

OFFICE OF INSPECTION AND ENFORCEMENT
DIVISION OF INSPECTION PROGRAMS
PERFORMANCE APPRAISAL SECTION (PAS)

Report: 50-267/85-26

Docket: 50-267

Licensee Nos. DPR-34

Licensee: Public Service Company of Colorado (PSC)
P. O. Box 840
Denver, Colorado 80201

Facility Name: Fort St. Vrain Nuclear Generating Station

Inspection At: Fort St. Vrain (FSV) Site, Platteville, Colorado

Inspection Conducted: August 19-28, 1985

Inspectors: *L. L. Wheeler* 10-2-85
L. L. Wheeler, ORPB, IE, Team Leader Date

J. E. Dyer 10-2-85
J. E. Dyer, ORPB, IE Date

L. E. Whitney 10-3-85
L. E. Whitney, ORPB, IE Date

Approved by: *Steven D. Anderson* 10-4-85
P. F. McKee, Chief, Operating Reactors Date
Programs Branch

Inspection Summary

Areas Inspected: This routine safety inspection involved 152 inspection hours on site in the areas of plant operations, surveillance programs, and maintenance.

Results: Three potential enforcement findings, referred to as unresolved items in the report and three open items were identified during the inspection. These items will be followed up by the NRC Region IV office.

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PDR ADOCK 05000267
Q PDR

DETAILS

1. Persons Contacted

Licensee

B. Barta, Nuclear Engineer
*F. Borst, Manager, Support Services
*B. Burchfield, Superintendent, Nuclear Betterment Engineering
O. Clayton, Technical Services Engineer
*W. Craine, Maintenance Superintendent
D. Decatoire, Plant Operations
T. Dice, Plant Operations
*D. Evans, Operations Superintendent
*M. Ferris, QA Operations Manager
W. Franek, Plant Scheduling and Stores Superintendent
*C. Fuller, Station Manager
*J. Gahm, Nuclear Production Manager
*J. Gramling, Nuclear Licensing
R. Heller, Senior Plant Engineer
D. Horshan, Plant Scheduling and Stores
J. Jackson, QA/QC Supervisor
C. Kasten, QA Computer Specialist
R. Kevan, Plant Operations
S. Koleski, Plant Operations
J. McCauley, Results Engineering Supervisor
*F. Novachek, Technical/Administrative Services Manager
J. Petera, Maintenance Supervisor
G. Redmond, QC Supervisor
C. Schmidt, Results Supervisor
*L. Singleton, QA Manager
H. Starner, Nuclear Site Construction Coordinator
J. Vandyke, Plant Operations
*D. Warembourg, Nuclear Engineering Manager
R. Webb, Maintenance Supervisor
J. Weller, Plant Operations
J. Wojtisek, Technical Services Engineer

Other licensee employees contacted included technician, operators, and office personnel.

NRC

R. Farrell, Senior Resident Inspector
*M. Skow, Region IV Project Inspector

* Attended exit interview.

2. Review of Plant Operations

a. Operational Safety Verification

The control room was inspected daily to verify compliance with minimum staffing requirements, access control, adherence to approved operating procedures, and compliance with limiting conditions for operation (LCOs). Reviews were made of logs, tagging requests, night orders, bypass logs, and incident reports. Two shift turnovers were also observed.

General housekeeping and professional demeanor in the control room were satisfactory. Normal background noise levels did not appear to have an adverse effect on operator performance. There were no unnecessary personnel observed in the control room.

The following concerns were identified:

- (1) The licensee's equipment control procedures did not comply with the requirements of TMI Item I.C.6. Procedure P-2, Equipment Clearances and Operation Deviations, Issue 13, did not require a second qualified person to verify the correct implementation of tagging activities. On May 22, 1985, NRC Region IV had requested a response within 120 days to a similar finding that had been discussed at a Management Conference on November 14, 1984. Clearance control form revisions were noted to be in progress during this inspection. The licensee's compliance with the requirements of TMI Item I.C.6 will remain an open item pending Region IV acceptance of the licensee's response to their finding (50-267/85-26-01).
- (2) Procedure P-1, Plant Operations, did not provide adequate control of temporary plant modifications. Specifically, Section 4.9, Control of Temporary Configuration, contained no provisions for ensuring the temporary nature of modifications made under that procedure. At the time of the inspection, 37 Temporary Configuration Requests (TCR) were open from two to nine years. The licensee had initiated permanent design change notices (DCN) for several of these TCRs, however at least 11 of these DCNs had been in preparation for over 2 years. This lack of control of temporary changes resulted in permanent changes being made to the station without the necessary reviews being conducted. The failure to establish and implement procedures to adequately control temporary plant modifications was discussed with the licensee and will be incorporated into unresolved item 50-267/85-26-02 for followup by the Region IV Office.

b. Corrective Action Systems

The system for performing trend analyses and management review of Corrective Action Requests (CARs) was considered a strength. Cor-

rective Action Effectiveness Summary Reports were issued monthly with trend analyses and a current review of CARs by type (failure to follow procedures, lack of training, etc.). Monthly reports are also issued to responsible departments identifying responses due in the near future and overdue responses. Overdue responses received adequate management attention.

c. Station Tours

The inspectors toured accessible areas of the plant. During these tours, observations were made of equipment condition, fire and safety hazards, use of procedures, radiological controls and conditions, housekeeping, and surveillance activities.

It was evident that a significant effort had been made to upgrade the general housekeeping conditions of the plant. Several major portions of the plant were clean and free of clutter, debris, etc. Maintenance personnel were observed making a deliberate effort to clean up the work site after performing repairs. The licensee had developed an extensive list of insulation repair requirements. However, several safety hazards and basic housekeeping deficiencies were noted. These included a fire hazard from oil in overhead cable trays, poor lighting in some areas, an open door on the back of an electrical cabinet, graffiti on the walls, some plant components in need of cleaning and repainting, a valve leaking onto exposed insulation repair work in progress, damaged operating instructions posted on an ammonia injection tank, chains for operating overhead valves hanging down into passageways, and a safety seal missing from a relief valve.

