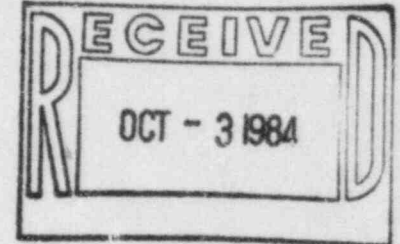


Public Service Company of Colorado

16805 WCR 19 1/2, Platteville, Colorado 80651

September 24, 1984
Fort St. Vrain
Unit #1
P-84370

Mr. E. H. Johnson, Chief
Reactor Project Branch 1
Region IV
Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011



SUBJECT: Damaged Control Rod Removal
on Fort St. Vrain Fuel Deck

Dear Mr. Johnson:

This letter is provided as a courtesy to keep you aware of the status of the fuel deck at Fort St. Vrain.

Removal of Control Rod Drive and Orificing Assembly (CRDOA) Serial Number 25 from Region 7 started on August 29 with retraction of the control rod absorber strings. The normal "OUT" limit and "FULL RETRACT" indications came up, as occur during a normal CRDOA removal. Installation of the battery box and shipping tool (used to hold the absorber strings in position once the CRD motor power was removed) was done, and the entire mechanism was unbolted. At this point, removal from the PCRV could proceed.

The next shift's crew moved the Auxilliary Transfer Cask (ATC) into place over the Reactor Isolation Valve (RIV) and prepared to remove the CRDOA. The mechanism was raised into the ATC with normal indications for weight and other parameters. When the ATC shutters were closed, an overcurrent fuse blew. This was the first indication of a problem. At the same time, the operator noted an increase in weight from 4900 to about 6000 lbs. The RIV, which had never been completely closed, was reopened, and the ATC Shutters were reopened. Radiation levels on the fuel deck were typical for this type of evolution.

8410170215 840924
PDR ADOCK 05000267
S PDR

H005
ORIGINAL TO
RIV 11

In accordance with normal routine, the Supervisor lowered the CRDOA back into the PCRV to re-evaluate the situation. The mechanism was lowered about 25 feet when a weight loss occurred. Normal position for seating the mechanism is 33 feet. The mechanism was again lifted into the ATC and consultation with station management occurred. A second attempt to lower the mechanism was made. This time, weight loss occurred at about 10 feet. The mechanism was raised into the ATC and lowered again, resulting in weight loss at 3 feet. The mechanism was fully retracted and work stopped pending evaluation.

Review of the events suggested the absorber strings may not have been fully retracted, despite the "FULL RETRACT" limit switch indication observed during retraction. This indication requires that only one of two redundant switches is made up, on either absorber string full retract assembly. The evidence suggested that one rod fully retracted while the other did not. It was decided to perform a radiation survey around the ATC to look for a skewed level along the rod pair axis, and remove the drive screw from the ATC shutters to allow internal examination by borescope.

Radiation survey did indicate a skewed level along the east-west axis. The first borescope examination, through the east drive screw penetration identified an absorber cannister, but the orientation could not be determined. A second, improved borescope was obtained, and several additional examinations were made from both the east and west sides. One absorber string could be observed during the examination, with the shock absorber from that string bent at a high angle and positioned near the RIV gate area. The lower cannister also appeared to be creased.

From this information, estimates of distance that the lowest section of the string was below the ATC shutter and anticipated radiation levels were made. A test to lift the ATC and actually observe the cannister string using video equipment to verify borescope observations and measure radiation levels was developed.

Test T-242 was written to accomplish this task and was performed on September 5 on swing shift. Levels in the gap formed between the ATC and RIV were about 7 R/hr, while those in the vicinity of the reactor building crane operator and Health Physics Technician were 20 mR/hr, maximum. In preparation for performing this task, the ATC shutters were intentionally manually closed on the absorber string to guarantee that it would not fall free and create a hazard. Remote viewing capability was provided by TV cameras and remote monitors. Information from Test T-242 was used to determine a procedure for removal of the damaged CRDOA from the reactor. Radiation levels were such that exposure for personnel "riding" on the ATC (crane operator and HP technician) would be acceptable provided no material was dropped during the transfer.

