APPENDIX B

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-267/87-10 License: DPR-34

Docket: 50-267

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

Facility Name: Fort St. Vrain Nuclear Generating Station (FSV)

Inspection At: Platteville, Colorado

Inspection Conducted: April 6-10 and 20-24, 1987 (onsite) to May 1, 1987 (NRC Region IV office)

Inspector: A. R. Johnson 6/29/87
A. R. Johnson, Reactor Inspector (Nuclear Engineer), Reactor Safety Branch Date

Also participating in the inspection and contributing to the report was:

R. E. Ireland, Chief, Engineering Section, Reactor Safety Branch, RIV

Approved: R. E. Ireland 6/29/87
R. E. Ireland, Chief, Engineering Section Reactor Safety Branch Date

Inspection Summary

Inspection Conducted April 6-10 and 20-24, 1987 (Onsite) to May 1, 1987 (NRC Region IV Office), Report 50-267/87-10)

Areas Inspected: Unannounced NRC inspection and post-implementation review of a program for establishing and maintaining the qualification of electric equipment within the scope of 10 CFR 50.49.

During the first round NRC equipment qualification (EQ) special team inspection conducted at FSV on January 26-30, 1987 (NRC Inspection Report 50-267/87-04), two violations (Potential Enforcement/Unresolved Items) and five open items

were identified. PSC has since completed corrective actions. Two of the five open items involve an evaluation and review of the overall implementation of the PSC EQ maintenance and procurement programs.

Results: The inspection and post-implementation review determined that the licensee's commitments to meet the requirements of 10 CFR 50.49 have been satisfactorily accomplished by implementing the corrective action necessary to close out the deficiencies identified during the NRC EQ special team inspection of January 20-26, 1987.

Corrective action for two violations regarding: (1) qualification of first generation Rockbestos coaxial cable, and (2) qualification of certain Raychem installed electrical splice configurations, have been satisfactorily accomplished in that the EQ qualification files (EQFs) now adequately establish qualification for these components.

Two open items in regard to the implementation of the PSC EQ maintenance and procurement programs have been closed out, in that both of these programs are currently being implemented satisfactorily.

The three remaining open items regarding: (1) ASCO solenoid valve conduit installations; (2) EQ cable binder upgrades; and (3) Limitorque valve operator vertical conduit entrances, have also been closed out.

Within the area inspected, no new violations, deviations, or unresolved/open items were identified.

DETAILS

1. Persons Contacted

Licensee Personnel

+H. Brey, Manager, Nuclear Licensing and Fuel (NLF)
*+D. Warembourg, Manager, Nuclear Engineering Division (NED)
*J. Eggebroten, Superintendent, Technical Services, Engineering
+M. Lehr, Supervisor, Quality Assurance (QA) Engineering
*+R. Craun, Site Engineering Manager, NED
*J. Grambling, Supervisor, Nuclear Licensing, Operations
R. Doyle, Engineer, QA
*M. Ferris, QA Operations Manager
*+T. Prenger, QA Services Manager
*+D. Brown, Supervisor, I&C, Nuclear Product Division (NPD)
+C. Fuller, Station Manager
*R. Williams, Vice President, Nuclear Operations
+M. Niehoff, PSC Nuclear Design Manager, NPD
*+F. Novachek, PSC Technical/Administrative Services Manager, NPD
W. Pressley, PSC, Procurement
+T. McIntire, PSC, NED
M. Lindinsky, Procurement Specialist, Stone & Webster Engineering Corporation
*+P. Tomlinson, PSC QA manager
F. Borst, PSC, NPD
*H. Hagan, Outage Manager, NPD
M. Fedie, PSC I&C, NBD
+L. Sutton, PSC QA
+S. Smith, PSC QA
*+J. Waage, Manager, Projects & Engineering, SMSC
*S. Marguez, PSC EQ Coordinator, NED
*M. Holmes, PSC Nuclear Licensing Manager
*+J. Reesy, PSC Staff Assistant, NED
*W. Franek, PSC Superintendent, Planning/Scheduling/Stores
+K. Owens, PSC, NLF

NRC Personnel

*+R. Farrell, Senior Resident Inspector, RIV
W. Bennett, Reactor Inspector, RIV
*+R. Ireland, Chief, Engineering Section, RIV
*+A. Johnson, Reactor Inspector (Nuclear Engineer), RIV

*Present at exit meeting April 10, 1987.
+Present at exit meeting April 24, 1987.

2. Purpose

The purpose at this inspection was a post-implementation review of the licensee's commitments with regard to the requirements of 10 CFR 50.49.

3. Background

In the fall of 1985, PSC requested that the NRC grant FSV an extension of the November 30, 1985, deadline for meeting the EQ requirements for 10 CFR 50.49. This request was documented in PSC letters dated September 24, October 22, and November 22, 1985. The extension request was granted in Commission Memorandum and Order dated November 26, 1985. This extension allowed operation of the plant until May 31, 1986, with reactor power level limited to 35 percent. At that time, the plant was shutdown and modifications for compliance with 10 CFR 50.49 were begun. Included in the Commission Memorandum and Order was the condition that operation of the plant after May 31, 1986, would only be allowed when the FSV EQ program was completed and approved by the Director, Nuclear Reactor Regulation (NRR).