Some of these deficiencies had been identified in past Region IV inspection reports. The region had made housekeeping an open item twice in previous inspection reports (8325-03 and 8415-03), and the latest SALP report (May 7, 1985) noted that housekeeping had continued to be a problem. Procedure SMAP-13, General Housekeeping Program, specified inspection requirements, assigned responsibility for designated plant zones, and provided directions for reporting deficiencies. However, the procedure had no provisions for tracking specific deficiencies to ensure appropriate corrective action and management review. The apparent failure to develop and implement adequate procedures for correcting housekeeping deficiencies will remain an open item pending followup by Region IV (50-267/85-26-03).

d. System Walkdown

The inspector conducted a walkdown and performed a valve lineup of the "B" diesel generator to observe equipment conditions and system lineups. No valves were found in improper positions, but one valve was not in accordance with the lineup sheet due to maintenance. Deficiencies were noted in that the lineup procedure did not include verification of the position of the following: diesel engine cooling water temperature control valves (TCVs), air valves on the TCV regulators, lube oil drain valves, and lube oil drain plugs. The misposition of these items had the potential for causing damage to the diesel engines to the extent that they could fail to operate.

The lube oil heater inlet and outlet valves were not on the lineup sheets, and they were not labeled. The failure to provide adequate procedures to ensure the operability of the diesel generators will remain an open item pending followup by Region IV (50-267/85-26-04).

3. Surveillance Activities

- a. The inspectors reviewed recent surveillance test results for the station and power plant systems (PPS) batteries, and the recently issued interim Technical Specifications (TS) for reactivity control. The following documents, tests and records were reviewed:

<u>Document Number</u>	<u>Topic</u>
SR 4.1.1.B. 1/2-W through 4.1.1.F.1b-R	Control Rod Operability
SR 4.1.2.A.3-W through 4.1.2.c-x	Rod Position Indication Systems- Operation
SR 4.1.3.B-R through 4.1.3.D-W/R	Rod Position Indication Systems- Shutdown
SR 4.1.4.A-W/ SR 4.1.4-B-P-X	Shutdown Margin
SR 4.1.6.C/D-X	Control Rod Position Requirements- Shutdown
SR 4.1.8.A/B-W through 4.1.8.D-A	Reserve Shutdown System-Operation
SR 4.1.9.A/B-W through 4.1.9.D.1-R	Reserve Shutdown System-Shutdown
SR 5.4.5-M	PCRV Cooling Water Flow Scan Functional Test
SR 5.4.1.3.2.b-M	Feedwater Flow Test
SR 5.6.2a-W, Issue 23 for weeks #29, 30, 31	Station and PPS Battery Check (Weekly)
SR 5.6.2b-M, Issue 1, for week #27	Station and PPS Battery Check (Monthly)
SR 5.6.2b-Q, Issue 20, for week #31	Station and PPS Battery Check (Quarterly)
SR 5.6.2c-A, Issue 17, for week #9	Station and PPS Battery Check (Annual)
TCR 85-04-01	Request to jumper cell 35 out of Battery 1A (N9242)

Change Notice (CN) 1391

Replace Station Batteries 1A and 1B. Replace PPS Battery 1C.

The inspectors found that the interim TS for reactivity control appeared to have been properly implemented by the surveillance procedures. The surveillance procedures for the feedwater flow test and control rod operability also appeared adequate.

Procedure SR 5.4.5-M allowed the potential for errors in PCRV Cooling Water Flow alarm setpoint restoration. The licensee had previously identified this deficiency and was processing a procedure change to correct this weakness.

The inspector reviewed the TS compliance log maintained by control room personnel and the daily surveillance status printouts provided by the licensee's scheduling organization. These documents appeared thorough, concise and effective. No missed surveillances were identified in this review.

b. The licensee failed to establish procedures that complied with TS requirements in the following instances:

- (1) The weekly battery surveillance test, 5.6.2a-W, did not measure the temperature of cells adjacent to the pilot cell as required by TS 5.6.2a.
- (2) Neither the monthly nor quarterly surveillance tests, SR 5.6.2b-M and SR 5.6.2b-Q, measured the height of the electrolyte in the sampled cells as required by TS 5.6.2b. SR 5.6.2b-M verified that all cell electrolyte levels were within the vendor specified operating band, but this was recorded by a single check mark on the data sheet and there were no cell measurements taken or recorded.
- (3) The licensee modified the configuration of a station battery and returned the battery to an operable status without adequately considering whether the modified battery would meet the requirements of TS 5.6.2c. The annual discharge test of battery 1B conducted in April 1985 was performed with a spare cell connected to the battery (59 cells total). On the basis of the performance of this 59 cell battery during the discharge, the licensee determined that battery capacity was acceptable in accordance with TS 5.6.2c and the battery was operable. Subsequently, the spare cell was removed from battery 1B, but there was apparently no discharge test or evaluation conducted to determine that the resulting 58 cell battery would meet the necessary operability requirements of the TS.

The apparent failure by the licensee to develop procedures to adequately implement TS surveillance requirements for determining battery operability was discussed with the licensee and will be

incorporated into unresolved item 50-267/85-26-02 for followup by the NRC Region IV Office. TS 4.6.1 requires that the station and PPS batteries be operable before the reactor is operated at power. The surveillance test results reviewed by the inspectors were for a period when the reactor was shutdown and therefore the violation of a limiting condition for operation (LCO) was not involved.

- c. The licensee failed to follow procedure SR 5.6.2c-A for the annual battery partial discharge test. The results from this discharge test satisfied the TS 5.6.2c requirements, however, the following implementation deficiencies were identified:
- (1) Procedure Deviation Request (PDR) 85-1032 revised the procedure to discharge the station batteries (1A, 1B) at 85 amps for 24 hours and the PPS battery at 79 amps for 12 hrs or until the battery terminal voltage reached 101.5 volts. Battery 1B was discharged at 35 amps for only 19.2 hrs and the PPS battery was discharged at 79 amps for only 9.6 hours without either battery reaching its minimum terminal voltage. Interviews revealed that these discharges were terminated by the personnel performing the tests without prior management approval.
 - (2) The end of discharge specific gravities for each cell of battery 1A and 1B were all recorded at 1.100 and 1.160, respectively. Interviews with maintenance personnel revealed that these readings were the minimum detectable values of the hydrometers used to record the end of discharge data. The actual battery cell specific gravities were lower than the recorded values and this information was not recorded on the surveillance data sheet.
 - (3) Although cell 35 was jumpered from battery 1A and did not participate in the discharge test, the final individual cell voltage ICV and specific gravity readings decreased from 2.07 VDC to 1.88 VDC and 1.210 to 1.100, respectively. These post discharge readings were indicative of the cell participating in the battery discharge test.