Finally, preparation and removal of the damaged mechanism was done under Fuel Handling Procedure Work Packet 82. Modifications to existing equipment included a special head for the overhead crane to allow as much as 50 inches of lift, special limit switches for this additional travel, remote operation capability on the RIV, remote viewing cameras and monitors to control the work, and a crane operation station against the body of the ATC, where shielding would be greatest. The transfer was done such that once the absorber string was clear of the RIV, the ATC was moved over a collapsible catch net, which was raised to contain any falling control rod parts and preclude personnel hazards should this possibility arise. The hot cell was set up to receive the damaged CRDOA, with a funnel-type cone installed in the east port to insure that the damaged string would not hang up during CRDOA installation.

The transfer itself (performed on swing shift September 9) was uneventful, with no material lost. The catch net was removed when the ATC was positioned over the shield adaptor on the east port of the hot cell, and the ATC was lowered. Nuclear Regulatory Commission Inspectors Plumlee and Chaney were present and cognizant of all activities.

When the CRDOA was lowered into the HSF, examination of the mechanism indicated no damage to the main assembly. One absorber string was hanging down, with damaged absorber sections and shock absorber, with about $4\frac{1}{2}$ cans evident. The other string was fully retracted as originally suspected.

On the damaged strings, the shock absorber had about a 150° bend occurring nearly at the top. The lowest three absorber cans had evidence of damage, such as creases, scrapes, and spine bending. Although examination is not complete at this time, all damage observed on the cannister string is consistent with the removal events scenario, i.e., the mechanism damage occurred from (1) closing the ATC and possibly the RIV on the lowest two cans, (2) initially attempting to deposit the CRDOA back into the reactor, (3) attempting to return the CRDOA to the ATC, and (4) repeating attempts to deposit the CRDOA back into the reactor. The shock absorber damage apparently occurred when the weight of the CRDOA was partially placed upon it when it failed to locate correctly in the control rod hole in the top plenum element. (Note that the damaged string was hanging below the guide tubes normally serving to align the control rod strings with the center element control rod holes.) The cannister creases resulted from closure of the RIV and ATC shutter.

Visual inspection of the Region 7 plenum area revealed no damage, although several contact spots may have been observed. There were no abnormalities with regard to plenum element/Region Constraint Device position and placement. Consequently, a replacement CRDOA was installed in the region on September 12.

Test T-244 was written to visually examine the "as found" condition of the CRD in the hot cell after removal. To prevent the disturbance of internal components, the orifice motor access plates were removed before lifting the CRD 200 Assembly. Both cables could be seen on the cable drum. One appeared to be in good shape, unaffected, while the other was wrapped around the cable drum hub assembly. Pieces of shredded cable were found on the orifice motor plate. One piece, approximately 12" in length, was found on the plate. The 200 Assembly was then raised to enable the examination of the cable drum hub assembly and shim motor. While this was being done, several pieces of cable fell to the orifice motor plate. A large four to five foot section of cable was found to be wrapped around the cable drum. This piece of cable was jammed in the cable channel at the bottom of the drum. It was also noticed that the outer channel of the cable drum had minor nicks, scratches, and scrapes on its edge.

Photographs of the damaged cannister string and CRD internals are included for your information.

If you have any questions, please contact Mr. Chuck Fuller at (303) 785-2224, Ext. 202.

Sincerely,

J. W. Gahm for

J. W. Gahm
Manager, Nuclear Production

Enclosure

JWG/djm

PICTURE DESCRIPTION

NOTE: Picture labels A-1 through A-16 correspond to 1 through 16 below.

