



WASHINGTON PUBLIC POWER SUPPLY SYSTEM

P.O. Box 968 • 3000 George Washington Way • Richland, Washington 99352

September 17, 1986  
G02-86-0885

Docket No. 50-397

Mr. J. B. Martin, Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region V  
1450 Maria Lane, Suite 210  
Walnut Creek, California 94596

Dear Mr. Martin:

Subject: NUCLEAR PLANT NO. 2  
LICENSE NO. NPF-21,  
EQUIPMENT QUALIFICATION AUDIT,  
AUDIT NO. NRC-IR-86-12

Reference: Letter GI2-86-0060, R.F. Heishman to  
G.C. Sorensen, "Inspection No. 50-397/  
86-12," dated July 30, 1986

The unresolved items in the referenced inspection report were briefly discussed at the Enforcement Conference on August 28, 1986. Additional information related to the unresolved items was discussed at that time. Attached, please find a summary of additional information related to the unresolved items.

While your inspectors were operating in a limited time frame, we have had the luxury of gathering information at a less pressured pace and believe this information, as well as our discussion of the safety significance of these unresolved items, will assist your evaluation.

8610280513 861022  
PDR ADOCK 05000397  
Q PDR

RECEIVED  
NRC

1986 SEP 22 PM 1:32

REGION V I&E

IEO1

114



114

114

114



If we can be of further assistance in evaluating the unresolved items from this audit, we will be happy to meet with you at a convenient time.

*for R.D. Sorensen*  
G.C. Sorensen, Manager  
Regulatory Programs

KRW/kss

cc: JO Bradfute - NRC  
E Revell - BPA  
NS Reynolds - BLCP&R  
NRC Site Inspector



#### POTENTIAL ENFORCEMENT/UNRESOLVED ITEM (ROSEMOUNT)

1. Contrary to paragraphs (f) and (k) of 10 CFR 50.49 and section 5.0 of NUREG-0588 Category II, at the time of the inspection, Washington Public Power Supply System's (WPPSS's) installation of three Rosemount 1151 transmitters was not qualified because spare cable entrance hubs were not sealed. (Paragraph 4.D.(1), Item 50-397/86-12-1.)

#### NRC AUDIT REPORT DISCUSSION

Rosemount pressure transmitter model 1151, QID file 209007 - In the QID file test report RTM 57820, page 11, section 4.2.1 states that the user has the responsibility to provide nuclear qualified seals at conduit connections to prevent the entrance of conductive fluid or vapor, which could cause abnormal operation due to leakage currents. Like other plant walkdown specimens, transmitter CMS-LT-1 was identified during the entrance meeting on April 28. During the plant physical inspection of April 30, the NRC inspector observed that thread sealant on a stainless steel plug in a spare cable entrance hub on the transmitters electronics housing was tacky and volatile. The I&C supervisor accompanying the inspector stated that on April 29, the transmitter O-rings were replaced and the cover torqued under MWR #AU5159. The inspector determined that the completed MWR did not address the housing plug, although it did identify the transmitter as environmentally qualified. The inspector also observed that the EPN was merely written on the housing in red felt tip pen, with no other tagging or identification in the area. The completed MWR did not address the lack of proper tagging.

The two technicians who worked on the transmitter on April 29, stated that they installed the plug because the hub was completely open. An I&C engineer who accompanied the technicians identified the transmitter for them based on his experience with it during the preoperational test program. Neither the technicians nor engineer replied when asked why they did not document the missing plug or tag. The QC inspector who witnessed the work stated that when he first saw the transmitter, it had a red shipping cap on the hub and that he did not document the missing plug or tag because his inspection was limited to verifying the special maintenance instructions of drawing M944. All four licensee personnel stated that they had completed their documentation on this matter.

Note: The inspectors also noted that the licensee NCR #286069 dated March 14, 1986 identified need for additional sealant in the conduit for CM-S-LT-1 and other transmitters. DCP 86-0101-OA dated April 4, 1986 covers resolution of the resultant FCR-86-047 by documenting the introduction of sealant into the conduits under vital (expedited) work request #AV 0570. The inspectors concluded that, even if the concern raised in NCR #286069 were regarded as a



violation, a notice of violation would not be issued under the self-identification and correction provision of 10 CFR 2, Appendix C, Section IV. This item is noted because of its apparent similarity to the concern raised during this inspection. In fact, the two are completely different because AV 0570 deals with connected conduit, whereas the inspection concern addresses the unused (spare) conduit connection.

At the request of the inspectors, the licensee examined additional transmitters for possible open spare cable entrance hubs. The licensee reported prior to the exit meeting that of 90 additional transmitters examined, nine had either a plastic cap or no closure in the unused conduit entry. Two of these, EPN's CIA-PT-21A and MS-P-51B, required plugs for environmental qualification.

Paragraph 3.11.4.2(4) of Supplement 3 to the WNP-2 SER NUREG-0892, dated May 1983, documented that during the February 1983 NRC plant walkdown, a transmitter housing was observed to have only a plastic insert instead of a threaded metal plug. The SER supplement states that the insert does not provide leaktight integrity and could permit steam from a high-energy line break to enter the housing. The licensee's awareness of this concern is documented on page 67 of 67 in the QID file, which is part of a July 9, 1983 "Appendix A" response to NRC comments as follows:

Comment: "There are two threaded connections on the Rosemount transmitter's electronic housing. In several cases, we noted that a plastic plug was used to "seal" the unused connection. However, this plug was loose and would permit steam to enter the electronic housing. Other transmitters utilized a threaded metal plug which appeared to provide adequate sealing.

These concerns relate to all instruments or equipment which are connected to Anaconda Flex conduit. Also, since all Rosemounts are of similar mechanical design, all models should be inspected for plastic plugs."

Response: "The Supply System will investigate these items following the audit. Corrective action will be taken as required."

The procedural aspects of the Rosemount 1151 transmitter installation deficiencies are included in Potential Enforcement/Unresolved Item 50-397/86-12-5 in section 4.D(5) below. The direct EQ deficiencies resulting from the installation of unqualified equipment constitute Potential Enforcement/Unresolved Item 50-397/86-12-1.

1





## SUPPLY SYSTEM RESPONSE

As stated in the inspection report (paragraph 4.D.1) the pertinent qualification test report (RTM 57820) notes that the user has the responsibility to provide qualified seals. The inspection report also noted that a previous concern had been raised on March 14, 1986, which resulted in the placement of additional sealant in conduits under MWR AV570. The inspection report, however, erroneously concluded that MWR AV570 deals with connected conduit whereas the inspection concern addresses the unused (spare) conduit connection." MWR AV570 in conjunction with the associated Field Change Record 86-047 (attached), which provided engineering direction for the vital Work Request AV0570, directed a procedure for the application of "Dow Corning 3-6548 silicone foam to fill the wire entry cavity and into the conduit entry...." The MWR AV0570 implemented the Field Change Record configuration and a portion of those instructions stated "Remove plug from the unused conduit port if necessary." It further instructed the craftsperson to "fill the wire cavity and into the conduit entry...." The transmitters, CMS-LT-1, MS-PT-51B, and CIA-PT-21A, were subject to this MWR and the documentation of work performed on 3/14/86 that states "Applied foam to fill cavities in Rosemount transmitters," is explicitly indicated.

In short, by using the qualified foam sealant, the need for a steel plug in the unused entry was no longer required. The Supply System correctly fulfilled its responsibility to provide seals at conduit connections to prevent the



entrance of conductive fluid or vapor, and the transmitters were in a qualified condition. Accordingly, the Supply System maintains that there was no qualification deficiency. (It should be noted that steel housing plugs were installed in all Rosemounts prior to the end of the refueling outage even though they were not required).





WASHINGTON PUBLIC POWER  
SUPPLY SYSTEM

## FIELD CHANGE RECORD

1. FCR NO.

86-047

PAGE

001

7. REASON FOR FCR

PROVIDE ~~TEMPORARY~~ CONDUIT  
ENTRY SEAL FOR SAFETY RELATED  
PRESSURE TRANSMITTERS

2. MWR NO.

3. DCP NO.

4. SYSTEM

VARIOUS CIA, CMS, NPCC,  
LPCC & MS

5. SUBJECT

SEALING CONDUIT ENTRY

6. QUALITY CLASS

I

8. RECOMMENDED CHANGE

REFER TO PAGE 003-005 OF THIS  
FCR.