The apparent failure by the licensee to follow procedure SR 5.6.2c-A for the annual discharge test of the station and PPS batteries was discussed with the licensee and will be incorporated into unresolved item 50-267/85-26-02 for followup by the NRC Region IV Office.

4. Maintenance Activities

The inspectors observed the material condition of and reviewed completed maintenance actions and procedures for batteries and motor operated valves (MOV). The helium circulator turbine steam inlet isolation valves (HV-2245, HV-2246, HV-2247, HV-2248) were the MOVs of interest during this inspection. Additionally, replacement parts used for safety-related maintenance actions were traced to their origin to determine their acceptability. The following documents were reviewed:

<u>Document Number</u>	<u>Topic</u>
Station Operating Procedure (SOP) 92-06, Issue 7	Electrical Distribution - AC System
Station Service Request (SSR) 84500238 P.O. 53476	Replace Frequency Meter for Battery IC Inveter
SSR 84500283/287, P.O. N4585	Rebuild Snubbers
SSR 84501102 NCR 85-563	Repair Motor For HV-2248
EMP 45, Issue 1	Disconnecting, Reconnecting and Testing of Limitorque or Rotork Values
MP 39.3, Issue 3	Maintenance and Repair of Rotork Valve Controllers
PM 92.10, Issue 24	Inspection and Preventive Maintenance of Caterpillar Diesel - Emergency Generator Units
SMAP-21, Issues 1	Post Maintenance Testing Requirements in Maintenance Related Procedures
P-5, Issue 8	Material Control
Q-4, Issue 6	Procurement Document Control
91-M-1-28-5	Rotork Instruction Handbook for Synchroset Electric Valve Actuators

a. The inspectors reviewed three safety-related station service requests (SSR) to determine the suitability of replacement parts being used for maintenance. Deficiencies were identified with each SSR as identified below:

- (1) The safety-related frequency meter replaced by SSR 84500238 was procured under a non-safety related purchase order without any of the required certifications and no attempt was made to qualify the meter for safety related use. The installation of this meter was approved by Maintenance Quality Control (MQC).
- (2) Safety-related snubber O-Rings, replaced by SSR 84500283/287, were purchased via a parts distributor from a manufacturer not on the qualified vendors list. A certification of conformance was provided from the parts distributor to the licensee without supporting documentation from the manufacturer. This document

was used as the basis for the receipt inspection acceptance, even though the certificate was not traceable to the original manufacturer and the original manufacturer did not have an approved QA program.

- (3) The motor installed on valve HV-2248 by SSR 84501102 was rewound by a vendor not on the approved vendors list. The licensee identified this deficiency with NCR 85-563 and had performed a component qualification test to upgrade the motor for safety-related applications. The qualification test consisted of meggering the motor windings to confirm proper electrical refurbishment and a post installation vibration test to verify correct bearing installation. The only documentation of test performance was the statement "Valve test cks okay: Valve is electrically okay". There was no record of the measured test results or the instruments utilized to obtain the vibration and resistance measurements. The licensee did not review the vendor's process or materials used for rewinding the motor. The inspectors concluded that the tests and documentation were inadequate to ensure that the replacement motor was equal to or better than the original construction phase component.
- (4) Gearcase oil used for MOV applications differed from that recommended by the vendor manual and may not have been suitable for the environment of all plant MOVs. Procedure MP 39-3 and the vendor manual specify the use of SAE 80 EP oil in the gearcase of motor operated valves. Discussions with maintenance personnel revealed that Mobil 629 oil was being used for all MOV applications. The licensee had not performed an engineering evaluation to determine that the Mobil 629 oil was suitable for all MOV applications or compatible with residual oil that may have been in the gearcase.

The inspector also noted that SAE 80 EP oil was rated for operation only to 180°F and this was significantly below the 737°F helium circulator inlet steam temperature listed in the updated FSAR, Fig 10.2-3, for 100% power operations. During the inspection, the licensee measured the gearcase temperature of HV-2247 at approximately 140°F with lower temperature steam being supplied from the auxiliary boilers. The suitability of both Mobil 629 and SAE 80 EP oil under these high temperature operating conditions is questionable.

The Ft. St. Vrain Quality Assurance (QA) Plan, Appendix B to the FSAR, requires that safety-related items be purchased from approved suppliers, receipt inspected and, if procured sole source, procured to standards that will assure an equal to or better than original condition. The apparent failure to procure safety-related replacement items in accordance with their QA Plan was discussed with the licensee and will remain unresolved pending followup by the NRC Region IV Office (50-267/85-26-05).

b. The inspectors reviewed the material condition of the four helium circulator turbine inlet steam isolation valves (HV-2245, HV-2246, HV-2247 and HV-2248). In addition to the improperly qualified motor installed in HV-2248 (see section 4.a.(3) of this report), valves HV-2247 and HV-2248 were leaking oil from their gearcase, and valves HV-2246 and HV-2248 local position indicators differed from their remote indication. Both valves indicated in the mid position locally, while valve HV-2246 indicated shut remotely and valve HV-2248 indicated open remotely. The licensee verified the remote positions to be correct. Contributing to these material deficiencies were the following procedure and implementation problems with the MOV maintenance program:

- (1) The electrical maintenance procedure for MOV motor installation, testing and documentation was inadequate. Procedure EMP 45 provided for verifying proper motor rotation by momentarily touching the motor leads to an energized terminal and jogging the motor in the closed direction. This appears contrary to the vendor manual which directs that the motor be energized from the operating switch to verify rotation.

Paragraph 3.9 of procedure EMP-45 provided general guidance for documenting the as found/as left condition of the valve but there was no requirement to record the torque or limit switch settings when adjusting these setpoints. A review of two completed SSR packages revealed that these setpoint values were not recorded.