1. View through one of the four orifice motor access plates. Shiny debris is from damaged cable.
2. View through another of the access plates. Damaged cable debris is visible.
3. Two pieces of cable that fell to the orifice motor plate while lowering the control rod absorber string during examination.
4. View of the 200 Assembly; cable is on the cable drum hub assembly. The cable should be under the housing (brown cover) in the guide channel.
5. View of the 200 Assembly with guide pulley cover visible (brown component below cable drum). Cable is wrapped between slack cable assembly and cable drum.
6. View of point where cable wraps were adjacent rather than on top of each other in the cable channel. Notice undamaged cable.
7. Another view of adjacent cable wraps.
8. View of cable protruding from bottom of cable drum.
9. View of cable protruding from bottom of cable drum.
10. View of shim motor/brake assembly and position potentiometer. No abnormalities.
11. Damaged absorber string strung out onto hot cell floor from CRDOA orifice valve assembly guide tube.

The following are sequential pictures moving down the cannister string to shock absorber.
12. Guide tubes showing retracted and damaged absorber string positions.
13. First cannister completely below end of guide tube.
14. Second cannister completely below guide tube.
15. Third and fourth cannisters completely below guide tube and shock absorber.
16. Same as (15), but better shock absorber detail.

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 01 CURRENT LOC: R-26 LOC ON 4/23/84 : R-26

PTR :

WORK :

REMARKS:

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 02 CURRENT LOC: ESW 4 LOC ON 6/23/84 : R-27
PTR :

WORK: SHIM MOTOR TO BE REFURBISHED - BAD BACK EMF ACCELERATION.

REMARKS: REMOVED FROM R-27 AND PLACED IN ESW 4 ON 9-20-84.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 03
PTR :

CURRENT LOC: R-2

LOC ON 6/23/84 : R-2

WORK:

REMARKS:

1 - TAN
2 - GREEN
3 - BLUE
4 - RED

1 - TAN
2 - GREEN
3 - BLUE
4 - RED

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 04 CURRENT LOC: ESW 2 LOC ON 6/23/84 : R-37
PTR :

WORK: SHIM MOTOR TO BE REFURBISHED - HEGGERS BAD.

REMARKS: REMOVED FROM R-37 AND PLACED IN ESW 2 ON 9-21-84.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 05 CURRENT LOC: R-22 LOC ON 6/23/84 : R-22
PTR :

WORK :

REMARKS :

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDGA: 06 CURRENT LOC: R-1 LOC ON 6/23/84 : R-1
PTR : 84-07-0367

WORK:

ROD 'OUT' LIMIT LIGHT REMAINS 'ON' WITH ROD ON BOTTOM
IDENTIFIED ON 7-19-84.
NEEDS TO BE INVESTIGATED AND REPAIRED.

REMARKS:

HAS 1 OF 2 REDUNDANT 'ROD OUT' LIMIT SWITCHES INOPERABLE.

93 . BLUE
94 . RED

91 . TAN
92 . GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 07 CURRENT LOC: R-37 LOC ON 6/23/84 : R-25
PTR :

WORK: SHIM MOTOR AND 200 ASSEMBLY TO BE REFURBISHED.

REMARKS: FAILED TO SCRAM ON 6/23/84. SHIM MOTOR AND 200 ASSEMBLY
REFURBISHED ON 8-27-84.

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 08 CURRENT LOC: R-36 LOC ON 6/23/84 : R-36
PTR :

WORK:

REMARKS:

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 09 CURRENT LOC: ESW-9 LOC ON 6/23/84 : ESW-4
PTR :

WORK: MOVED FROM ESW 4 TO ESW 9 ON 8-4-84.

REMARKS: IMOPERABLE SPARE. NO SHIM MOTOR. BENT SHOCK ABSORBER FROM
SARTA TESTING. STUCK ORIFICE VALVE.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 10 CURRENT LOC: R-5 LOC ON 6/23/84 : R-5
PTR :

WORK:

REMARKS:

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 11 CURRENT LOC: R-27 LOC ON 6/23/84 : R-30
PTR :

WORK:

BAD SHIM MOTOR IDENTIFIED ON 7-21-84.
STUCK ORIFICE VALVE IDENTIFIED ON 6-28-84.
SHIM MOTOR AND 200 ASSEMBLY TO BE REFURBISHED.
UNACCEPTABLE CABLE STRAND IDENTIFIED ON 8-31-84 - CABLE
TO BE REPLACED.
REMOVE FROM REGION 27 BEFORE STARTUP.