Based on PSC submittals dated May 12, June 20, July 28, and 31, 1986, a Final EQ Safety Evaluation Report (SER) was issued for FSV on September 10, 1986.

As a result of the NRC first round EQ special team inspection conducted January 26-30, 1987, the NRC determined that PSC had implemented a program to meet the requirements of 10 CFR 50.49 with the exception of two potential violations and five open items (NRC Inspection Report 50-267/87-04).

On March 23, 1987, the "Enforcement Criteria for EQ Enforcement" (enclosure to Generic Letter 86-15) was approved by the Commission.

On March 31, 1987, PSC certified to the NRC: (1) the completion of EQ related issues; (2) that the PSC EQ program is in place and satisfies the requirements of 10 CFR 50.49; (3) the availability of at least one path to safe shutdown using fully qualified equipment available; and (4) that all other equipment within the scope of 10 CFR 50.49 is fully qualified.

On April 3, 1987, PSC received approval from NRR of the FSV EQ program in that it has been completed as specified in the Commission Memorandum and Order above.

On April 6, 1987, PSC received authorization for interim operation of FSV at 35 percent of full power. The Commission issued a Confirmatory Order Modifying License to PSC to operate FSV based on the commitments contained in PSC letter dated January 30, 1987 (P-87038), and subject to NRC post-implementation review and inspections.

The post-implementation review of a program for establishing and maintaining the qualification of electric equipment within the scope of

CFR 50.49 involved onsite and subsequent in-office inspection of PSC records furnished by the licensee.

4. EQ Preventive and Corrective Maintenance (PM/CM) Program; Open Item 50-267/8704-02 (Closed)

The NRC inspectors reviewed the implementation of the FSV EQ preventive maintenance (PM) and corrective maintenance (CM) programs.

The NRC inspectors selected five PM/CM packages in accordance with PSC Procedure SMAP-27 to verify the methodology used by the licensee to identify, review, and incorporate maintenance information for plant EQ equipment into the PSC PM and CM programs for FSV. Procedure SMAP-27 applies to the review and incorporation of information into the PM/CM programs from manufacturer/vendor maintenance manuals, EQ binders, and external sources of maintenance information for EQ equipment installed at FSV. Each PM/CM package contains the completed SMAP-27 attachment sheets (controls) which were reviewed by the NRC inspectors to verify that implementation of all maintenance information were being identified, adequately reviewed, and incorporated into a computerized data information system known as the "plant preventive maintenance information system (PPMIS)." The SMAP-27 attachment sheets reviewed by the NRC inspectors included information such as: (1) maintenance requirement reviews; (2) independent review checklists; (3) comment worksheets (which identify the preparers recommendations); (4) maintenance worksheets (which identify the PM and lubrication tasks); (5) input data sheets (which describe the PM tasks in detail such as precautions, procedures, special tools, and parts); (6) plant lubrication sheets; (7) spare parts sheets; (8) procedure information sheets (incorporate required PSC procedure changes); (9) equipment tag number sheets; (10) station service request (SSR) addendum sheets; (11) corrective maintenance worksheets, and (12) operations input sheets. The five PM/CM packages reviewed by the NRC inspectors are listed as follows:

Date Approved	SMAP Package/ Equipment	EQ Binder No.
February 24, 1987	ASCO solenoid valves, model K206-380-2VU	EQ-FSV-47
March 13, 1987	Foxboro pressure transmitters, model N-E11GH HIM2-C-E-L	EQ-FSV-19
December 27, 1986	General Electric panel push button switches, model CR2940-U201	EQ-FSV-18
November 18, 1986	Microswitch limit switches, model BZE6-2RN	EQ-FSV-4

November 18, 1986 NAMCO limit switches, model EA-180-31302 EQ-FSV-6

In addition, the NRC inspectors reviewed the implementation of the FSV planning and discipline scheduling function, on receipt of the SMAP-27 input sheets for the above five PM/CM packages, in accordance with NPAP-13 "Preventive Maintenance Planning/Scheduling Implementation." Also, the NRC inspectors reviewed the station service request (SSR) work planning function in accordance with SMAP-29 "Station Service Request Work Planning." This included NRC inspector reviews of the SMAP-29 attachments (controls) such as (1) work planning sheets; (2) planners controlled work instructions; (3) SSR data field change requests; and (4) material requirements list. In addition, the NRC inspectors reviewed and verified the NPD coordinators functions in generating the following PPMIS schedules: (1) weekly schedule; (2) weekly prioritized PM's to be completed schedule; (3) look ahead schedule (16 weeks); and (4) as required look ahead schedule identifying added PM's in accordance with SMAP-27 reviews.