The post installation testing for MOV motors consisted of cycling the valve to verify proper operation, circuit integrity and position indication. However, there were no quantitative acceptance criteria for determining proper valve operation even though nominal valve operating speeds were provided in the vendor manual. MQC was not required to observe the test and the determination of proper valve operation was left to the judgement of the workman performing the maintenance.

- (2) The torque values listed for use in the MOV mechanical repair procedure had an inadequate technical basis and their use was optional. Procedure MP 39-3 had a table of MOV torque values that were based on bolt size. The table was identical to one in procedure PM 92.10 for diesel generator maintenance and was based on values in the diesel generator vendor manual. Additionally, a note at the bottom of the table made torque wrench use optional by stating that:

An average man on a 12 inch wrench can develop about 100 ft. lb. of torque. Therefore, if a torque wrench is not available, or cannot be used, use the following wrench-bolt combinations:

Bolt Sizes, Inches	1/2	9/16	5/8	3/4	7/8	1-1/8
Wrench Sizes, Inches	6	9	12	18	24	36

For larger bolting where specific torque values are not stated and/or configuration precludes the use of torque equipment, standard striking wrenches may be used by qualified mechanics working to industrial journeyman standards.

The technical basis for this note was a vendor valve manual notation applying to stud nuts and cap screws. The licensee had applied the torque values for diesel generators and other valves to MOVs without any apparent engineering justification.

- (3) The post maintenance testing of valve HV-2246 was signed off by MQC as being complete when plant conditions would not support the operational test. Procedure MP 39.3, section 6.1, stated that the post maintenance testing acceptance criteria was "Valve Stroke and limit switch settings are acceptable for system requirements at operating pressure and temperature". There were no quantitative acceptance limits provided in the procedure to determine this acceptability and MQC signed off this part of the procedure on February 23, 1985 for SSR 84500240. At this time the reactor was shutdown and steam was being supplied to the helium circulators from the auxiliary boilers which are not capable of producing steam at operating temperatures and pressures. There was no outstanding action item to test this valve when the plant was at normal operating temperatures and pressures. The licensee had no assurance that this valve would operate as designed under expected operation conditions.

c. Station battery maintenance and surveillance procedures were inconsistent with the guidance provided by the battery vendor manual. The following inconsistencies were identified:

- (1) The battery ventilation low flow monitor was alarming in the control room and exhaust air flow from battery rooms 1A and 1B appeared to be insufficient to meet the vendor manual recommendations for removing hydrogen gas during charging evolutions.
- (2) The upper temperature limit specified on the surveillance procedures for a battery receiving a float charge was 110°F. This was contrary to the vendor manual which recommended maximum allowable battery temperatures of 110°F during equalizing charge evolutions and only 90°F for float charge conditions. The inspector observed a pilot cell temperature of 92°F in battery 1A on August 22, 1985. The battery vendor manual stated that continued operation at this elevated temperature could degrade the battery capacity and life.
- (3) Battery specific gravity and individual cell voltage (ICV) measurements were not analyzed to determine whether an equalizing charge should be performed. The battery vendor manual

recommended that an equalizing charge be conducted when the specific gravity of any cell dropped .010 from an initial standard value or any cell ICV was below 2.13 VDC. Instead, the licensee performed an equalizing charge monthly in accordance with SOP 92-06. There was no in progress monitoring of these charges and the end of charge parameters were not measured to verify improved battery conditions.

- (4) There were no procedures for periodically checking battery intercell resistances and connector tightness, adding water to individual cells, or cleaning the battery with approved solvents.

The apparent failure to establish, implement and maintain adequate battery, and MOV maintenance and testing procedures was discussed with the licensee and will be incorporated into unresolved item 50-267/85-26-02 for followup by the NRC Region IV Office.

5. Post-Modification Testing

The licensee did not ensure that all required post-modification tests were developed as part of modification work packages. The NRC inspector reviewed Change Notices (CN's) 1798 and 1798-A and their associated Controlled Work Procedures (CWP's) 84-92, 84-93, 84-94, 84-95 and 85-560 which replaced Emergency Water Booster Pumps (Fire Water Booster Pumps) P-2109 and P-2110 with pumps having a higher output head. These pumps could be used to drive the helium circulator turbine to achieve adequate core cooling in the event of the failure of three feedwater pumps. The CWP's for this modification did not contain post-installation flow tests for the new emergency water booster pumps. The failure to develop adequate controls to ensure that all required post-modification testing was conducted was discussed with the licensee and will remain an unresolved item pending review by Region IV (50-267/85-26-06).

6. Unresolved and Open Items:

Unresolved items are matters about which more information is required to determine whether it is an acceptable item, a deviation, or a violation. An open item is a matter that requires further review and evaluation by the inspectors. The following unresolved and open items will be followed by the NRC Region IV office.

(50-267/85-26-01) (Open Item) The revision of equipment control procedures to establish compliance with TMI Item I.C.6. This item will remain open pending NRC Region IV acceptance of the revised procedures (Item 2.a(1)).

(50-267/85-26-02) (Unresolved) The failure to establish adequate procedures for control of temporary plant modifications, station battery maintenance and surveillance tests, and motor operated valve maintenance. Also, the apparent failure to comply with procedures for battery surveillances and motor operated valve maintenance (Items 2.a(2), 3b, 3c, 4b, and 4c).

(50-267/85-16-03) (Open Item) The revision of housekeeping procedures to provide a means for ensuring specific deficiencies are corrected. This item will remain open pending NRC Region IV acceptance of the revised procedures (Item 2.c).

(50-267/85-16-04) (Open Item) The adequacy of the diesel generator valve lineup procedure to ensure the availability of the system. The item will remain open pending NRC Region IV followup of potential weaknesses in the lineup procedure (Item 2.d).

(50-267/85-26-05) (Unresolved) The failure to procure safety-related replacement items in accordance with the QA plan requirements (Item 4.a).

(50-267/85-26-06) (Unresolved) The failure to establish adequate controls to ensure the performance of required post-modification testing (Item 5).