REMARKS:

SHIM MOTOR REPAIRED & REFURBISHED, 200 ASSEMBLY REFURBISHED,
STUCK ORIFICE VALVE REPAIRED ON 9-4-84.

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDDA: 12 CURRENT LOC: R-15 LOC ON 6/23/84 : R-15
PTR : 84-07-0382

WORK:

INCORRECT CR ANALOG POSITION INDICATION PTR'D ON 7-21-84.
INVESTIGATED AND NEEDS TO BE REPAIRED.

REMARKS:

DIGITAL POSITION POT WORKS FINE.
FOUND POT OPEN IN CONTROL ROD. READ FROM MCC 2TB-5 TO 7.

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 13 CURRENT LOC: HSF WP LOC ON 6/23/84 : R-19
PTR :

WORK:

STUCK ORIFICE VALVE IDENTIFIED ON 6/27/84-NEEDS REPAIR.
FAULTY "ROD IN" LIGHT IDENTIFIED ON 7/17/84-NEEDS REPAIR.
INCORRECT CR ANALOG AND DIGITAL POSITION INDICATION
IDENTIFIED ON 7/7/84-REPLACE POSITION POT.

REMARKS:

WORK IN PROGRESS AS OF 9-22-84.

3 - BLUE
4 - RED

1 - TAN
2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRD/A: 14
PTR :

CURRENT LOC: R-6

LOC ON 6/23/84 : R-10

WORK :

SHIM MOTOR AND 200 ASSEMBLY TO BE REFURBISHED.

REMARKS:

FAILED TO SCRAM ON 6/23/84. SHIM MOTOR AND 200 ASSEMBLY
REFURBISHED ON 7-30-84.

1 - TAN
2 - GREEN
3 - BLUE
4 - RED

1 - TAN
2 - GREEN
3 - BLUE
4 - RED

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDDA: 15 CURRENT LOC: R-32 LOC ON 6/23/84 : R-32
PTR :

WORK :

REMARKS :

3 - BLUE
4 - RED

1 - TAN
2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 16 CURRENT LOC: R-13 LOC ON 6/23/84 : R-13

PTR :

WORK :

REMARKS :

#1 - TAN
#2 - GREEN
#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN
#3 - BLUE
#4 - RED

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 17
PTR :

CURRENT LOC: R-31

LOC ON 6/23/84 : R-31

WORK :

REMARKS :

IDENTIFIED ON 6/28/84 AS HAVING A STUCK ORIFICE VALVE.

3 - BLUE
4 - RED

1 - TAN
2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 1B CURRENT LOC: R-10 LOC ON 6/23/84 : R-7
PTR :

WORK: SHIM MOTOR AND 200 ASSEMBLY TO BE REFUBISHED.

REMARKS: FAILED TO SCRAM ON 5/23/84. SHIM MOTOR AND 200 ASSEMBLY
REFUBISHED BY 7-13-84.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 19 CURRENT LOC: R-25 LOC ON 6/23/84 : ESW-3
PTR : 84-08-0048

WORK:

SR-RE-48-X WAS STARTED AND UPON PRESSURIZATION OF
REFUELING PENETRATION #25 THE PRIMARY SEALS LEAKED
THROUGH.
REMOVE FROM R-25 BEFORE STARTUP.

REMARKS:

TEMPORARY INSTALLATION IN R-26. BAD SEALS. NO SHIM MOTOR.

3 - BLUE
4 - RED

1 - TAN
2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 20 CURRENT LOC: R-19 LOC ON 6/23/84 : ESW-9
PTR : 84-03-0010 84-07-0328

WORK:

REPLACE RSD HOPPER PRESSURE SWITCH.
POSITION POT BROKEN - REPLACE.
REMOVE FROM R-19 BEFORE STARTUP.