Involves safety-related components



Requires change to FSAR



Involves work on ASME pressure boundary



Materially changes previously approved design

9. THIS FCR MODIFIES DIRECTION GIVEN BY DCP / FCR

NONE

10. THIS FCR INITIATES A NEW DESIGN CHANGE AFFECTING DWGS

NONE

### 11. FCR PACKAGE INDEX

Approval Form, Page 001

10CFR50.59 Safety Evaluation, Page 002

FCR Plates, Pages: 003 Through: 005

Other:

Bill of Material, Pages: N/A Through:

Design Verification (If any) Pages: N/A Through:

Other:

### 12. TELECON RECORD

Telecon initiated by: RON BARBEE

DATE / TIME

Design Engineer contacted: T. L. MILES

Telecon initiated by:

DATE / TIME

Plant Technical contacted:

This FCR was approved technically for implementation by this telecon.

### 13. INSTALLATION AND INSPECTION REQUIREMENTS

The following installation and inspection requirements were identified by the Design Engineer:

☒ NONE

☐ AS DESCRIBED BELOW

### PACKAGE APPROVAL

14. PREPARED BY

DATE / TIME

MARCH 13, 1986

15. SHIFT MANAGER APPROVAL

DATE / TIME

3-14-86 0846

16. DESIGN ENGINEER APPROVAL

DATE / TIME

3/14/86 7:50 AM

17. PLANT TECHNICAL APPROVAL

DATE / TIME

3/14/86

18. PLANT MANAGER APPROVAL

Plant Manager approval is prerequisite to  
beginning work of making physical changes to hardware.

Engineering Manager approval required after field work complete  
and before declaring system operable. (Safety-related changes)



Engineering Manager approval not required (change is not safety-related).

(Plant Manager, Check appropriate block)

19. GENERATION ENGINEERING MANAGER APPROVAL

Generation Engineering approval is prerequisite  
for declaring safety system operable.

Design has been verified by (state method):

SIGNATURE

DATE / TIME

3/14/86 835

SIGNATURE

DATE / TIME



10CFR50.59 SAFETY EVALUATION

1. OCP NO.	PAGE
FCR NO. 86-047	002
1. PROCEDURE NO.	
1. SPECIAL TEST NO.	

3. TECH. SPEC REFERENCE	
SECTION	PAGE

☒ Not Addressed in Tech. Specs.

4. Does this Design Change, Procedure Revision, and/or Special Test constitute a change as described in the Final Safety Analysis Report?

☐ YES ☒ NO

5. Is a change in Technical Specifications involved?

☐ YES ☒ NO

2. FSAR REFERENCE		
VOLUME	SECTION	PAGE

☒ Not Addressed in FSAR

IF YES

IF NO

8. UNREVIEWED SAFETY QUESTION EVALUATION: Answer the following questions with a "yes" or "no", and provide specific reasons justifying the decision:

A. Can the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report be increased?

☐ YES ☒ NO Because: PROVIDES LOCA SEAL TO CONDUIT CONNECTION OF INSTRUMENTS ONLY.

B. Can a possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report be created?

☐ YES ☒ NO Because: SHOULD RESULT IN AN IMPROVED RELIABILITY.

C. Is the margin of safety as defined in the basis for any technical specification reduced?

☐ YES ☒ NO Because: NOT SPECIFICALLY ADDRESSED IN TECH. SPEC.

Any Answer (8A, B, C) ☐ YES

☒ All Answers (8A, B, C) NO

AUTHORIZATION RECEIVED

Initiate Design Change, Procedure Change and/or Special Test Implementation.

6. Complete Block No. 8 of this form Proceed to Block No. 7

7. Request and receive Nuclear Regulatory Commission authorization for change prior to implementation of the subject change. Refer to 10CFR50.30.

\* If answer in Block No. 4 is YES, then the change is reportable under 10CFR50.59b and description of the change will be included in the Annual Report. The individual initiating the Design Change, Procedure Revision, and/or Special Test is responsible for submitting FSAR changes to the Plant Licensing Manager.

9. Shomo L. White 3-13-86  
PREPARED BY DATE  
10. Shasta 3/13/86  
APPROVED BY DATE

WASHINGTON PUBLIC POWER  
SUPPLY SYSTEM

FCR PLATE

FCR PAGE NO.:

86-047-003

DESCRIPTION OF CHANGE

INSTRUCTIONS

SEAL CONDUIT ENTRY TO THE FOLLOWING  
ROSEMOUNT 1153 PRESSURE TRANSMITTERS  
IN ACCORDANCE WITH ATTACHED PROCEDURE  
SHEETS 0043005 OF THIS DCP.

INSTR. TAG NO.

CIA-PT-21A, B	REA-DPT-1A1
CMS-LT-1, 2	REA-DPT-1A3
HPCS-FT-5	REA-DPT-1B2
LPCS-FT-3	
MS-LT-26A	
MS-LT-26D	
MS-PT-51A, B	
RHR-FT-15A, B & C	

NOTE:~~ON ALL INSTRUMENTS.~~

~~EXCEPT CIA-PT-21A & 21B~~  
~~REMOVE 1" OF SEAL TIGHT~~  
~~ECHERIALC JUST ABOVE THE~~  
~~INSTRUMENT.~~

ON <sup>ALL</sup> PRESSURE TRANSMITTERS *except* REA-DPT-1A1, 1A3, 1B2

~~CIA-PT-21A & 21B~~ APPLY  
DOW CORNING SILICONE FOME  
IN THE CONDUIT AT THE  
FIRST TERM BOX.

~~or cable tray~~  
entry into the conduit.

Revises

☐ AE Drawing☐ CVI Document☐ Spec / Criteria

Drawing / Document No.:

INFORMATION ONLY

Revision:

3. PREPARED BY

5. CHECKED BY

6. SCALE

7. DRAWING OR DOCUMENT TITLE

*Shankar* 3/13/86

*W. S. Shuman* 3/13/86

NONE

SEALING PROCEDURE

PROCEDURE FOR SEALING CONDUIT  
ENTRY INTO ROSEMOUNT MODEL  
1153 SERIES B PRESSURE TRANSMITTER

1. Remove cover (part 1 of Fig. 1) to allow access to wiring terminals and conduit entry cavity (Area 2 of Fig.1).
2. Prepare and apply Dow Corning 3-6548 silicone foam to fill the wire entry cavity and into the conduit entry, taking care to separate wires and providing a complete seal to the cavity walls and wire surfaces. Preparation and application of the foam material shall be carried out in accordance with PPM 102923.
2. After foam has fully cured, replace seal ring (part 3 of Fig. 1) and replace cover.