The NRC inspectors reviewed and verified the implementation of the SSR processing in accordance with Procedure P-7 "Station Service Request Processing." Two sample SSR work packages were reviewed by the NRC inspectors involving pressure switches and solenoid operated shutoff valves to the FSV instrument air compressor 1A. It should be noted that surveillance testing to meet Technical Specification (TS) requirements do not require SSR's for PM. The NRC inspectors reviewed the implementation of each of the P-7 attachments (controls) for the SSR work packages which included the SSR rejection process and categories. Also, implementation of SMAP-25 "EQ Review of SSR's" was verified by the NRC inspectors. The NRC inspectors reviewed the SSR work packages for adequacy of the EQ program to maintain equipment qualification. Also, these two packages showed evidence that they were reviewed by NED for trending, deficient conditions, and other feedback information. At FSV the SSR flow for CM activities is identical to SSR flow for PM activities, with the exception that PM activities involve steps that are preplanned or preperformed. The FSV maintenance program uses PPMIS to track work flow and assist work control. The detailed use of PPMIS is in accordance with Procedure NRMM-10 reviewed by the NRC inspectors. The guidelines for PM and CM requirements, in accordance with Procedure NPAP-11 were reviewed by the NRC inspectors. These included: (1) lubrication programs; (2) stores parts inventory and controls; (3) procedure development; (4) frequency of PM; and (5) preparation and use of model SSR's.

The FSV operations department incorporates the PM/CM activities required to meet the TS requirements for surveillance testing (ST) in accordance with Procedure SMAP-1 "Technical Specification Surveillance Testing Program." The NRC inspectors verified the TS information as correct for one SMAP-27 work package (Foxboro N-E10 Series transmitters).

The FSV NPD PM coordinator, along with the discipline schedulers, prepare the yearly PM program schedule (PREMIS) from the SSR work packages, and coordinates this information with maintenance supervisors and the station manager. The NRC inspectors reviewed the latest PREMIS with the NPD PM coordinator. The PREMIS system use is widespread by PSC, being used at PSC plants other than FSV.

The NRC inspectors determined that the FSV, EQ, PM, and CM programs are currently being implemented satisfactorily. This open item is now closed.

5. EQ Procurement System; Open Item 50-267/8704-01 (Closed)

The NRC inspectors reviewed the implementation of the FSV EQ procurement system and materials management by sampling six procurement packages as follows:

Date of Purchase	P.O. Number	Item Code	Qty	Item
Jan. 15, 1987	N-7632	1749346	60	Raychem Nuclear Cable Sleeves, WCSF-N
Oct. 11, 1982	N-4382	1733198	700 ft.	Anaconda Cable, EPR Insulated, CSPE, with Hypalon Jacket
May 25, 1984	N-5481	1733172	20,000 ft.	Anaconda Cable, Unshielded, EP, FREP
May 31, 1984	N-5501	1733228 1733192	3500 ft. 1500 ft.	Okonite Cable, EPR Insulation with Okonolon Jacket
Nov. 29, 1987	N-5727	1733230 1733232	2500 ft. 5000 ft.	Rockbestos Firewall EP Cable, EPR Insulation, with Neoprene/ Hypalon Jacket
Aug. 28, 1986	N-7243	1733172	10,000 ft.	Rockbestos Firewall III (Copper) Cable, XLPE Insulation, and PVC/ Neoprene Jacket

The FSV activities involved are controlled by the following procedures:

Procedure No.	Issue	Date	Title
Q-4	9	10/24/86	Procurement System
MRIM-1	8	03/11/87	Control of Procured Materials, Equipment, Services
Q-10	*	*	Inspection
P-5	9	01/24/86	Material Control
ENG-16	3	01/05/87	NED Procurement Document Evaluation
ED-76	1	01/12/87	EQ Procurement Document Review
Q-7	9	10/24/86	General Receiving Inspection
STD-1	*	*	Cleanness, Packaging, Shipping, Receiving, Storage, and Handling
MPRM-10	5	01/05/87	Requirements for Safety-Related MR/PR's and SRR's (Material Requests/Purchase Requisitions and Special Recurring Requisitions)

*Issue and date not documented by the NRC inspectors.

The EQ procurement system and material management program at FSV consists of: (1) identification; (2) procurement; (3) receiving (includes control of procured materials, and receiving inspection); (4) storage; and (5) issuance.

The NRC inspectors determined that the NED engineering evaluation of procurement documents issued for purchase were effectively being implemented as evidenced by the NRC inspectors review of the above six procurement packages in accordance with the ENG-16, Q-4, ED-76, MPRM-10, and Q-7 procedures. The NRC inspectors reviewed the contents of each procurement package against procedure ENG-16 and the attachment requirement forms (A, B, C, D, and E) which included: (1) baseline checklist requirements for procurement (acceptance criteria, inspection requirements, performance characteristics, source inspection requirements, storage traceability requirements, seismic requirements, and testing requirements.); (2) standard, non-standard, and special purchase order (PO) clauses (substitutions, markings, seller records, reporting defects/nonconformances, installation/maintenance instructions, witness and hold points, certificates of conformance (CC), certified material test

reports (CMTR), certified test reports (CTR), electrical property reports (EPR), EQ test procedures, and EQ test reports); (3) QA/QC source inspection requirements; (4) QC receiving inspection requirements; and (5) dedication of commercial grade item requirements (considerations given to EQ items to verify particular characteristics).