REMARKS:

ICRD. TO BE TEMPORARILY INSTALLED IN REGION 19 FOLLOWING
REMOVAL OF CRDOA 13 ON 8/3/84.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

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CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 21 CURRENT LOC: ESW 5 LOC ON 6/23/84 : R-35
PTR :

WORK :
SHIM MOTOR TO BE REFURBISHED - BAD BACK EMF ACCELERATION.

REMARKS:
REMOVED FROM R-35 AND PLACED IN ESW 5 ON 9-15-84.

3 - BLUE
4 - RED

1 - TAN
2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 22

CURRENT LOC: R-34

LOC ON 6/23/84 : R-34

PTR :

WORK :

REMARKS :

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 23
PTR :

CURRENT LOC: R-24

LOC ON 6/23/84 : R-24

WORK :

REMARKS :

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDDA: 24 CURRENT LOC: R-14 LOC ON 6/23/84 : ESW-5
PTR : 84-09-0028

WORK:

WHEN POSSIBLE, REMOVE COVER FROM REG. 14 TO VERIFY HEAT #
ON CRD 24. THE HEAT NUMBER WILL BE VERIFIED AND
DOCUMENTATION WILL BE UPDATED. THIS DOES NOT AFFECT THE
OPERABILITY OF THE CONTROL ROD. NOT REPORTABLE. L.R. 8-7-84
INSTALL IN R-14.

REMARKS:

SPARE FROM REFUELING #3. HEAT NO. VERIFIED. INSTALLED IN R14
ON 6-27-84.

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 25 CURRENT LOC: HSF EP LOC ON 6/23/84 : R-14
PTR : 84-07-0406

WORK:

SHIM MOTOR HAS BEEN REFURBISHED.
SLACK CABLE SWITCHES NEED RESETTING.
POSSIBLE PROBLEMS WITH SLACK CABLE.
CONTROL ROD DAMAGED IN ATC.
CONDUCT TEST T-242.
CONDUCT TEST T-244.

REMARKS:

FAILED TO SCRAM ON 6/23/84. SHIM MOTOR HAS BEEN REFURBISHED.
IDENTIFIED ON 7/19/84 AS HAVING A FAULTY "SLACK CABLE"
SWITCH. TO BE REMOVED FROM CORE AGAIN TO REPAIR "SLACK
CABLE" SWITCH. WEST ABSORBER STRING DAMAGED BY ATC SHUTTER
ON 8-29-84. T-242 CONDUCTED ON 9-5-84 TO DETERMINE RADIATION
LEVELS. CRD MOVED FROM ATC TO HSF ON 9-11-84. BEGAN T-244 ON
9-18-84 TEST IS STILL IN PROGRESS.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 26 CURRENT LOC: R-9 LOC ON 6/23/84 : R-9
PTR : 84-07-0320

WORK :
 FAULTY "ROD OUT" LIMIT SWITCH IDENTIFIED ON 7-17-84.

REMARKS:
 ROD OUT LIMIT LIGHT COMES ON WITH ROD IN.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRD00A: 27 CURRENT LOC: ESW-1 LOC ON 6/23/84 : ESW-1

PTR :

WORK :

REMARKS:

INOPERABLE SPARE. ORIFICE VALVE WAS BROKEN OFF AND IS CURRENTLY SITTING ON THE BOTTOM OF ESW-1. NO SHIM MOTOR. NO RESERVE SHUTDOWN MATERIAL.

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 2B CURRENT LOC: R-21 LOC ON 6/23/84 : R-21

PTR :
WORK :

REMARKS: IDENTIFIED ON 7/5/84 AS HAVING A STUCK ORIFICE VALVE.

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 29 CURRENT LOC: R-7 LOC ON 6/23/84 : R-6
PTR :

WORK: SHIM MOTOR AND 200 ASSEMBLY TO BE REFURBISHED.
 STUCK ORIFICE VALVE IDENTIFIED ON 6-29-84.
 FAULTY "ROD OUT" SWITCH IDENTIFIED ON 7-25-84.