7. The findings of this inspection were discussed with those persons indicated in paragraph 1 on August 29, 1985.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

October 8, 1985

Docket No. 50-267/85-26

Public Service Company of Colorado
ATTN: Mr. O. R. Lee, Vice President
Electric Production
P. O. Box 840
Denver, Colorado 80201

Gentlemen:

This refers to the routine safety inspection conducted by L. L. Wheeler, J. E. Dyer and L. E. Whitney of this office on August 19-28, 1985 of activities at the Fort St. Vrain Nuclear Generating Station authorized by NRC Operating License DPR-34. The inspection findings were discussed with J. Gahm and others of your staff during and at the conclusion of the inspection.

The enclosed inspection report includes findings of significant weaknesses in several maintenance-related areas (maintenance of station batteries and motor operated valves, post-modification testing, and the safety-related qualification of replacement parts). The most recent SALP report (May 7, 1985) considered your maintenance activities to be minimally satisfactory with respect to operational safety. The findings of this inspection confirm that assessment and indicate that your corrective action has not been effective. The NRC will focus increased inspection attention on your maintenance and maintenance-related activities until improved performance is achieved.

The enclosed report includes findings that may result in enforcement actions. Disposition of these potential enforcement findings, referred to as unresolved items in the report, will be made by the NRC Region IV office.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

A handwritten signature in dark ink, appearing to read "R. L. Spenser" or similar, with a flourish at the end.

James G. Partlow, Director
Division of Inspection Programs
Office of Inspection and Enforcement

Enclosure:
Inspection Report No. 50-267/85-26

Dule

Mr. O. R. Lee

- 2 -

Distribution:

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ORPB reading

DI reading

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OFFICE OF INSPECTION AND ENFORCEMENT
DIVISION OF INSPECTION PROGRAMS
PERFORMANCE APPRAISAL SECTION (PAS)

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Licensee: Public Service Company of Colorado (PSC)
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L. L. Wheeler, ORPB, IE, Team Leader

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10-3-85
Date

Approved by:

Steven D. Anderson

F. F. McKee, Chief, Operating Reactors
Programs Branch

10-4-85
Date

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Results:

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DuPE

~~8510150196~~

DETAILS

1. Persons Contacted

Licensee

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* Attended exit interview.

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General housekeeping and professional demeanor in the control room were satisfactory. Normal background noise levels did not appear to have an adverse effect on operator performance. There were no unnecessary personnel observed in the control room.

The following concerns were identified:

- (1) The licensee's equipment control procedures did not comply with the requirements of TMI Item I.C.6. Procedure P-2, Equipment Clearances and Operation Deviations, Issue 13, did not require a second qualified person to verify the correct implementation of tagging activities. On May 22, 1985, NRC Region IV had requested a response within 120 days to a similar finding that had been discussed at a Management Conference on November 14, 1984. Clearance control form revisions were noted to be in progress during this inspection. The licensee's compliance with the requirements of TMI Item I.C.6 will remain an open item pending Region IV acceptance of the licensee's response to their finding (50-267/85-26-01).
- (2) Procedure P-1, Plant Operations, did not provide adequate control of temporary plant modifications. Specifically, Section 4.9, Control of Temporary Configuration, contained no provisions for ensuring the temporary nature of modifications made under that procedure. At the time of the inspection, 37 Temporary Configuration Requests (TCR) were open from two to nine years. The licensee had initiated permanent design change notices (DCN) for several of these TCRs, however at least 11 of these DCNs had been in preparation for over 2 years. This lack of control of temporary changes resulted in permanent changes being made to the station without the necessary reviews being conducted. The failure to establish and implement procedures to adequately control temporary plant modifications was discussed with the licensee and will be incorporated into unresolved item 50-267/85-26-02 for followup by the Region IV Office.

b. Corrective Action Systems

The system for performing trend analyses and management review of Corrective Action Requests (CARs) was considered a strength. Cor-

rective Action Effectiveness Summary Reports were issued monthly with trend analyses and a current review of CARs by type (failure to follow procedures, lack of training, etc.). Monthly reports are also issued to responsible departments identifying responses due in the near future and overdue responses. Overdue responses received adequate management attention.

c. Station Tours

The inspectors toured accessible areas of the plant. During these tours, observations were made of equipment condition, fire and safety hazards, use of procedures, radiological controls and conditions, housekeeping, and surveillance activities.

It was evident that a significant effort had been made to upgrade the general housekeeping conditions of the plant. Several major portions of the plant were clean and free of clutter, debris, etc. Maintenance personnel were observed making a deliberate effort to clean up the work site after performing repairs. The licensee had developed an extensive list of insulation repair requirements. However, several safety hazards and basic housekeeping deficiencies were noted. These included a fire hazard from oil in overhead cable trays, poor lighting in some areas, an open door on the back of an electrical cabinet, graffiti on the walls, some plant components in need of cleaning and repainting, a valve leaking onto exposed insulation repair work in progress, damaged operating instructions posted on an ammonia injection tank, chains for operating overhead valves hanging down into passageways, and a safety seal missing from a relief valve.

Some of these deficiencies had been identified in past Region IV inspection reports. The region had made housekeeping an open item twice in previous inspection reports (8325-03 and 8415-03), and the latest SALP report (May 7, 1985) noted that housekeeping had continued to be a problem. Procedure SMAP-13, General Housekeeping Program, specified inspection requirements, assigned responsibility for designated plant zones, and provided directions for reporting deficiencies. However, the procedure had no provisions for tracking specific deficiencies to ensure appropriate corrective action and management review. The apparent failure to develop and implement adequate procedures for correcting housekeeping deficiencies will remain an open item pending followup by Region IV (50-267/85-26-03).

d. System Walkdown

The inspector conducted a walkdown and performed a valve lineup of the "B" diesel generator to observe equipment conditions and system lineups. No valves were found in improper positions, but one valve was not in accordance with the lineup sheet due to maintenance. Deficiencies were noted in that the lineup procedure did not include verification of the position of the following: diesel engine cooling water temperature control valves (TCVs), air valves on the TCV regulators, lube oil drain valves, and lube oil drain plugs. The misposition of these items had the potential for causing damage to the diesel engines to the extent that they could fail to operate.

The lube oil heater inlet and outlet valves were not on the lineup sheets, and they were not labeled. The failure to provide adequate procedures to ensure the operability of the diesel generators will remain an open item pending followup by Region IV (50-267/85-26-04).