Additionally, the NRC inspectors verified the effective implementation of the FSV receipt inspection station and the control of EQ procured materials during receiving inspection in accordance with procedures MPRM-1, Q7, Q10, and Std. 1. The NRC inspectors conducted interviews with the FSV Receipt Inspection Station Superintendent and personnel as to their methods, inspection techniques, dispositioning of EQ items, dispositioning of nonconforming materials, inspection record keeping (acceptance reject, and hold tagging), and issuance to the stores warehouse. The NRC inspectors determined that the FSV receipt inspection activity was effectively being implemented in accordance with the FSV procedures.

The NRC inspectors will verify the effective implementation of the FSV stores warehouse techniques and methods during a subsequent NRC inspection when the FSV overall storage program will be reviewed.

The NRC inspectors determined that the FSV EQ procurement system has been implemented satisfactorily. This open item is now closed.

6. Qualification of Rockbestos Coaxial Cable; EQ-FSV-79; Violation 50-267/8704-03 (Closed)

During the NRC inspection of January 26-30, 1987, a review of binder EQ-FSV-79 (Rockbestos coaxial cable) determined that Rockbestos first generation coaxial cable was installed in the FSV plant. Rockbestos first generation coaxial cable is constructed using LD (low density) polymer as the first insulation, cross-linked polyethlene (XLPE) as the second insulation, and a XLPE jacket. Rockbestos first generation cable has displayed shorting characteristics due to thermal expansion problems above identified temperature thresholds during laboratory type testing and was the subject of 10 CFR Part 21 reporting several years ago by other licensees. PSC could not explain the documented conclusion that first generation cable was qualified for the FSV plant environment based on a Rockbestos qualification report QR-6802 and a Rockbestos coaxial cable similarity letter.

During this followup inspection, the NRC inspectors reviewed EQ binder EQ-FSV-79 and a new PSC change notice (CN) No. 2598, dated March 9, 1987, relating to the qualification of Rockbestos coaxial first generation cable. The EQ-FSV-79 binder (per CN 2598) now includes S&L Calculation No. CQD-033322, February 18, 1987, for the purpose of environmentally qualifying Rockbestos first generation coaxial cable for use in the FSV plant in accordance with DOR guidelines. Calculation CQD-033322 references the following additional qualification documentation contained in EQ-FSV-79, reviewed by the NRC inspectors, to first generation coaxial cable qualification:

a. Wyle Test Report No. 57102, February 6, 1980 (qualification for peak DBA/post-DBA 30-day temperatures).

b. PSC Test Specification 93-I-720, Issue January 17, 1980 (test plan for Wyle Report 57102 above).

c. General Atomic Company Test Report No. E-254-960, May 1, 1981 (qualification for post-DBA temperatures beyond 30 days).

d. Rockbestos letter to PSC, July 18, 1981 (temperature thresholds).

e. NSLD Calculation No. 3C21-0786-001, Revision 3, February 23, 1987, (thermal lag analysis).

Rockbestos Report QR-6802, March 12, 1986, for coaxial, twinaxial, and triaxial generic cable (qualification tests for adverse service conditions) remains in place together with the Rockbestos letter to S&L, August 4, 1986, (subject: Rockbestos report QR-6802), regarding a qualified (greater than) 35-year service life.

In the above PSC has provided (1) a letter from Rockbestos which defines temperature thresholds relating to the thermal expansion problems; and (2) documentation that demonstrates by analysis that cable temperatures remain below the damage threshold.

The NRC inspectors determined that the documentation contained in EQ-FSV-79 binder and CN 2598 including that described above, adequately establish the environmental qualification of the Rockbestos first generation coaxial cables at FSV.

Failure of inadequate documentation to demonstrate qualification of Rockbestos first generation type test cables in the EQF during the January 26-30, 1987, EQ inspection was a violation of 10 CFR 50.49 (05-267/8704-03). This violation is now closed.

7. Qualification of Raychem N-PKV Stub Type and WCSF-N In-Line Type Cable Splices; EQ-FSV-15, Violation 50-267/8704-06 (Closed)

a. Raychem N-PKV Stub Type Splices

During the inspection, the NRC inspectors reviewed EQ binder EQ-FSV-15 and associated CN 2523, February 23, 1987, relating to the above Raychem stub type N-PKV cable splice qualification. The EQ-FSV-15 binder (per CN 2523) now includes approved qualification documentation, specifically Wyle qualification plan No. 17873-02 dated January 19, 1987, and Wyle EQ test report No. 17883-1, dated January 22 1987, as a result of a new qualification test performed on the most limiting existing installed splice configurations at FSV.