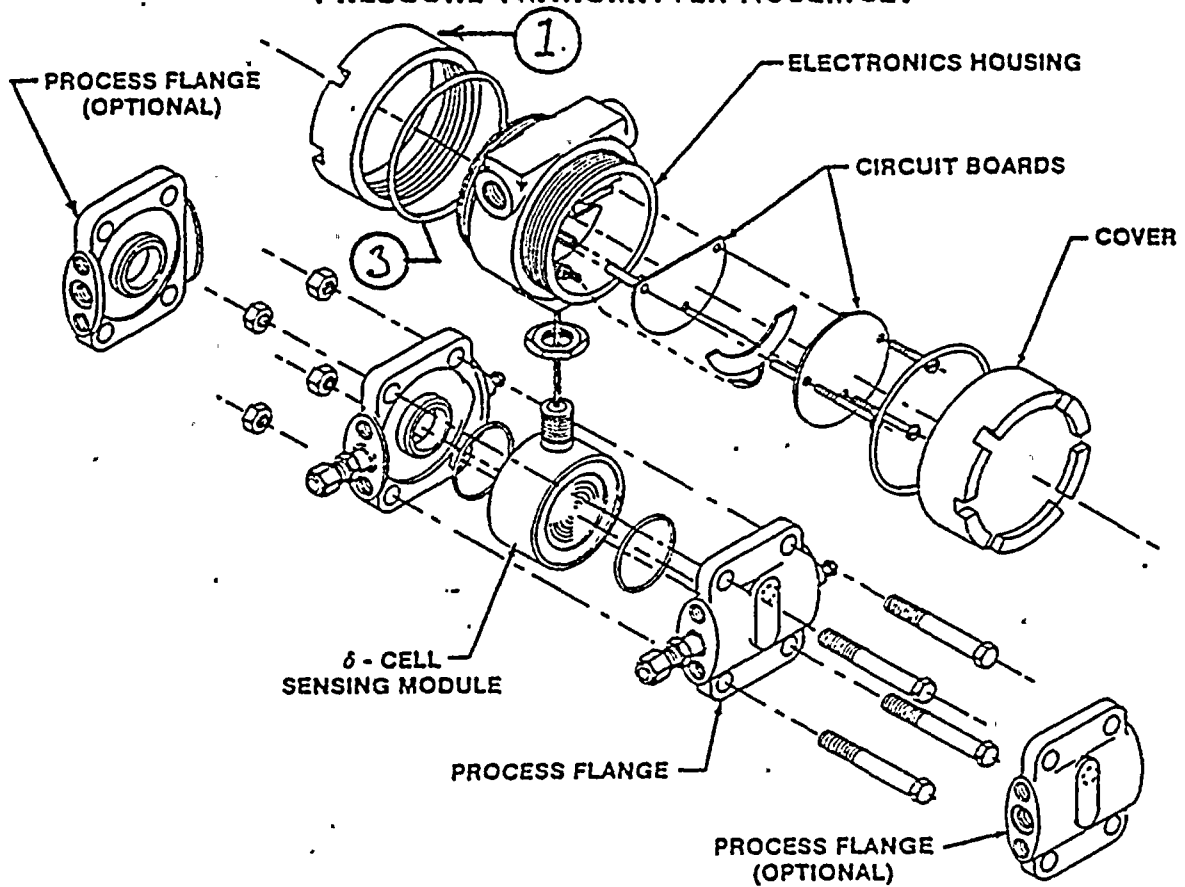
Ed. S. Robinson / 3/13/86  
EQG ENG. DATE

Thomas P. White / 3/13/86  
IIC ENG. DATE

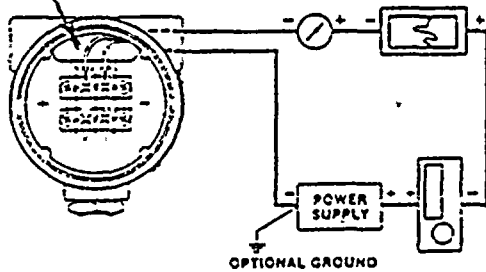




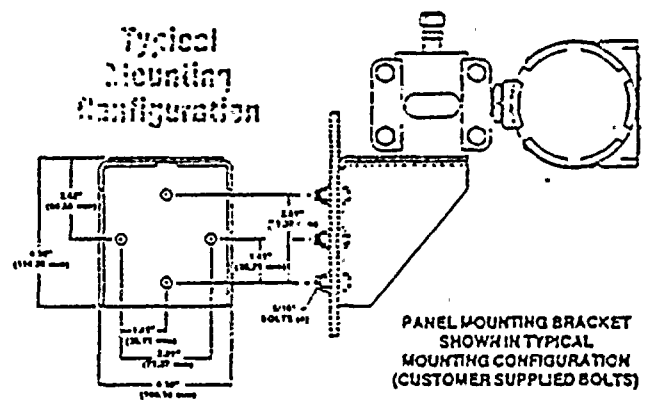
# TYPICAL MODEL 1153 SERIES 3 PRESSURE TRANSMITTER ASSEMBLY



## 2. Wiring Connections



## Typical Mounting Configuration



## Electrical Block Diagram

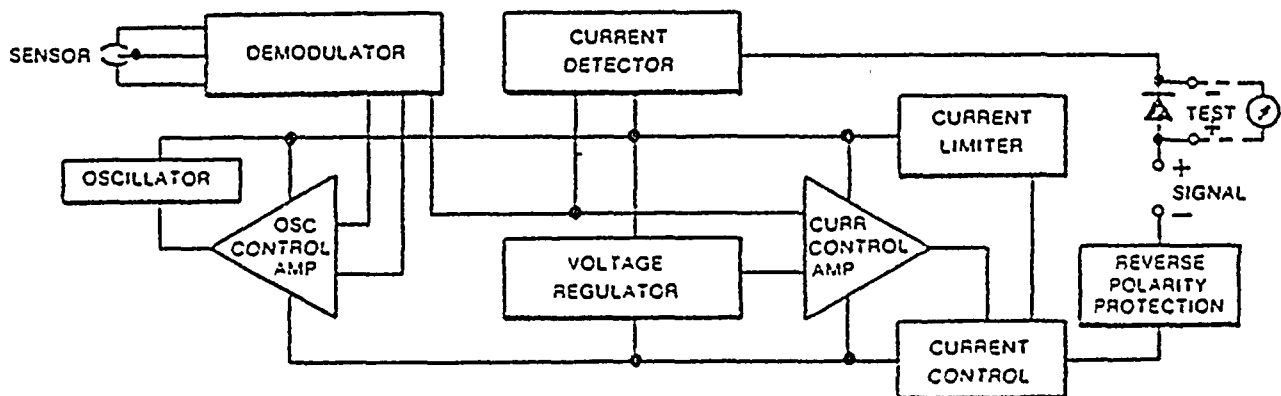


FIGURE 1

Priority 1

WNP-2

GENERATION ENGINEERING

TO Document Control  
FROM Engineering

TRANSMITTAL NO. 3676  
DATE 4-8-86

DOCUMENT BEING TRANSMITTED 86-0101-0A

\*\*\*\*\*

<u>Responds To:</u>	<u>Reference Doc.:</u>	<u>Advance Info For:</u>
<u>PMR 86-0101</u>	<u><del>PMR</del></u>	
<u>FCR 86-047</u>	<u>DCP 86-0106-0A</u>	

\*\*\*\*\*

DOCUMENT RECEIPT ACKNOWLEDGEMENT

Signature \_\_\_\_\_ Date \_\_\_\_\_

\*\*\*\*\*

WNP-2 Document Control is requested to make the following distribution of the issued Design Change Package (DCP)

L. Barndt	(1)	-	1020 (EOF)
D. Densley	(2)	-	981D
C. Hexum	(1)	-	994E
J. Weil	(2)	-	988U
KA Willoughby	(1)	-	964N
Design/Drafting	(1)	-	965 (UE/C)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\*\*\*\*\*



## VITAL WORK REQUEST

PMR-02-86-0101-C

EST NO.

207320

NWE NO.

AVCS

ESTIMATE NO.

ELECT-SCHED-1

INITIATING DOCUMENT

EOP 86-067X

EQUIPMENT DESCRIPTION/LOCATION

Rosemont transmitters conduit sealing

PROBLEM/WORK INSTRUCTIONS

EPN	Loc.	EPN	LOC
CMS-LT-1	R465 (J5/4.3)	REA-DPT-1A1	R572/H
CMS-LT-2	R464 (M2/7.7)	REA-DPT-1A3	1 (G)
HPCS-FT-5	R471 (H22-P024)	REA-DPT-1A2	↓ (G)
LPCS-FT-3	R471 (H22-P001)		
MS-LT-26A	R522 (H22-P004)		
MS-PT-51A	↓		
MS-LT-26D	R522 (H22-P027)		
MS-PT-51B	↓		
RHR-FT-15A	R501 (H22-P018)		
RHR-FT-15B	R501 (H22-P021)		
RHR-FT-15C	R501		
CIA-PT-21A	R548 (IR67)		
CTA-PT-21B	R548 (IR68)		

RECEIVED

MAR 21 1986

WHD-2 ODS FILE

PROCEDURE NO.