3. Surveillance Activities

- a. The inspectors reviewed recent surveillance test results for the station and power plant systems (PPS) batteries, and the recently issued interim Technical Specifications (TS) for reactivity control. The following documents, tests and records were reviewed:

<u>Document Number</u>	<u>Topic</u>
SR 4.1.1.B. 1/2-W through 4.1.1.F.1b-R	Control Rod Operability
SR 4.1.2.A.3-W through 4.1.2.c-x	Rod Position Indication Systems- Operation
SR 4.1.3.B-R through 4.1.3.D-W/R	Rod Position Indication Systems- Shutdown
SR 4.1.4.A-W/ SR 4.1.4-B-P-X	Shutdown Margin
SR 4.1.6.C/D-X	Control Rod Position Requirements- Shutdown
SR 4.1.8.A/B-W through 4.1.8.D-A	Reserve Shutdown System-Operation
SR 4.1.9.A/B-W through 4.1.9.D.1-R	Reserve Shutdown System-Shutdown
SR 5.4.5-M	PCRV Cooling Water Flow Scan Functional Test
SR 5.4.1.3.2.b-M	Feedwater Flow Test
SR 5.6.2a-W, Issue 23 for weeks #29, 30, 31	Station and PPS Battery Check (Weekly)
SR 5.6.2b-M, Issue 1, for week #27	Station and PPS Battery Check (Monthly)
SR 5.6.2b-Q, Issue 20, for week #31	Station and PPS Battery Check (Quarterly)
SR 5.6.2c-A, Issue 17, for week #9	Station and PPS Battery Check (Annual)
TCR 85-04-01	Request to jumper cell 35 out of Battery 1A (N9242)

Change Notice (CN) 1391

Replace Station Batteries 1A and 1B. Replace PPS Battery 1C.

The inspectors found that the interim TS for reactivity control appeared to have been properly implemented by the surveillance procedures. The surveillance procedures for the feedwater flow test and control rod operability also appeared adequate.

Procedure SR 5.4.5-M allowed the potential for errors in PCRV Cooling Water Flow alarm setpoint restoration. The licensee had previously identified this deficiency and was processing a procedure change to correct this weakness.

The inspector reviewed the TS compliance log maintained by control room personnel and the daily surveillance status printouts provided by the licensee's scheduling organization. These documents appeared thorough, concise and effective. No missed surveillances were identified in this review.

b. The licensee failed to establish procedures that complied with TS requirements in the following instances;

- (1) The weekly battery surveillance test, 5.6.2a-W, did not measure the temperature of cells adjacent to the pilot cell as required by TS 5.6.2a.
- (2) Neither the monthly nor quarterly surveillance tests, SR 5.6.2b-M and SR 5.6.2b-Q, measured the height of the electrolyte in the sampled cells as required by TS 5.6.2b. SR 5.6.2b-M verified that all cell electrolyte levels were within the vendor specified operating band, but this was recorded by a single check mark on the data sheet and there were no cell measurements taken or recorded.
- (3) The licensee modified the configuration of a station battery and returned the battery to an operable status without adequately considering whether the modified battery would meet the requirements of TS 5.6.2c. The annual discharge test of battery 1B conducted in April 1985 was performed with a spare cell connected to the battery (59 cells total). On the basis of the performance of this 59 cell battery during the discharge, the licensee determined that battery capacity was acceptable in accordance with TS 5.6.2c and the battery was operable. Subsequently, the spare cell was removed from battery 1B, but there was apparently no discharge test or evaluation conducted to determine that the resulting 58 cell battery would meet the necessary operability requirements of the TS.

The apparent failure by the licensee to develop procedures to adequately implement TS surveillance requirements for determining battery operability was discussed with the licensee and will be

incorporated into unresolved item 50-267/85-26-02 for followup by the NRC Region IV Office. TS 4.6.1 requires that the station and PPS batteries be operable before the reactor is operated at power. The surveillance test results reviewed by the inspectors were for a period when the reactor was shutdown and therefore the violation of a limiting condition for operation (LCO) was not involved.

c. The licensee failed to follow procedure SR 5.6.2c-A for the annual battery partial discharge test. The results from this discharge test satisfied the TS 5.6.2c requirements, however, the following implementation deficiencies were identified:

- (1) Procedure Deviation Request (PDR) 85-1032 revised the procedure to discharge the station batteries (1A, 1B) at 85 amps for 24 hours and the PPS battery at 79 amps for 12 hrs or until the battery terminal voltage reached 101.5 volts. Battery 1B was discharged at 85 amps for only 19.2 hrs and the PPS battery was discharged at 79 amps for only 9.6 hours without either battery reaching its minimum terminal voltage. Interviews revealed that these discharges were terminated by the personnel performing the tests without prior management approval.
- (2) The end of discharge specific gravities for each cell of battery 1A and 1B were all recorded at 1.100 and 1.160, respectively. Interviews with maintenance personnel revealed that these readings were the minimum detectable values of the hydrometers used to record the end of discharge data. The actual battery cell specific gravities were lower than the recorded values and this information was not recorded on the surveillance data sheet.
- (3) Although cell 35 was jumpered from battery 1A and did not participate in the discharge test, the final individual cell voltage ICV and specific gravity readings decreased from 2.07 VDC to 1.88 VDC and 1.210 to 1.100, respectively. These post discharge readings were indicative of the cell participating in the battery discharge test.

The apparent failure by the licensee to follow procedure SR 5.6.2c-A for the annual discharge test of the station and PPS batteries was discussed with the licensee and will be incorporated into unresolved item 50-267/85-26-02 for followup by the NRC Region IV Office.