The new qualification type test was performed on the above Raychem N-PKV-2-16 type stub connecting splice. The type test specimen wires used were a 26 AWG teflon insulated wire and a 16 AWG Rockbestos SIS wire crimped together in one ring-tongue terminal lug. The type test configuration used a Raychem WCSF-050 heat shrinkable tubing shim on the 26 AWG wire extending outside of the overall end cap (sealing sleeve). This configuration has complete sealing between end cap, shim, breakout, and wires.

b. Raychem WCSF-N In-Line Type Splices

PSC has in place CN 2630, April 8, 1987, which requires a similarity analysis using the Wyle EQ test plan No. 17873-02 and test report No. 17883-1 (referred to in paragraph 7.a above) being incorporated into EQ binder EQ-FSV-15 with regard to the Raychem WCSF-N in-line splice qualification. During the NRC inspection of January 26-30, 1987, the NRC inspector observed WCSF-N in-line splices in low voltage junction box Nos. K555 and K556, with extended shims on the cable beyond the overall sealing sleeves. As a result of the new qualification test performed on the most limiting existing installed splice configurations at FSV for the Raychem N-PKV stub type (see paragraph 7.a above), PSC has established qualification for the WCSF-N most limiting installed in-line splice configurations at FSV, by a similarity analysis. Again, this configuration uses a Raychem WCFS-050 heat shrinkable tubing shim on the wire extending outside of the overall sealing sleeve and has complete sealing between cable jacket, shim, and sealing sleeve.

Since June 1986, PSC has performed several walkdown inspections with regard to IE Information Notice No. 86-53, in which PSC took immediate corrective action to replace improperly installed Raychem type WCSF and N-PKV electrical cable splices. PSC procedures have been issued since October 1985 to maintain tight control of nuclear adhesive heat shrinkable tubing (shim) applications as follows:

Procedure No.	Issue	Date	Title
MPE-1901.2	1 thru 5	10/19/85 11/08/85 11/20/85 09/17/86 10/14/86	Installation of Raychem Material on New Splices (Control/Instrumentation Cables)
MPE-1901.2-EQ	1	02/05/87	Installation of Raychem Material on New Splices (Control/Instrumentation Cables)

The above procedures were reviewed by the NRC inspectors and were determined to adequately control these splice installations at FSV.

The above corrective action by PSC also completes the action described in a PSC "Speed Letter" at the time of the January 26-30, 1987, inspection, of which an NRC recommendation was agreed to by the licensee, in regard to a plant design request (PDR) 87-1067, dated January 28, 1987, to procedure MPE-1901.2-EQ to assure no bend radii occur in Raychem splice installations which have overall sealing sleeves extending less than 2 inches beyond the inner shim (e.g., particularly applicable to the new qualification test configurations of paragraphs 7.a and 7.b above). These instructions have always been included in MPE-1901.2, Issue 5, dated October 14, 1986. PDR 87-1067 has incorporated the same instructions into procedure MPE-1901.2-EQ, Issue 1, dated February 5, 1987, reviewed by the NRC inspectors.

In addition, corrective action has been completed as described in a PSC "Speed Letter" of which an NRC recommendation was agreed to by the licensee, in regard to qualified life calculations of Raychem cable splices using a less than 2-inch overlap at the outer sleeve. The thermal aging analysis of EQ binder EQ-FSV-15 (S&L calculation No. CQD-028078, Revision 5) is being changed by CN 2570, January 29, 1987, to include aging parameters from Wyle Test Report No. 17852-2 contained in the binder. Consideration of these added aging parameters will augment those calculations already in place, which are based on Raychem reports. This now results in an extended qualified life for the splices under plant service conditions documented in binder EQ-FSV-15.

Failure to have adequate documentation to demonstrate qualification of the WCSF-N and N-PKV splices in the EQF during the January 26-30, 1987, EQ inspection (paragraphs 7.a and 7.b above) is a violation of 10 CFR 50.49 (05-267/8704-06). This violation is now closed.

8. Normal Service Aging Qualification of Okonite Nos. 35 (Jacketing) and T95 (Insulating) Splicing Tapes; EQ-FSV-23

The Okonite T-95 insulating tape and Okonite No. 35 jacketing tape are used in the repairing of damaged power cable at FSV. The Okonite T-95 is used as an insulation material, the Okonite No. 35 is used as a jacket over the insulating tape T-95. During the NRC inspection of January 26-30, 1987, the NRC inspector observed that Wyle test report No. 17883-1, dated January 22, 1987, for the above splicing tapes, took credit for a 22-year normal service life temperature aging qualification. Calculations in the report however computed to 15 years.

Corrective action has been completed as described in a PSC "Speed Letter," of which an NRC recommendation was agreed to by the licensee, in regard to documenting the extended service life qualification.