ASME

☐ YES☒ NO

SAFETY RELATED

☒ YES☐ NO

FIRE PROTECTION PERMIT

☐ YES☒ NO

NUMBER

CONFINED SPACE WORK PERMIT

☐ YES☒ NO

NUMBER

CLEARANCE ORDER

☐ YES☒ NO

NUMBER

RADIATION WORK PERMIT

☐ YES☒ NO

NUMBER

PLANT CONDITIONS

1,2,3,4,5,6,7,8,9

SYSTEM

1,2,3

COMPONENT

1,2,3,4,5,6

LEAKAGE RELATED

☐ YES☒ NO

QUALITY CLASS

I,II,G

QC NOTIFIED

NAME

TIME / DATE

T. S. REQUIREMENTS

☐ YES☒ NO

NFRDS (MAINT Y/B)

☐ YES☒ NO

SHIFT MGR

NAME

DATE/TIME

WORK PERFORMED

Applied foam to fill cavities in Rosemont

Transmitters, conduit in first terminal box  
or conduit on outside end of plot,  
according to Engineers Inst. & PMR 0.27

Torqued Covers to 200 lbs

PARTS/MATERIAL USED? ☒ YES ☐ NO; If YES, List parts and accept Tag/PR/PO No: 73668

COMPLETED BY

DATE/TIME

REVIEWED BY

II



# MAINTENANCE WORK REQUEST

PMR-02-86-0101-0

(CONTINUATION SHEET)

PAGE

2 OF 3

0570

Seal Conduit on Rosemount Transmitters using Dow Corning 3-654P silicone foam to fill with entire cavity and into the conduit entry RTV Foam to form water tight seals for maintenance of environmental qualification

Seals to be installed without determination of wiring

1. Remove cover on terminal block side of Rosemount transmitter (side is labeled)
2. Remove plug from the unused conduit port if necessary
3. Dam the conduit. Prepare and apply Silicone foam to fill the wire cavity and into the conduit entry, taking care to separate wires and providing a complete seal to the cavity walls and wire serving

Preparation and application of the foam shall be carried out in accordance with PPM 10.29.23.

4. After silicone foam has fully cured install seal ring and torque cover to 200 in lbs

## SPARE PARTS/MATERIAL

NO. USED	MATERIAL CODE	NO. USED	MATERIAL CODE	NO. USED	MATERIAL





# MAINTENANCE WORK REQUEST

(CONTINUATION SHEET)

PMR-02-86-D101

0570

PAGE

OF

5. - On all instruments except CIA-PT-1  
 & 31B removal of seal light covering  
 just above instrument conduit  
 connection to provide drainage.  
 All Pressure Transmitters except PTA-PT-1  
 - On PTA-PT-31B  
 and PTA-PT-31B  
 Sample flow carrying  
 Solingno Idm in the conduit at  
 the first terminal box or cable tray  
 entry into the conduit

## SPARE PARTS/MATERIAL

NO. USED	MATERIAL CODE	NO. USED	MATERIAL CODE	NO. USED	MATERIAL CODE



#### POTENTIAL ENFORCEMENT/UNRESOLVED ITEM (LIMITORQUE)

2. Contrary to paragraphs (f) and (k) of 10 CFR 50.49 and section 5.0 of NUREG-0588 Category II, at the time of the inspection, WPPSS's files did not adequately document qualification of Limitorque operators because various internal parts and materials and installation features had not been identified and documented to be qualified. (Paragraph 4.D.(2), Item 50-397/86-12-2.)

#### NRC AUDIT REPORT DISCUSSION

Limitorque operators, QID file 221001 - IE Information Notices 83-72 and 86-03 called attention to numerous qualification problems involving parts and materials used in Limitorque operators. Late in 1985 WPPSS began planning walkdown inspection of Limitorque operators as part of their Integrated Limitorque Qualification Program (ILQP). A comprehensive listing was made of all known or suspected concerns, and binders were assembled to collect walkdown findings and records of corrective actions. The first inspection in the WPPSS ILQP took place on March 28, 1986 during the first refueling outage of WNP-2. An April 15, 1986 NCR documented deficiencies found in the first operator inspected, RHR-MO-9. The deficiencies listed include incorrect lubricant type, motor orientation, absence of T drains, unidentified/unqualified splices on power and control wiring, and a grease relief valve shipping cap left in place. The "Not Reportable" block on the NCR was marked.

The licensee stated that the nonreportable determination was based on the availability of alternate equipment. Upon questioning, the licensee also stated that no further NCR's would be issued until the ILQP walkdowns and evaluation were completed. Thus, any consideration of reportability involving more than just one operator was deferred until a complete evaluation was performed.

At the time of the NRC inspection, the licensee stated that the outside containment operators in the ILQP had been walked down, and about 30 percent of those in the reactor building. Although the licensee declined to provide a commitment date for completing the walkdown, agreement was reached that the hardware would be in a qualified configuration prior to restart.

NRC review of walkdown sheets for the first eight Limitorque operators examined by WPPSS in the ILQP showed the following deficiencies:

- a. T drains not installed in several units.
- b. Gear grease not sampled in two or more units.
- c. Gear grease sampled, but not identified, in four units.



- d. Limit switch cover gasket material not identified in two or more units.
- e. Limit switch gear housing material not determined in one unit.
- f. Improper orientation of drain plugs in one or more units would not permit drainage of motor housing.

The NRC inspection team's walkdown of six Limitorque operators identified the following deficiencies:

- a. The motor nameplate for RWCU-MO-1 shows 40 ft.-lb. starting torque, vs. 25 ft.-lb. on the ILQP walkdown sheet.
- b. Several wires on the limit switch finger board of RCIC-MO-76 had stripped, stretched, and/or frayed insulation in close proximity to the switch compartment cover.
- c. A thin film of oil on the bottom of the RCIC-MO-8 switch compartment cover indicated grease leakage around the switch seals.
- d. Unidentified tape splices with no qualification documentation were typically found on the motor leads inside the limit switch compartment.

Additionally, the review of the QID file showed that it did not contain sufficient information to establish similarity between the plant equipment and test specimens for each model reviewed. Limitorque operators constitute Potential Enforcement/Unresolved Item 50-397/86-12-2.

#### SUPPLY SYSTEM RESPONSE

Prior to 1986, the Supply System had established qualification of all 147 safety related Limitorque motor operators with qualification documentation which relied on Limitorque documents and field walkdown to verify installed configuration. The Supply System has a documented program to review IE Notices. In addition, the Supply System is an active participant in the Nuclear Utility Group on Equipment Qualification. From these sources, the Supply System became aware of concerns



regarding the qualification of Limitorque internal subcomponents. The need to perform a detailed examination of Limitorque subcomponents crystallized with IE Notice 86-03, dated January 14, 1986. A program to examine Limitorque motor operators at WNP-2 and correct any deficiencies was planned. The program included evaluating the scope of investigation, establishing inspection criteria, determining the need to include investigation of other Limitorque issues, establishing materials procurement requirements, training of inspectors, discussions with craft, and review of records. The planning resulted in inspections being conducted about 60 days after receipt of the 1986 I&E notice. This also coincided with the start of the first refueling outage of WNP-2. A detailed chronology is attached. The events presented represent appropriate timeliness and effort for the problem as it evolved.

The program, called Integrated Limitorque Qualification Program, first reexamined all sources describing potential problems which might be found. This assisted in training technicians and in anticipating material requirements. As described in the NRC Audit report, the first motor operator was examined on March 28, 1986. The results were evaluated and an NCR completed on April 15, 1986. The NCR was evaluated as not reportable. The ILQP was completed on all 147 Safety-Related motor operators prior to the end of the outage. The NCR was reevaluated and deemed reportable, and reported on July 2, 1986, by LER 86-019. The Supply System believes that NCR #286-132, dated April 15, 1986, identified the need for





corrective action on internal components to one Limitorque operator and called for inspections to determine if other operators were in need of similar actions. The ensuing ILQP covers resolution of the issues for all Limitorque operators located in potential harsh environments at WNP-2. We conclude that if the concern raised by Item 50-397/86-12-2 is regarded as a violation, that a Notice of Violation should not be issued under the self identification and correction provision of 10CFR Part 2, Appendix C, Section IV.