4. Maintenance Activities

The inspectors observed the material condition of and reviewed completed maintenance actions and procedures for batteries and motor operated valves (MOV). The helium circulator turbine steam inlet isolation valves (HV-2245, HV-2246, HV-2247, HV-2248) were the MOVs of interest during this inspection. Additionally, replacement parts used for safety-related maintenance actions were traced to their origin to determine their acceptability. The following documents were reviewed:

<u>Document Number</u>	<u>Topic</u>
Station Operating Procedure (SOP) 92-06, Issue 7	Electrical Distribution - AC System
Station Service Request (SSR) 84500238 P.O. 53476	Replace Frequency Meter for Battery IC Inverter
SSR 84500283/287, P.O. N4585	Rebuild Snubbers
SSR 84501102 NCR 85-563	Repair Motor For HV-2248
EMP 45, Issue 1	Disconnecting, Reconnecting and Testing of Limitorque or Rotork Values
MP 39.3, Issue 3	Maintenance and Repair of Rotork Valve Controllers
PM 92.10, Issue 24	Inspection and Preventive Maintenance of Caterpillar Diesel - Emergency Generator Units
SMAP-21, Issues 1	Post Maintenance Testing Requirements in Maintenance Related Procedures
P-5, Issue 8	Material Control
Q-4, Issue 6	Procurement Document Control
91-M-1-28-5	Rotork Instruction Handbook for Synchroset Electric Valve Actuators

- a. The inspectors reviewed three safety-related station service requests (SSR) to determine the suitability of replacement parts being used for maintenance. Deficiencies were identified with each SSR as identified below:
- (1) The safety-related frequency meter replaced by SSR 84500238 was procured under a non-safety related purchase order without any of the required certifications and no attempt was made to qualify the meter for safety related use. The installation of this meter was approved by Maintenance Quality Control (MQC).
 - (2) Safety-related snubber O-Rings, replaced by SSR 84500283/287, were purchased via a parts distributor from a manufacturer not on the qualified vendors list. A certification of conformance was provided from the parts distributor to the licensee without supporting documentation from the manufacturer. This document

was used as the basis for the receipt inspection acceptance, even though the certificate was not traceable to the original manufacturer and the original manufacturer did not have an approved QA program.

- (3) The motor installed on valve HV-2248 by SSR 84501102 was rewound by a vendor not on the approved vendors list. The licensee identified this deficiency with NCR 85-563 and had performed a component qualification test to upgrade the motor for safety-related applications. The qualification test consisted of meggering the motor windings to confirm proper electrical refurbishment and a post installation vibration test to verify correct bearing installation. The only documentation of test performance was the statement "Valve test cks okay: Valve is electrically okay". There was no record of the measured test results or the instruments utilized to obtain the vibration and resistance measurements. The licensee did not review the vendor's process or materials used for rewinding the motor. The inspectors concluded that the tests and documentation were inadequate to ensure that the replacement motor was equal to or better than the original construction phase component.
- (4) Gearcase oil used for MOV applications differed from that recommended by the vendor manual and may not have been suitable for the environment of all plant MOVs. Procedure MP 39-3 and the vendor manual specify the use of SAE 80 EP oil in the gearcase of motor operated valves. Discussions with maintenance personnel revealed that Mobil 629 oil was being used for all MOV applications. The licensee had not performed an engineering evaluation to determine that the Mobil 629 oil was suitable for all MOV applications or compatible with residual oil that may have been in the gearcase.

The inspector also noted that SAE 80 EP oil was rated for operation only to 180°F and this was significantly below the 737°F helium circulator inlet steam temperature listed in the updated FSAR, Fig 10.2-3, for 100% power operations. During the inspection, the licensee measured the gearcase temperature of HV-2247 at approximately 140°F with lower temperature steam being supplied from the auxiliary boilers. The suitability of both Mobil 629 and SAE 80 EP oil under these high temperature operating conditions is questionable.

The Ft. St. Vrain Quality Assurance (QA) Plan, Appendix B to the FSAR, requires that safety-related items be purchased from approved suppliers, receipt inspected and, if procured sole source, procured to standards that will assure an equal to or better than original condition. The apparent failure to procure safety-related replacement items in accordance with their QA Plan was discussed with the licensee and will remain unresolved pending followup by the NRC Region IV Office (50-267/85-26-05).

b. The inspectors reviewed the material condition of the four helium circulator turbine inlet steam isolation valves (HV-2245, HV-2246, HV-2247 and HV-2248). In addition to the improperly qualified motor installed in HV-2248 (see section 4.a.(3) of this report), valves HV-2247 and HV-2248 were leaking oil from their gearcase, and valves HV-2246 and HV-2248 local position indicators differed from their remote indication. Both valves indicated in the mid position locally, while valve HV-2246 indicated shut remotely and valve HV-2248 indicated open remotely. The licensee verified the remote positions to be correct. Contributing to these material deficiencies were the following procedure and implementation problems with the MOV maintenance program:

- (1) The electrical maintenance procedure for MOV motor installation, testing and documentation was inadequate. Procedure EMP 45 provided for verifying proper motor rotation by momentarily touching the motor leads to an energized terminal and jogging the motor in the closed direction. This appears contrary to the vendor manual which directs that the motor be energized from the operating switch to verify rotation.

Paragraph 3.9 of procedure EMP-45 provided general guidance for documenting the as found/as left condition of the valve but there was no requirement to record the torque or limit switch settings when adjusting these setpoints. A review of two completed SSR packages revealed that these setpoint values were not recorded.

The post installation testing for MOV motors consisted of cycling the valve to verify proper operation, circuit integrity and position indication. However, there were no quantitative acceptance criteria for determining proper valve operation even though nominal valve operating speeds were provided in the vendor manual. MQC was not required to observe the test and the determination of proper valve operation was left to the judgement of the workman performing the maintenance.

- (2) The torque values listed for use in the MOV mechanical repair procedure had an inadequate technical basis and their use was optional. Procedure MP 39-3 had a table of MOV torque values that were based on bolt size. The table was identical to one in procedure PM 92.10 for diesel generator maintenance and was based on values in the diesel generator vendor manual. Additionally, a note at the bottom of the table made torque wrench use optional by stating that:

An average man on a 12 inch wrench can develop about 100 ft. lb. of torque. Therefore, if a torque wrench is not available, or cannot be used, use the following wrench-bolt combinations:

Bolt Sizes, Inches	1/2	9/16	5/8	3/4	7/8	1-1/8
Wrench Sizes, Inches	6	9	12	18	24	36

For larger bolting where specific torque values are not stated and/or configuration precludes the use of torque equipment, standard striking wrenches may be used by qualified mechanics working to industrial journeyman standards.