A new service aging qualification analysis has been documented in EQ binder EQ-FSV-23 to analyze the Okonite No.'s 35 and T95 splicing tapes for a normal service time/temperature aging extending the qualified life to

22 years at 120°F. The calculations are contained in S&L Justification Analysis No. CQD-034801, dated March 16, 1987, reviewed by the NRC inspectors.

No violations, deviations, or unresolved items were identified.

9. Qualification of Sealed and Vented Conduit/Junction Box Installation for ASCO Solenoid Valves, Models NPK 8316, NPK 8320, K206-308, and K206-832, EQ-FSV-47, Open Item 50-267/8704-04 (Closed)

During the inspection, the NRC inspectors reviewed EQ binder EQ-FSV-47 and associated CN 2523, dated February 23, 1987, relating to the above sealed and vented conduit/junction box installation, of which the licensee agreed to clarify the installed configurations in the EQ binder. CN 2523 provided additional information in support of these installed configurations at FSV. Applicable ASCO bulletin No. 8320, catalog NP-1, and maintenance instruction sheets, have been included which identify specific vendor recommended installation requirements. PSC also included their analysis that FSV ASCO installations were in compliance with the vendor recommended installation practices to assure moisture sealing requirements. An additional engineering analysis addressing moisture ingress has been added to the EQ-FSV-47 binder (S&L calculation). The analysis determined that the mechanism for moisture intrusion is negated when properly sealed and vented.

The NRC inspectors determined that the changes to EQ binder EQ-FSV-47 (per CN 2523) adequately clarify and establish qualification of the sealed and vented conduit/junction box installed configurations. This open item is closed.

10. Qualification of Conduit Entrance Configurations on Limitorque Valve Operators; EQ-FSV-16, Open Item 50-267/8704-07 (Closed)

During the inspection, the NRC inspectors reviewed EQ binder EQ-FSV-16 and associated CN 2523, dated February 23, 1987, relating to the above unsealed conduit entrance configurations with long vertical runs to Limitorque valve operators. The licensee agreed to clarify the qualification binder regarding water accumulation in motor operator switch compartments by flooding, fire suppression spray, and saturated steam. CN 2523 adds a discussion to provide justification to preclude the need to install conduit seals, as these absolute seals add no further considerations for qualification. The qualification testing results demonstrates proper performance of the motor operator's intended function even under complete submergence. The FSV specific installations however, are much less severe and submergence is not a plant concern. The new justification in the EQ binder now provides more specific information related to valve operator sealing requirements (S&L Calculation No. CQD-027605). FSV actuators are not subjected to submergence, chemical spray, or fire suppression sprays. It also states that these actuator motors were designed to survive DBA/post DBA environment without absolute sealing.

Also, corrective action has been completed as described in two PSC "Speed Letters," of which NRC recommendations were agreed to by the licensee, in regard to replacement of unidentified terminal blocks (TB's) in Limitorque motor operators, in that EQ binder EQ-FSV-16 did not identify the TB manufacturers. As a result of a PSC walkdown inspection, PSC has replaced all unidentified TB's with Buchanan EQ qualified TB's per CN 2294A and revised the EQ-FSV-16 binder accordingly. In addition, qualified Raychem splice kits were used in lieu of Buchanan TB's in motor operators HV-4225 and HV-4257 due to the physical restraints which would not allow this model TB to fit within the operator. CN 2294C, February 23, 1987, has been completed to EQ binder EQ-FSV16, which documents a departure from the qualification basis and test report to which these motor operators were originally tested. The qualification of the Raychem splices has been evaluated and established in EQ binder EQ-FSV-15. Reference to the use of qualified Raychem splices in lieu of the TB's has been documented in the S&L calculation No. CQD-027695 in EQ-FSV-16 binder.

The NRC inspectors determined that the changes to EQ binder EQ-FSV-16 adequately clarifies the qualification status of Limitorque motor operators with regard to conduit entrance configurations, unidentified TB replacements, and incorporation of Raychem splice kits in lieu of TB's. This open item is closed.

11. Upgrading of EQ Binders for Rockbestos, Okonite, and Anaconda Cable from DOR Guidelines to 10 CFR 50.49, Category I; EQ-FSV-50, EQ-FSV-54, EQ-FSV-51, EQ-FSV-64, and EQ-FSV-77, Open Item 50-267/8704-05 (Closed)

During the inspection, the NRC inspectors reviewed the EQ binders for the above cable and associated CN's relating to the upgrading qualification status of these binders. The EQ binders had been upgraded from the NRR Division of Operating Reactors, "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors, November 1979," requirements (DOR guidelines) to the most current qualification requirements of the rule (10 CFR 50.49). In accordance with 10 CFR 50.49, equipment for FSV may be qualified to the criteria specified in either the DOR Guidelines or Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment (NUREG-0588), except for replacement equipment. Replacement equipment installed subsequent to February 22, 1983, must be qualified in accordance with the provisions of 10 CFR 50.49 using the guidance of Regulatory Guide (RG) 1.89, unless there are sound reasons to the contrary. RG 1.89 refers to the requirements of IEEE Std. 323-1974, "IEEE Standard for Qualifying Class IE Equipment for Nuclear Power Generating Stations, February 28, 1974," as acceptable to the NRC staff, subject to the regulatory positions stated therein.