#### SAFETY SIGNIFICANCE

The Supply System corrected all of the concerns associated with the Limitorque operators discovered during the walkdown and prior to starting up from the outage. As detailed in LER 86-019, we consider the discrepancies corrected as having little safety significance in the time frame prior to the outage.

### Limatorque Motor Operator Chronology

11/15/85 NRC issues draft EQ inspection modules to the Regions. Checklist for valve motor operators at page 17 does not mention terminal blocks, wiring material, or any other internals.

01/03/86 Nuclear Utility Group on Equipment Qualification (NUGEQ) consultant issues memorandum describing status of Limatorque issues.

01/14/86 NUGEQ Steering Committee discusses contacting Limatorque for clarification of all issues which might raise questions of Limatorque qualification.

01/15/86 NRC issues IE Notice 86-03 regarding Limatorque wires.

01/27/86 NUGEQ consultant sends group members extensive packages regarding Limatorque qualification.

02/11/86 NUGEQ directs Steering Committee to proceed with a meeting with Limatorque.

02/24/86 Supply System has Impell perform special review to independently assure that all issues are being considered.

03/06/86 Supply System management directs Engineering to prepare to perform an Integrated Limatorque Qualification Program (ILQP) at refueling outage. Maintenance authorized to expand craft forces to perform the inspection.

03/11/86 NUGEQ status letter on plan to meet with Limatorque.

03/20/86 NUGEQ members met with Limatorque to discuss various qualification issues.

03/28/86 Supply System begins inspection program and performs corrective action on Limatorque operators. Walkdown data questions and potential corrective actions based upon ILQP issues list.

04/29/86 NUGEQ issues draft Limatorque report.

06/03/86 POC decides to complete work on all Limatorques prior to end of outage (only 3 remained to be worked).

06/07/86 Final completion of work on all Limatorques.

07/02/86 LER 86-019 issued.



### POTENTIAL ENFORCEMENT/UNRESOLVED ITEM (ROCKBESTOS)

3. Contrary to paragraphs (f) and (k) of 10 CFR 50.49 and section 5.0 of NUREG-0588 Category II, WPPSS's files did not adequately document qualification of two types of Rockbestos cable because documentation of qualification of type 780 polyethylene compound was not available. (Paragraph 4.D.(3), Item 50-397/86-12-3.)

### NRC AUDIT REPORT DISCUSSION

Rockbestos cable, QID file 036003 - The qualification criterion for this file was NUREG-0588 Category II. The file did not contain any performance/acceptance criteria or functional analysis, nor was there any indication that current-produced heating of the cable had been considered in the determination of service temperature. A revision to the file incorporating discussions of these two items was in progress at the close of the inspection. WPPSS personnel had determined that cable in primary containment consisted of second generation Series 100 coax, power and control cable formulated with 760D and 760G, and two conductors formulated with 780. Qualification was established for the coax and 760 formulations with vendor supplied test reports. The test report referenced for the 780 formulation was one identified in IN 84-44 and, therefore, did not support qualification. WPPSS was attempting to obtain a report from TVA which they feel will qualify the 780 formulation. Rockbestos cable constitutes Potential Enforcement/Unresolved Item 50-397/86-12-3.

### SUPPLY SYSTEM RESPONSE

Environmental qualification of Rockbestos Cable is a well known issue. Rockbestos' testing of their cable was called into question following NRC inspections which included evaluation of Rockbestos environmental qualification testing. This deficiency was documented in IE Notice 84-44, dated June 8, 1984. Rockbestos responded with a testing program to establish long term qualification of each cable type currently produced by Rockbestos. Final Rockbestos reports were dated November 11, 1985, November 12, 1985, and March 12, 1986 for chemically cured, irradiation cured and coaxial cables, respectively.



Rockbestos also responded to the NRC's inspection reports and IE Notice by justifying their cables' capability to perform based on correlations between the flawed Rockbestos testing and testing performed by others. These justifications were accepted by the NRC as adequate interim qualification. At the time of the NRC audit in April 1986, the Supply System had incorporated the final Rockbestos reports and with Rockbestos' assistance, documented the similarity between all Supply System cable insulation and the Rockbestos tests except one wire in each of two cable types with the insulation material formulation KXL-780. The similarity between KXL-780 and the tested KXL-760 material was open at the time of the audit. This open issue was explicitly recognized in the Supply System documentation. Because of this open issue, the interim qualification documentation was still being maintained as part of the overall qualification package. Additionally, procurement had begun to obtain a TVA report which would complete qualification documentation for the KXL-780 compound. This report has now been obtained, the file amended, and the documentation deficiency closed. In addition, we have since received the Rockbestos similarity evaluation which establishes that the test of the KXL-760 material formulation qualifies the KXL-780 (attached).

SIMILARITY ANALYSISOFKXL-780, KXL-760-5, KXL-760 AND KXL-760-D

REV.	BY/DATE	APP./DATE	APP./DATE
0 7/31/86	<i>Stephen H. Giff</i> 7/31/86	<i>R. J. L. Lunn</i> 7/31/86	<i>B. M. L.</i> 7/31/86





SIMILARITY ANALYSIS OF KXL-780, KXL760-5, KXL760 AND KXL-760-D

The Rockbestos Company has used four slightly different formulations of its chemically cross-linked primary insulation material in Firewall III constructions. Some of these were tested prior to 1984 in qualification tests which were the subject of US NRC IE Information Notice 84-44. The material in current use, designated KXL-760-D, was requalified by Rockbestos Qualification Report #QR-5804 in 1985, testing for which was done under tight QA control and was periodically monitored by the NRC. Rockbestos has completed a series of tests to determine whether the four materials are sufficiently similar that LOCA test results for one are applicable to all. The tests were performed in accordance with Rockbestos Test Plan #TP-6801. This report presents a summary of the results of these tests and conclusions based thereon.

Cable Descriptions

Cable A: 3/C #16 AWG Firewall III with KXL-780 as primary insulation  
Cable B: 3/C # 4 AWG Firewall III with KXL-780 as primary insulation  
Cable C: 7/C #12 AWG Firewall III with KXL-760-5 as primary insulation  
Cable D: 5/C #12 AWG Firewall III with KXL-760 as primary insulation  
Cable E: 7/C #14 AWG Firewall III with KXL-760-D as primary insulation

All cables except cable "E" were manufactured in 1977 and supplied by Sacramento Municipal Utility District. Cable "E" was randomly selected from stock.

Tests Before Conditioning

Two samples from each cable were tested for flammability per ICEA S-19-81, Para. 6.19.6. All passed this test. Two samples from each cable were tested for tensile strength and elongation per ICEA S-66-524, Para. 6.4.11. Six measurements of each were taken. Averages of these results are listed as "as received" values in Tables I and II. They show all cables met the ICEA standard of 275% elongation at rupture and all but cable "A" met the ICEA standard of 1800 lb./in<sup>2</sup> tensile strength. It is clear that all values are in the same range inasmuch as there is nearly as much variation in the values for the two samples incorporating KXL-780 (Cables A and B) as in the values for cables made from materials with different designations.

Conditioning

Samples from each cable were placed on a mandrel in an air-circulating oven and maintained at a temperature of 121°C for 168 hours. Other samples underwent radiation conditioning - one sample from each cable being subjected to 50 megarads, another to 100 megarads, another to 150 megarads and another to 200 megarads. Radiation was from a gamma source, Cobalt 60, in air at a dose rate of less than 1 megarad per hour. Irradiation was performed by Isomedix, Inc., of Parsippany, NJ. No samples were exposed to both heat and radiation conditioning.



### Tests After Conditioning

All conditioned samples were tested for tensile strength and elongation per ICEA S-66-524. Three measurements of each sample were taken. Averages of these results are shown in Tables I and II. Tensile strength was not drastically affected by radiation. Cable "A" showed a significant increase in tensile strength after heat aging, but cable "B", also made with KXL-780, showed a decrease. Only cable "E" fell below the TP-6801 target of 85% of the "as received" value after heat conditioning, but even this cable exceeded the ICEA standard of 75%. The results for elongations after air-oven aging were similar to those for tensile strength. As expected, the elongations of all samples were significantly affected by radiation. All trend the same way: The elongation of each was sharply reduced by absorption of the first 50 megarads, little affected by the next 50 megarads, then greatly reduced again by the last 50 to 100 megarads, all cables retaining between 6% and 9% of their original elongations after the full 200 megarad dose.