REMARKS: FAILED TO SCRAM ON 6/23/84. SHIM MOTOR AND 200 ASSEMBLY
 REFURBISHED, ORIFICE VALVE AND "ROD OUT" SWITCH REPAIRED ON
 8-22-84.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 30

CURRENT LOC: R-11

LOC ON 6/23/84 : R-11

PTR :

WORK :

REMARKS :

IDENTIFIED ON 6/29/84 AS HAVING A STUCK ORIFICE VALVE.

• 3 - BLUE
• 4 - RED

• 1 - TAN
• 2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 31 CURRENT LCC: R-4 LOC ON 6/23/84 : R-4
PTR :

WORK :

REMARKS :

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 32 CURRENT LOC: R-20 LOC ON 6/23/84 : R-20
PTR :

WORK :

REMARKS :

3 - BLUE
4 - RED

1 - TAN
2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 33 CURRENT LOC: R-16 LOC ON 6/23/84 : R-16
PTR : 84-02-365

WORK:

FAULTY ANALOG POSITION INDICATION IDENTIFIED ON 7-21-84.
FOUND OPEN IN CRD BETWEEN 2TB 6 & 7, AND 2TB 5 & 6.

REMARKS:

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 34 CURRENT LOC: R-33 LOC ON 6/23/84 : R-33
PTR :

WORK :

REMARKS :

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 35 CURRENT LOC: R-29 LOC ON 6/23/84 : R-29
PTR :

WORK :

REMARKS :

• 3 - BLUE
• 4 - RED

• 1 - TAN
• 2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 36 CURRENT LOC: R-28 LOC ON 6/23/84 : ESW-7
PTR : 84-08-0033

WORK:

ORIFICE VALVE STUCK.
ADJUSTED TO REMAIN IN THE 170 OHM POSITION - EQUAL FLOW
FOR REGION 28. ADJUSTED ON 8-6-84.
PROBLEM STILL EXISTS WITH ORIFICE VALVE.

REMARKS:

SPARE FROM REGION 12. ROD PLACED IN R-28 ON 8-6-84.

3 - BLUE
4 - RED

1 - TAN
2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 37 CURRENT LOC: R-3 LOC ON 6/23/84 : R-3
PTR : 84-07-0319

WORK:

FAULTY "ROD OUT" LIMIT SWITCH IDENTIFIED ON 7-17-84.
STUCK ORIFICE VALVE IDENTIFIED ON 6-29-84.

REMARKS:

• 3 - BLUE
• 4 - RED

• 1 - TAN
• 2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 79 CURRENT LOC: R-8 LOC ON 6/23/84 : R-8
PTR :

WORK :

REMARKS :

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 39 CURRENT LOC: R-23 LOC ON 6/23/84 : R-23
PTR : 84-06-0468 84-07-0346

WORK:

R.P.I. REGION 23 ANALOG ON I-03 NOT READING PROPERLY.
IN PERFORMANCE OF A SCRAM TEST THE IN LIMIT LIGHT DID NOT GO
OUT WHILE PULLING THE ROD OUT IT STAYED ON ALL THE WAY OUT
AND WHILE SCRAMING IT STAYED ON. THE OUT LIMIT LIGHT WORKED
FINE. THE ANALOG AND DIGITAL WERE 20" OFF FROM EACH OTHER
WITH THE ANALOG IN THE LEAD.

REMARKS:

IDENTIFIED ON 6/25/84 AS HAVING INCORRECT CR ANALOG POSITION
INDICATION. IDENTIFIED ON 7/18/84 AS HAVING A FAULTY "ROD
IN" LIMIT SWITCH.

#3 - BLUE
#4 - RED

#1 TAN
#2 GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 40 CURRENT LOC: R-18 LOC ON 6/23/84 : R-18
PTR :

WORK :

#3 . BLUE
#4 . RED

REMARKS: IDENTIFIED ON 6/28/84 AS HAVING A STUCK ORIFICE VALVE.