a. EQ Binder FSV-50, Rockbestos Firewall EP Cables (EPR Insulation with Neoprene or Hypalon Jacket)

CN 2590 dated March 6, 1987, upgrades this EQ binder in accordance with 10 CFR 50.49 based upon the original testing performed by the manufacturer. In each instance, the original testing was performed in

accordance with the recommended guidelines of IEEE Std. 323-1974. Testing for each cable was completed in accordance with the manufacturer's approved test procedures. The primary qualification documentation for the DBA in the S&L Calculation CQD-030749 was Wyle Report 17722-1, "Nuclear Qualification on Rockbestos Cables for Niagara Mohawk's 9 Mile Point Power Plants," December 19, 1985. Franklin Institute Report No. F-C3798, March 1984, originally in place, is still used but only for cable flame test qualification.

b. EQ Binder FSV-54, Rockbestos Firewall III (CERRO) Cables (XLPE Insulation with PVC or Neoprene Jacket)

CN 2595 dated March 9, 1987, upgrades this EQ binder in accordance with 10 CFR 50.49 based on new qualification tests performed in accordance with the requirements of IEEE Std. 323-1974. The technical content of this binder has been revised to include this new basis in which these cables have been tested to satisfy the most current requirements of 10 CFR 50.49. S&L Calculation CQD-028382 now incorporates the latest qualification documentation (test reports) by Rockbestos (QR-5804, October 10, 1985; QR-5805, October 8, 1985; QR-5804, November 11, 1985; and QR 5805, November 11, 1985).

c. EQ Binder FSV-51, Okonite Power and Control Cables (EPR Insulation with Hypalon or Neoprene Jacket)

The justification/analysis section of EQ binder FSV-51 upgrades this binder in accordance with 10 CFR 50.49. S&L Calculation CQD-027087, Revision 6, February 3, 1987, has been revised in accordance with 10 CFR 50.49 which bases the qualification on the original testing by the manufacturer. The primary qualification documentation includes Okonite Test Report No. NQRN-1A, Revision 3, February 16, 1984. The qualification for thermal aging is demonstrated by type testing and analysis. The DBE 30-day test plus 100-day post-DBE qualification is demonstrated by a combination of type testing and analysis. The test sequence demonstrated in report NQRN-1A is in accordance with IEEE Std. 383-1974 requirements.

d. EQ Binder FSV-64, Anaconda Unshield EP Thermocouple and Instrumentation Cable (Flame Retardant EPR Insulated with Chlorinated Polethylene (CPE) Jacket)

The justification/analysis section of EQ binder FSV-64 upgrades this binder in accordance with 10 CFR 50.49. S&L Calculation CQD-032890, Revision 1, February 3, 1987, has been revised in accordance with 10 CFR 50.49 which bases the qualification on the original testing by the manufacturer. The primary qualification documentation is the Franklin Institute Research Laboratory Report F-C4350-4, dated July 1976. An attachment to Report F-C4350-4, dated June 1978 and a Anaconda letter dated July 1978 are also included. This documentation demonstrates that thermal aging tests were performed before radiation

testing in accordance with IEEE Std. 323-1974. Accelerated thermal aging qualification are based on a regression line analysis, arrhenius methodology, and type testing.

e. EQ Binder FSV-77, Anaconda EPR Insulated, Power and Instrument Cable (Hypalon Jacket)

The justification/analysis section of binder FSV-77 (S&L Calculation No. CQD-031209, February 3, 1987) has been revised and upgraded in accordance with 10 CFR 50.49 which bases the qualification on the original testing by the manufacturer. The primary qualification documentation is the Franklin Institute Research Laboratory Report F-C4350-4, dated July 1976. An Attachment to Report F-C4350-4, dated June 1978, and a Anaconda letter dated July 1978 are also included. This documentation demonstrates the qualification of the cable's thermal life by type testing and the DBE qualification by type testing and analysis per IEEE Std 323-1974 requirements.

The NRC inspectors determined that the revisions to the above listed EQ binders (paragraphs 11.a, 11.b, 11.c, 11.d, and 11.e), as described above, adequately establish qualification for the above Class 1E cable to the most current requirements of the 10 CFR 50.49 rule. This open item is closed.

12. Qualification of Masoneilan Electropneumatic Transducers and Valve Positioners, Models 8005, 8006 and 8012; EQ-FSV-02

Corrective action has been completed as described in a PSC "Speed Letter," of which an NRC recommendation was agreed to by the licensee, in regard to the addition of functional descriptions in EQ binder EQ-FSV-02. The addition of a functional discription is necessary to verify that these transducers and valve positioners will perform their intended safety function following a DBE.