After conditioning, all samples were tested for heat distortion for 1 hour at 121°C per ICEA S-66-524, Para.6.10.2.2. Results, shown in Table III, indicate all four insulating materials respond to conditioning similarly, and remain significantly below the ICEA limit of 30% distortion.

Heat-conditioned samples of cables "B" through "E" were subjected to an EM-60 Accelerated Water Absorption test per ICEA S-66-524, Para. 6.6.2. This test is intended by ICEA for "as made" rather than heat-conditioned samples, therefore, failure to meet criteria established for the class of insulation should not be interpreted as indicative of substandard material. Results are shown in Table IV. Dielectric constants were all between 2.25 and 2.91, capacitance increases generally were greater than ICEA standards (with exceptions) and stability factors met the ICEA standards with great margin, uniformly. The results indicate overall similarity.

### Conclusions

Rockbestos Firewall III primary insulation materials KXL-780, KXL-760-5, KXL-760 and KXL-760-D are all chemically cross-linked polyethylenes. The differences in their formulations are slight. The results of this test program demonstrate their electrical and mechanical properties to be similar both initially and after either heat conditioning or radiation conditioning. It is concluded that these materials are sufficiently similar that LOCA test results obtained using any one of these materials are completely applicable to comparable cables containing any of the other of these materials.

TABLE IA - TENSILE STRENGTH (LB/IN )

	<u>Cable A</u>	<u>KXL - 780 Cable B</u>	<u>Average</u>	<u>KXL-760-5 Cable C</u>	<u>KXL-760 Cable D</u>	<u>KXL-760-D Cable E</u>
As received	1760	2476	2118	2078	2557	2800
After:						
50 Mrad	1850	2540	2195	1857	2004	2253
100 Mrad	1901	2413	2157	2004	1975	1976
150 Mrad	1850	2413	2132	2413	1886	2011
200 Mrad	1799	2349	2074	2349	2004	1664
Heat Aging	3340	2127	2734	2741	2623	2341

TABLE IB - TENSILE STRENGTH AS PERCENT OF "AS RECEIVED" (%)

	<u>Cable A</u>	<u>KXL-780 Cable B</u>	<u>Average</u>	<u>KXL-760-5 Cable C</u>	<u>KXL-760 Cable D</u>	<u>KXL-760-D Cable E</u>
As received	100%	100%	100%	100%	100%	100%
After:						
50 Mrad	105	103	104	89	81	81
100 Mrad	108	98	102	96	79	71
150 Mrad	105	98	101	116	76	72
200 Mrad	102	95	98	113	81	59
Heat Aging	190	86	129	132	105	84

TABLE IIA - ELONGATION AT RUPTURE (%)

	<u>Cable A</u>	<u>KXL-780 Cable B</u>	<u>Average</u>	<u>KXL-760-5 Cable C</u>	<u>KXL-760 Cable D</u>	<u>KXL-760-D Cable E</u>
As received	286	378	332	379	454	425
After:						
50 Mrad	93	77	85	92	105	102
100 Mrad	108	95	102	113	100	87
150 Mrad	60	80	70	80	48	68
200 Mrad	23	33	28	33	40	27
Heat Aging	462	273	368	400	443	373

TABLE IIB - ELONGATION AT RUPTURE AS PERCENT OF "AS RECEIVED" (%)

	<u>Cable A</u>	<u>KXL-780 Cable B</u>	<u>Average</u>	<u>KXL-760-5 Cable C</u>	<u>KXL-760 Cable D</u>	<u>KXL-760-D Cable E</u>
As received	100%	100%	100%	100%	100%	100%
After:						
50 Mrad	33	20	26	24	23	24
100 Mrad	38	25	31	30	22	21
150 Mrad	21	21	21	21	11	16
200 Mrad	8	9	8	9	9	6
Heat Aging	162	72	111	106	98	88



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TABLE III - HEAT DISTORTION - ABSOLUTE (%)

	<u>Cable A</u>	<u>KXL-780 Cable B</u>	<u>Average</u>	<u>KXL-760-5 Cable C</u>	<u>KXL-760 Cable D</u>	<u>KXL-760-D Cable E</u>
After:						
50 Mrad	11.67	0	5.84	1.54	1.59	3.08
100 Mrad	7.63	0	3.82	1.54	3.13	3.17
150 Mrad	7.63	0	3.82	0	1.59	1.59
200 Mrad	5.84	0	2.92	0	3.13	1.64
Heat Aging	22.90	7.95	15.43	8.47	20.63	20.63

TABLE IV EM-60 Accelerated Water Absorption (Aged Samples)

	<u>B (780)</u>	<u>C (760-5)</u>	<u>D (760)</u>	<u>E (760-D)</u>
Dielectric Constant after 1 Day	2.253	2.905	2.594	2.602
Capacitance Increase 1 to 14 Days	3.14%	3.47%	5.02%	1.73%
Capacitance Increase 7 to 14 Days	1.18%	1.81%	1.92%	.08%
Stability Factor after 14 Days	.06	.07	.10	0.0
Alt. to Stability Factor (1 to 14)	.04	.03	.03	-.01

The following equipment was used in this test:

Partlow Model RFT Temperature Recorder, Serial #7176859

Leads & Northrup H.V. Schering Bridge, Serial #1650917

Hipotronics Model 710-1 A.C. Test Set, Serial #7962-00

Randall Stickney Heat Distortion Gage, Serial #29116

Randall Stickney Gage Weights, Serial #37425A

Junghaus Timer, Serial #607

Omega Model 881C Digital Multimeter, Serial #139310

Instron Tensile Tester, Model 1130, Serial #2046

Calibration records and accuracies for these instruments are appended.





1. The first part of the report is a summary of the work done during the year.

2. The second part is a detailed account of the work done during the year.

3.

4. The third part is a summary of the work done during the year.

5. The fourth part is a summary of the work done during the year.

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7. The fifth part is a summary of the work done during the year.

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9. The sixth part is a summary of the work done during the year.

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11. The seventh part is a summary of the work done during the year.

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**NEW HAVEN, CONNECTICUT 06504 USA    TELEPHONE: (203) 772-2250    TELEX: 710-465-2149**

[illegible]





HiPotronics AC DC  
kilovoltmeter model #50  
serial # 5000-1051

Remarks: Left as found  
next due 1/18/7

Q. NO.	TEST VALUE	DIFFER. FROM STD.	% ERROR	Q. NO.	TEST VALUE	DIFFER. FROM STD.	% ERROR
4	0.5KV	.1	4%				
9	1KV	.1	4%				
14	1.5KV	.1	4%				
19	2KV	.1	4%				
24	2.5KV	.1	4%				
29	1KV	.1	2%				
195	2KV	.05	1%				
3	3KV	0	0				
4	4KV	0	0				
5.05	5KV	.05	1%				
185	2KV	.15	1.5%				
4	4KV	0	0				
61	6KV	.1	1%				
85	8KV	.15	1.5%				
10	10KV	0	0				





THE ROCKBESTOS COMPANY

**NEW HAVEN, CONNECTICUT 06504 USA    TELEPHONE: (203) 772-2250    TELEX: 710-465-2149**

alibrated

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quipment:

**manufacturer:**

odel:

Serial #:

IC #:

**:a1c:**

Location:

**Standards Used:**

RWC-1 Starratt Weber-  
gage blocks

12/2/85

Date \_\_\_\_\_

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% Maximum Measured Error

Remarks:

Left as found

next due 12/86

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# THE ROCKBESTOS COMPANY

**NEW HAVEN, CONNECTICUT 06504 USA TELEPHONE: (203) 772-2250 TELEX: 710-465-2149**

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**equipment:**

**manufacturer:**

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serial #:

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>cation:

**Standards Used:**

Remarks:

### % Maximum Allowable Error

### 2 Maximum Measured Error

Remarks: The 85 gr weight  
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when used with a dial  
micrometer  $\pm 5\%$  left  
as found. Next due  
5/87. Procedure # 24