#1 . TAN
#2 . GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 41 CURRENT LOC: R-17 LOC ON 6/23/84 : R-17
PTR :

WORK:

REMARKS:

#3 - BLUE
#4 - RED

#1 - TAN
#2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 42 CURRENT LOC: R-12 LOC ON 6/23/84 : R-12
PTR :

WORK :

REMARKS :

3 - BLUE
4 - RED

1 - TAN
2 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 43 CURREN' LOC: R-30 LOC ON 6/23/84 : ESW-2
PTR : 83-04-0106

WORK:

ANALOG ZI FOR R-35 IS ERRATIC WHEN FIRST PULLED. INCREASES TO "25" AND DROPS TO "15". IT INCREASES NORMALLY AFTER THAT. REVERSE IS TRUE WHEN FALLING IN - NEEDS REPAIR. REMOVE FROM R-30 BEFORE STARTUP.

REMARKS:

ICRD. TEMPORARILY INSTALLED IN R-30 TO REPLACE CRDOA 11. CALIBRATION AND OPERATION OF ZI-1233-35 CHECKED.

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

CONTROL ROD DRIVE ORIFICE ASSEMBLY REPORT

CRDOA: 44 CURRENT LOC: R-35 LOC ON 6/23/84 : R-28
PTR : 84-08-9080

WORK:

WRONG SERIAL NUMBER PAINTED ON THE TOP OF CLOSURE ASSEMBLY,
NEEDS TO BE STAMPED WITH CORRECT SERIAL NUMBER (S/N 44).
SHIM MOTOR AND 200 ASSEMBLY TO BE REFURBISHED.

REMARKS:

FAILED TO SCRAM ON 6/23/84.
SHIM MOTOR AND 200 ASSEMBLY REFURBISHED ON 8-17-84.
CORRECT SERIAL NUMBER STAMPED ON CLOSURE ASSEMBLY ON 8-17-84

03 - BLUE
04 - RED

01 - TAN
02 - GREEN

VIAB
TABLE I.D. CRD
CRD

PORT SAIN VRAIN SYSTEM TABLES
FUNCTION: N NEXT: CRD 8409212
CONTROL ROD MOVEMENT RECORDS

8408062	36	FM: HSF TO: R28	PER FHPWP-75
8408063	44	FM: E4 TO: HSF	PER FHPWP-22 -WHEN PLACED IN
84080631	44	CONT'D...FIRST THOUGHT TO BE CRDOA#44,	THEN IT
84080632	44	CONT'D...BUT-LATER, IT WAS CONFIRMED TO BE #44	
8408161	44	FM: HSF TO: E4	PER PTR # 6-860
8408162	29	FM: E5 TO: HSF	PER FHPWP-22
8408231	29	FM: HSF TO: E5	PER FHPWP-22
8403232	7	FM: E6 TO: HSF	PER FHPWP-22
840825	7	FM: HSF TO: E6	PER FHPWP-22, MP12-12, AND P
840826	11	FM: E3 TO: HSF	PER FHPWP-22, MP12-12, AND P
8408301	25	FM: R7 TO: HSF-EP	PER FHPWP-78, FHPWP-82, TH
8408302	25	CONT'D...FIRST PUT IN ATC ON 8/30/84,	GOT STUCK
8408303	25	CONT'D...INTO HSF ON 9/11/84.	ABSORBER STRING
840913	29	FM: E5 TO: R7	PER MP12-1
840915	21	FM: R35 TO: E5	PER MP12-1
840917	44	FM: E4 TO: R35	PER MP12-1
8409201	2	FM: R27 TO: E4	PER MP12-1
8409202	11	FM: HSF TO: R27	PER MP12-1
8409211	13	FM: E2 TO: HSF	PER FHPWP-22

FOR MORE OF THIS LIST, PUSH ENTER AGAIN.