CN 2585, dated February 20, 1987, incorporates a revision to the S&L Calculation contained in binder EQ-FSV-02 which fully describes the loss of the pneumatic feedback signal for the bearing water supply valves HV-21185, HV-21186, HV-21187, and HV-21188. The calculation concludes that the loss of the feedback signal to the positioner will have no effect on the operation of the bearing water system.

The NRC inspectors reviewed CN 2585 and the S&L calculation and determined that the additional functional descriptions were adequate.

No violations, deviations, or unresolved items were identified.

13. Qualification of Revere Thermocouple Cable (EPDM Insulation with Hypalon Jacket); EQ-FSV-86

Corrective action has been completed as described in a PSC "Speed Letter," of which an NRC recommendation was agreed to by the licensee, in regard to a thermal aging analysis for the above cable qualification.

CN 2523, dated February 24, 1987, incorporates a revision to the S&L Calculation No. CQD-033782 contained in binder EQ-FSV-86, which now clarifies that the above cable has been thermally aged for 168 hours at 121°C by sole means of a regression line method used in determining its qualified service life.

The NRC inspectors reviewed S&L Calculation No. CQD-033782 and the above CN and determined that the thermal aging analysis was adequate.

No violations, deviations, or unresolved items were identified.

14. Instrument Loop Inaccuracy Evaluation for Instruments at FSV using Insulation Resistances (IR's) of Tested Cables; EQ-FSV-11, 53, 54, 60, 63, 64, 66, 72, 75, 77, 78, 79, 80, 81, 82, and 85.

Corrective action has been completed as described in a PSC "Speed Letter," of which an NRC recommendation was agreed to by the licensee, in regard to instrument loop accuracy calculations at FSV. Instrument loop accuracies are affected as a result of a change in cable IR's. This is due to the various cable lengths installed at FSV, as compared to those cable lengths used during type testing.

S&L Calculation No. CQD-034680, Revision 2, dated March 4, 1987, now considers the IR measurements obtained during type testing as applied to the long cable runs of installed instruments at FSV. Table 1, on page 10, of this calculation was revised making comparisons of IR measurements between those taken during type testing and the extrapolated values for cable IR's at 1000-foot lengths. The results of these calculations for each cable type demonstrated no appreciable induced error which would significantly affect the accuracy of the instruments.

The NRC inspectors reviewed S&L Calculation No. CQD-034680, Revision 2, and determined that these IR considerations were negligible with regard to the required instrument accuracy.

No violations, deviations, or unresolved items were identified.

15. Qualification of Westinghouse Relays, 24 VDC; EQ-FSV-20

Corrective action has been completed as described in a PSC "Speed Letter," of which an NRC recommendation was agreed to by the licensee, in regard to the above EQ binder checklist NDMAP-4 which requires a 23-year replacement. This replacement schedule was not specified in the maintenance and surveillance section.

CN 2585, dated February 16, 1987, incorporates a revision to EQ-FSV-20 deleting the 23-year replacement requirement. The MDMAP-4 checklist was in error and did not agree with the analysis (Tab C) in the EQ binder. EQ-FSV-20 qualifies these relays for 51.7 years. Consequently, no replacement is required in the maintenance and surveillance section.

No violations, deviations, or unresolved items were identified.

16. FSV Shelf Life Program, Procedure SMAP-28, November 5, 1986

During the NRC inspection at FSV, the NRC inspectors remained cognizant of a PSC audit being performed by their QA department (QA Audit on Maintenance/Procurement No. 87-01). This audit addressed shelf life controls for stocked materials in establishing shelf life expiration dates, based on data provided by vendors/manufacturers. The audit resulted in eight discrepant conditions. A management corrective action report (MCAR) was issued by PSC on April 9, 1987. The discrepant conditions involved: (1) occasions where stores had issued materials since November 5, 1986, with expired shelf lifes; (2) material management department (MMD) failure to input shelf life data into the shelf life data base; (3) failure to identify shelf life expiration dates on items for which it had expired; (4) failure to determine the disposition of the expired items; (5) failure to generate and to distribute shelf life data base scheduled reports; (6) failure of stores personnel to document shelf life expiration dates at the time of material issue; (7)failure to provide classroom training for stores personnel; and (8) failure of MED to evaluate the safety significance of installing material with expired shelf life. PSC has completed all corrective actions to date.

The NRC inspectors remained appraised of the PSC audit progress and reviewed information through the PSC QA manager as the audit discrepancies were being evaluated. The NRC inspectors were careful to identify that the shelf life discrepancies did not impact the shelf life EQ items as listed on the 10 CFR 50.49 master equipment list (MEL).

No violations, deviations, or unresolved items were identified.

17. Exit Interview

An exit meeting was held on April 24, 1987, at which time results of the NRC inspection were discussed with FSV staff members.