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**NEW HAVEN, CONNECTICUT 06504 USA    TELEPHONE: (203) 772-2250    TELEX: 710-465-2149**

**TELEX: 710-465-2149**

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THE ROCKBESTOS COMPANY

**NEW HAVEN, CONNECTICUT 06504 USA    TELEPHONE: (203) 772-2250    TELEX: 710-465-2149**

1- در صورتی که

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equipment: Digital Multimeter  
manufacturer: Omega

odel: 881C

serial #: 139310

HC #: \_\_\_\_\_

name: Matti

Location: Lab

### Standards Used:

Shallcross Decade Resistance

Box S/N 14501

Distilled ice bath

30:1500 distilled water

Picturen Megohm Resistor - 5.3104 M

## Resistance

Temp. of sound

[illegible]









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THE ROCKBESTOS COMPANY

**NEW HAVEN, CONNECTICUT 06504 USA    TELEPHONE: (203) 772-2250    TELEX: 710-465-2149**

ated  
y:

equipment: Tensile Tester

Manufacturer: Easton

Label: 11.30

Serial #: 2046

MC #: \_\_\_\_\_

sale: 10/20/50/100 % off load

Location: K&D Lab

**Standards Used:**

Dillon Dynamometer

S/N AP3771

3/10/86

**Date**

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% Maximum Allowable Error

Q.5

% Maximum Measured Error	Full range of load cell
0.00	
0.01	
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Remarks:

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calibration, calibrated

for 1000 lbs. Next

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100 lb load cell

2000 16 bud cell

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#### POTENTIAL ENFORCEMENT/UNRESOLVED ITEM (WESTINGHOUSE LOW VOLTAGE EPA'S)

4. Contrary to paragraphs (f) and (k) of 10 CFR 50.49 and section 1.4 of NUREG-0588 Category II, WPPSS's files did not adequately establish qualification of Westinghouse low voltage containment penetrations because the plant total integrated radiation dose (TID) was not enveloped by referenced test conditions. (Paragraph 4.D.(4), Item 50-397/86-12-4.)

#### DISCUSSION

Westinghouse low voltage containment penetrations, QID file 382003 -The qualification criterion for this file was NUREG-0588 Category II. Separate test reports covering the low voltage penetration, the medium voltage penetration, and a materials study were included in the file. The total integrated radiation dose of  $3.3\text{E}+07$  rads in the low voltage penetration test report was not sufficient to envelope the stated requirement of  $7\text{E}+07$  rads. A test report on the low voltage penetration from WNP Units 3 & 5 did envelope the Unit TID, and will be added to the file. Westinghouse low voltage containment penetrations constitute Potential Enforcement/Unresolved Item 50-397/86-12-4.

#### SUPPLY SYSTEM RESPONSE

The qualification file associated with the Staff's concern, QID file 382003, states at paragraph 6.5, "Test Sequence Evaluation for Low Voltage Penetrations," that the sequential irradiation testing alone "was not adequate to envelope the TID (Total Integrated Dose) of  $7.0\text{E}+07$ ." A Westinghouse document PEN-TR-81-58, was referenced in the file as providing "separate effects testing" which established the materials qualification capability of  $1.2\text{E}+08$  rads. In short, the body of the qualification file correctly stated that supplemental separate material effects testing in conjunction with partial type testing was used to establish qualification to the appropriate radiation envelope. (It should be noted that 10CFR50.49, Section (f)4 allows partial type testing supplemented by analysis). Although this



information was omitted on the summary sheet, it was correctly delineated in the body of the QID file and not brought to the attention of the inspector at the time of the inspection.

The adequacy of the methodology specified in the Westinghouse Report was subsequently confirmed by another Westinghouse Report, PEN-TR-81-49, which qualified the low voltage penetrations by sequential type testing to a radiation level of  $1.1\text{E}+08$  rads (Total Integrated Dose) prior to LOCA testing. The Westinghouse Report has now been inserted in the primary file. In summary, the Supply System maintains that the typographical error to correctly transpose the qualification method from the body of the analysis to the summary sheet does not constitute a violation pursuant to 10CFR50.49.



#### POTENTIAL ENFORCEMENT/UNRESOLVED ITEM (PROCEDURES)

5. Contrary to Criterion V of Appendix B to 10 CFR 50, WPPSS did not adequately implement procedures and instructions for the qualification documentation of component installations of the following equipment:
- a. Victoreen high range radiation monitor, documentation
  - b. Conax connectors for HRRM, documentation
  - c. Barber Coleman motor, documentation
  - d. Rosemount 1151 transmitter, installation and non-EQ-file documentation and instructions

(Paragraph 4.D.(5), Item 50-397/86-12-5.)

#### NRC AUDIT REPORT DISCUSSION

##### Procedural Deficiencies

The Victoreen high range radiation monitor, its Conax connectors, and the Barber Coleman motor are all R.G. 1.97 items not required to be qualified until the end of the first refueling outage. However, all three files were complete and signed off, and the equipment shown on the Master List as qualified. These three component types are combined with the procedural aspects of the Rosemount 1151 transmitters discussed in section 4.D.(1) above to form an Appendix B violation constituting Potential Enforcement/ unresolved Item 50-397/86-12-5.

- (a) Victoreen high range radiation monitor, QID file 27707 - The qualification criterion for this file was 10 CFR 50.49. Qualification was established with a vendor supplied test report for Victoreen Model 875 which includes the detector Part No. 877-1 listed on the SCEW sheet. Two file deficiencies were identified. First, the test report gave the accuracy established by the LOCA test; however, the file did not contain a statement of performance/acceptance criteria or functional analysis. Secondly, Section 6.1 and QRMS Section 2.0 of the file indicated that the vendor-supplied sealed conduit system was not used. Photographs from the WPPSS walkdown, comments by WPPSS personnel, and the inspection walkdown all established that the system was used. The file was revised during the inspection to remove these discrepancies.
- (b) Conax connectors for HRRM, QID file 049008 - The qualification criterion for this file was 10 CFR 50.49. The test report used in the file had aging data for 3 years. An aging analysis was performed on the test profile to determine an equivalent life at 150°C. Then equivalent time for the accident and margin was subtracted from the total and a life of 23 years was claimed. This analysis

is unacceptable for 10 CFR 50.49, which requires in paragraph (e)(5) that equipment qualified by test must be preconditioned by aging; that is, the aging must precede the LOCA test, rather than in effect follow it. To address the concern, the licensee planned to change the qualification criterion to Category II of NUREG-0588 and a revised aging analysis was being prepared at the close of the inspection.

- (c) Barber Coleman motor, QID file 221002-E - The file did not contain evidence of radiation qualification for the lubricant; the motor is filled with ATS-DMET 6 oil. The licensee contacted the vendor for fluid properties, and also plans to qualify a separate oil supplier prior to restart. The file was also difficult to audit because it did not clarify that the motor would be exposed to either high temperatures or high radiation, depending on the initiating pipe break, but not both.
- (d) Rosemount 1151 transmitter CMS-LT-1 - The procedural deficiencies for the Rosemount 1151 transmitter discussed in section 4.D.(1) above are included in Potential Enforcement/Unresolved Item 50-397/86-12-5. They include failure to tag the component; modification without written procedure; failure to document the modification; failure to document or report discovery of the unqualified component installation; and failure to consider the possibility that other equipment could be similarly deficient.

#### SUPPLY SYSTEM RESPONSE

This Appendix B 10CFR Part 50 finding encompasses four unrelated concerns involving equipment qualification documentation. Three of the concerns relate to equipment which was not required to be qualified at the time of the inspection (Regulatory Guide 1.97 related equipment). Accordingly, while the Supply System has taken actions to correct the issues identified and assure that they do not pose generic concerns (discussed below), we submit that these three concerns should not subject us to enforcement action. The fourth concern relates to the Rosemount transmitter issue





which was previously addressed in an earlier discussion and determined to not reflect a qualification deficiency. (This latter concern is also addressed further below).