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VTAB
TABLE I.D. CRD

FORT SAINT VRAIN SYSTEM TABLES
FUNCTION: N NEXT: CRD 8408062
CONTROL ROD MOVEMENT RECORDS

8407021	25	FM:	HSF	TO:	E5	PER	PTR	#6-754
8407022	25	FM:	E5	TO:	R7	PER	PTR	#6-859
8407031	18	FM:	R7	TO:	HSF	PER	PTR	#6-859
8407141	18	FM:	HSF	TO:	E5	PER	PTR	#6-863
8407142	14	FM:	R10	TO:	HSF	PER	PTR	#6-863
8407143	18	FM:	E5	TO:	R10	PER	PTR	#6-863
8407271	29	FM:	R6	TO:	E3	PER	PTR	#6-857 & 6-884
8407311	14	FM:	HSF	TO:	R6	PER	PTR	#6-857
8408011	7	FM:	R25	TO:	E6	PER	FHPWP	-72
8408021	11	FM:	R30	TO:	E3	PER	FHPWP	-71
8408022	43	FM:	E2	TO:	R30	PER	FHPWP	-73
8408023	19	FM:	E3	TO:	R25	PER	FHPWP	-72
8408031	13	FM:	R19	TO:	E2	PER	FHPWP	-73
8408041	20	FM:	E9	TO:	R19	PER	FHPWP	-75
8408042	9	FM:	E4	TO:	E9	PER	FHPWP	-75
8408043	36	FM:	E7	TO:	HSF	PER	FHPWP	-75
8408061	44	FM:	R28	TO:	E4	PER	FHPWP	-75 FIRST THOUGHT T
84080611	44	CONT'D...	WAS CRDOA#44, THEN THOUGHT TO BE CRDOA					
84080612	44	CONT'D...	BUT-LATER, THIS WAS FOUND TO BE #44 AN					

FOR MORE OF THIS LIST, PUSH ENTER AGAIN.

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TABLE I.D.	CRD	FUNCTION:	N	NEXT:	CRD	8407021
CONTROL ROD MOVEMENT RECORDS						
8402271	34	FM:	HSF	TO:	E9	PER FHPWP-21 (REFUELING)
840301	34	FM:	E9	TO:	R33	REFUELING PER FHPWP-21
8403021	10	FM:	E2	TO:	R5	PER C/N 1742
8403022	20	FM:	R5	TO:	E9	PER C/N 1742
840303	43	FM:	R35	TO:	E2	PER C/N 1742
840304	21	FM:	HSF	TO:	R35	PER C/N 1742
840309	5	FM:	R22	TO:	HSF	PER PTR 2-331-84
840311	5	FM:	HSF	TO:	R22	PER PTR 2-331-84
840315	6	FM:	E5	TO:	HSF	PER PTR #3-234-84
840316	6	FM:	HSF	TO:	R1	NO CMG-12A IS AVAILABLE,
8403161	6	CONT'D.....	SEE PTR #3-243-84			
840318	24	FM:	R1	TO:	E5	PER PTR #3-243-84
840420	24	FM:	E5	TO:	HSF	PER PTR #4-354-84
840423	42	FM:	E7	TO:	HSF	PER PTR #2-28-84 & 1-415-84
840426	36	FM:	R12	TO:	E7	PER PTR # 84-2-28
840427	42	FM:	HSF	TO:	R12	PER PTR # 2-28-84
840509	24	FM:	HSF	TO:	E5	PER PTR #4-354-84
8406271	25	FM:	R14	TO:	HSF	PER PTR #6-754
8406272	24	FM:	E5	TO:	R14	PER PTR #6-754

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VTAB
TABLE I.D. CRD
CRD
8409212
8409213
999999

FORT SAINT VRAIN SYSTEM TABLES
FUNCTION: NEXT: CSK
CONTROL ROD MOVEMENT RECORDS
4 FM: R37 TO: E2 PER FHPWF-80
7 FM: E6 TO: R37 PER FHPWF-80
99 THIS IS A DUMMY LINE TO ADD A NEW PAGE WHEN NEEDED

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