The technical basis for this note was a vendor valve manual notation applying to stud nuts and cap screws. The licensee had applied the torque values for diesel generators and other valves to MOVs without any apparent engineering justification.

- (3) The post maintenance testing of valve HV-2246 was signed off by MQC as being complete when plant conditions would not support the operational test. Procedure MP 39.3, section 6.1, stated that the post maintenance testing acceptance criteria was "Valve Stroke and limit switch settings are acceptable for system requirements at operating pressure and temperature". There were no quantitative acceptance limits provided in the procedure to determine this acceptability and MQC signed off this part of the procedure on February 23, 1985 for SSR 84500240. At this time the reactor was shutdown and steam was being supplied to the helium circulators from the auxiliary boilers which are not capable of producing steam at operating temperatures and pressures. There was no outstanding action item to test this valve when the plant was at normal operating temperatures and pressures. The licensee had no assurance that this valve would operate as designed under expected operation conditions.

- c. Station battery maintenance and surveillance procedures were inconsistent with the guidance provided by the battery vendor manual. The following inconsistencies were identified:
 - (1) The battery ventilation low flow monitor was alarming in the control room and exhaust air flow from battery rooms 1A and 1B appeared to be insufficient to meet the vendor manual recommendations for removing hydrogen gas during charging evolutions.
 - (2) The upper temperature limit specified on the surveillance procedures for a battery receiving a float charge was 110°F. This was contrary to the vendor manual which recommended maximum allowable battery temperatures of 110°F during equalizing charge evolutions and only 90°F for float charge conditions. The inspector observed a pilot cell temperature of 92°F in battery 1A on August 22, 1985. The battery vendor manual stated that continued operation at this elevated temperature could degrade the battery capacity and life.
 - (3) Battery specific gravity and individual cell voltage (ICV) measurements were not analyzed to determine whether an equalizing charge should be performed. The battery vendor manual

recommended that an equalizing charge be conducted when the specific gravity of any cell dropped .010 from an initial standard value or any cell ICV was below 2.13 VDC. Instead, the licensee performed an equalizing charge monthly in accordance with SOP 92-06. There was no in progress monitoring of these charges and the end of charge parameters were not measured to verify improved battery conditions.

- (4) There were no procedures for periodically checking battery intercell resistances and connector tightness, adding water to individual cells, or cleaning the battery with approved solvents.

The apparent failure to establish, implement and maintain adequate battery, and MOV maintenance and testing procedures was discussed with the licensee and will be incorporated into unresolved item 50-267/85-26-02 for followup by the NRC Region IV Office.

5. Post-Modification Testing

The licensee did not ensure that all required post-modification tests were developed as part of modification work packages. The NRC inspector reviewed Change Notices (CN's) 1798 and 1798-A and their associated Controlled Work Procedures (CWP's) 84-92, 84-93, 84-94, 84-95 and 85-560 which replaced Emergency Water Booster Pumps (Fire Water Booster Pumps) P-2109 and P-2110 with pumps having a higher output head. These pumps could be used to drive the helium circulator turbine to achieve adequate core cooling in the event of the failure of three feedwater pumps. The CWP's for this modification did not contain post-installation flow tests for the new emergency water booster pumps. The failure to develop adequate controls to ensure that all required post-modification testing was conducted was discussed with the licensee and will remain an unresolved item pending review by Region IV (50-267/85-26-06).

6. Unresolved and Open Items:

Unresolved items are matters about which more information is required to determine whether it is an acceptable item, a deviation, or a violation. An open item is a matter that requires further review and evaluation by the inspectors. The following unresolved and open items will be followed by the NRC Region IV office.

(50-267/85-26-01) (Open Item) The revision of equipment control procedures to establish compliance with TMI Item I.C.6. This item will remain open pending NRC Region IV acceptance of the revised procedures (Item 2.a(1)).

(50-267/85-26-02) (Unresolved) The failure to establish adequate procedures for control of temporary plant modifications, station battery maintenance and surveillance tests, and motor operated valve maintenance. Also, the apparent failure to comply with procedures for battery surveillances and motor operated valve maintenance (Items 2.a(2), 3b, 3c, 4b, and 4c).

(50-267/85-16-03) (Open Item) The revision of housekeeping procedures to provide a means for ensuring specific deficiencies are corrected. This item will remain open pending NRC Region IV acceptance of the revised procedures (Item 2.c).

(50-267/85-16-04) (Open Item) The adequacy of the diesel generator valve lineup procedure to ensure the availability of the system. The item will remain open pending NRC Region IV followup of potential weaknesses in the lineup procedure (Item 2.d).

(50-267/85-26-05) (Unresolved) The failure to procure safety-related replacement items in accordance with the QA plan requirements (Item 4.a).

(50-267/85-26-06) (Unresolved) The failure to establish adequate controls to ensure the performance of required post-modification testing (Item 5).

7. The findings of this inspection were discussed with those persons indicated in paragraph 1 on August 29, 1985.

Docket No. 50-267/85-26

Public Service Company of Colorado
ATTN: Mr. O. R. Lee, Vice President
Electric Production
P. O. Box 840
Denver, Colorado 80201

Gentlemen:

This refers to the routine safety inspection conducted by L. L. Wheeler, J. E. Dyer and L. E. Whitney of this office on August 19-28, 1985 of activities at the Fort St. Vrain Nuclear Generating Station authorized by NRC Operating License DPR-34. The inspection findings were discussed with J. Gahn and others of your staff during and at the conclusion of the inspection.

The enclosed inspection report includes findings of significant weaknesses in several maintenance-related areas (maintenance of station batteries and motor operated valves, post-modification testing, and the safety-related qualification of replacement parts). The most recent SALP report (May 7, 1985) considered your maintenance activities to be minimally satisfactory with respect to operational safety. The findings of this inspection confirm that assessment and indicate that your corrective action has not been effective. The NRC will focus increased inspection attention on your maintenance and maintenance-related activities until improved performance is achieved.

The enclosed report includes findings that may result in enforcement actions. Disposition of these potential enforcement findings, referred to as unresolved items in the report, will be made by the NRC Region IV office.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

James G. Partlow, Director
Division of Inspection Programs
Office of Inspection and Enforcement

Enclosure:
Inspection Report No. 50-267/85-26