Of those concerns associated with Regulatory Guide 1.97 equipment, the first relates to test accuracy versus acceptable accuracy for a radiation monitor. For this same device, concerns regarding identification of the installed versus qualified conduit interface/moisture barrier and the aging analysis of the Conax connectors were expressed. Finally, for a Barber-Coleman air damper motor in an almost mild radiation environment, the Staff was concerned regarding whether the QID file ignored radiation effects on the lubricant.

At the outset, the Supply System promptly resolved all of the specific concerns regarding these issues. Further, the following generic actions are being taken:

1. Refresher training will be required of all personnel involved in the preparation, review, and approval of Environmental Qualification files.

This refresher training will focus on the following:

- a. Ensuring required accuracy for instrumentation is obtained and test results are evaluated to the required accuracy.
- b. Ensuring installed configuration of equipment is similar to tested configuration, and where differences exist, supplemental analysis/testing has been accomplished to justify the differences.

- c. Ensuring the methods used to address aging prior to accident testing are acceptable.
  - d. Ensuring when material analysis is used to address subcomponent's sensitivity to aging and radiation effects, that all critical components of the equipment are addressed.
2. A review of selected QID files, where these types of documentation problems would potentially occur, will be undertaken to assure the above concerns were isolated occurrences.

The procedural concern raised by Item 5d hinges on whether the plug for the unused conduit entry needed to be controlled. Prior to the modification to provide a silicone seal, the plugs were critical and control was required. After the modification, the plugs were no longer needed to form a moisture barrier. Contrary to the NRC's position, the components were not modified without a written procedure, i.e., FCR 86-047, followed by DCP 86-0101-0A and PMR 86-0101-0 all provide documentation to support MWR AV-0570. At the time of the inspection, the equipment was in a qualified configuration with all similar equipment having been addressed. Further, as addressed fully in response to Potential Deficiency #1, above, the installed sealant rendered the presence of a plug to have no safety significance. In short, it is our opinion that this issue does not present a violation as suggested by the inspection report.



APPLICABILITY OF "NRC ENFORCEMENT  
CRITERIA FOR EQ ENFORCEMENT"

The new Staff enforcement criteria for qualification deficiencies existing before November 30, 1985, whereof a licensee clearly knew or clearly should have known before that date, is not applicable to the potential enforcement unresolved items identified in NRC Inspection 50/397/86-12. The Supply System did not clearly know that any of the deficiencies identified by the audit existed at or before November 30, 1985. Indeed, the Supply System reviewed the equipment which was required to be environmentally qualified and declared that that scope of equipment had been qualified by November 30, 1985 (see letter G02-85-881, G.C. Sorensen to E.G. Adensam, subject "Equipment Qualification," dated December 30, 1985). Whether the Supply System clearly should have known that any of the equipment deficiencies identified in the audit existed at or before November 30, 1985, is addressed below for each concern:

1. With respect to the Rosemount transmitters and the need for a metal plug in the spare cable entrance hub:

As previously noted, the Supply System maintains that a qualified condition existed at the time of inspection and, therefore, no deficiency existed. Therefore, the policy is not applicable.



## 2. Internal Wiring of Limitorque Motor Operators:

The initial Staff notification of possible concerns related to Limitorque motor operator internal wiring was issued in 1983 (I&E Information Notice 83-72). In response to the information notice, the Supply System received assurance from Limitorque that the concern expressed in the notice did not apply to the Supply System and that Limitorque did not recommend that any corrective action be taken as a result of this information notice. Following issuance of the 1983 notice, the Supply System closely monitored Staff review of qualification programs, NTOL audits, and operating reactor equipment qualification inspections. Significantly, no additional concerns regarding Limitorque were raised by the Staff, other Licensees, or vendors (including Limitorque) regarding this issue until late 1985.

The Supply System was made aware of a broader potential problem regarding this issue in late 1985 as a result of its association with the Nuclear Utility Equipment Qualification Group (Group). In response to information provided by its Group members, in December 1985, the Group took aggressive and timely action to determine from Limitorque and affected licensees if a problem existed, and if so, the extent of the problem. The Staff did not raise the possibility of a generic problem associated with the new information until January 1986, when it published I&E Information Notice 86-03.





In conclusion, in response to I&E Notice 83-72, the Supply System acted reasonably in obtaining from Limitorque assurance that the Limitorque concern raised in the information notice was not applicable to our equipment. Although the Staff was aware of the issue and was conducting extensive reviews of all licensee EQ programs and EQ audits of many NTOLs and operating plants, the Staff did not raise the issue again until late 1985 and did not provide industry notification of a generic concern until issuance of I&E Notice 86-03 in January 1986. In short, after issuance of IEN 83-72 and until issuance of IEN 86-03, the Staff's activities (which the Supply System monitored by, among other things, representation in the Group) did not call into question Limitorque's assurances provided to the Supply System as well as to the rest of the industry. Accordingly, the Supply System maintains that it acted reasonably in response to IEN 83-72 and that there is no basis for concluding that the Supply System clearly should have known, prior to November 30, 1985, that deficiencies regarding Limitorque motor operators were present at WNP-2.

3. With respect to Rockbestos cable:

As described earlier, the Supply System received the New Rockbestos Qualification reports for Firewall III cable in November 1985. Our November 30, 1985 status of qualification was based on the new test



reports and Rockbestos' assurance that the reports encompassed all the insulation materials and cable configurations used at WNP-2, except for specialty coaxial cable. The coaxial cable was used only on Regulatory Guide 1.97 instrumentation. The schedule for this cable was set by a WNP-2 license condition to be completed prior to restart following the first refueling outage, in the Spring of 1986. At this point, we did not clearly know a deficiency existed nor should we have known that a deficiency existed. The discovery of a potential deficiency occurred during a review of cable pull records and material lot certification reports. The WNP-2 certification data supplied by Rockbestos indexed against material lot numbers not material formulation codes. The new test reports identified only the material formulation code (i.e., KXC-760, etc.). We, therefore, initiated an activity to obtain a cross reference from Rockbestos between the material lot numbers and the material formulation used in each lot of cable produced for WNP-2. In a letter, dated March 10, 1986, Rockbestos informed the Supply System that a material formulation, KXL 780, was used in Shop Order 91003-09. Further investigation revealed that one conductor of two multi-conductor cable types had the KXL 780 material formulation. At this point, Rockbestos could only offer us the old QR 1807 test report which was rejected by the NRC in IEN 84-44. They did inform us that TVA had conducted successful tests on the KXL 780 formulation. Rockbestos was, at this time, performing a similarity evaluation between the four slightly different formulations used to manufacture the Firewall III cable.



Two courses of action were undertaken in March 1986. The first was to preserve the qualification data assembled on the old Rockbestos reports and an interim justification to justify continued operation supported by the procurement of the successful test report from TVA. The second was to await Rockbestos' formal similarity evaluation of the KXL 780 material formulation with the tested KXL 760 initial formulation. At the time of the NRC audit, only the interim qualification data was available.

We have since, received both the test data from TVA testing of the KXL 780 material, and the final similarity evaluation by Rockbestos which establishes KXL 780 qualification by the new test reports. Rockbestos now states that the KXL 780 insulation material is covered by the new test reports provided to us in November 1985.

As the exact formulation used for producing the Firewall III cable for WNP-2 was not known by the Supply System; and, that to the best of our ability, the Supply System believed that the reports received in November 1985, covered the WNP-2 cable (this belief has now been confirmed by Rockbestos' similarity evaluation), we believe that applying the New Enforcement Criteria in this case is inappropriate.



4. With respect to Westinghouse low voltage penetrations:

The error identified by the NRC auditor was characterized as not adequately establishing radiation qualification as the tested level of  $4.5 \times 10^7$  rads did not envelope the required level of  $7 \times 10^7$  rads. The Supply System failed to bring to the auditor's attention that Section 6.5 of the QID file addressed this condition and referenced another Westinghouse Report PEN-TR-81-58 which provided material analysis to justify a  $1.2 \times 10^8$  level. At most, the Staff's concern was simply an editorial error on the summary sheet which stated sequential testing as the methodology employed and omitted the supplemental material analysis referenced in the body of the file. This methodology is acceptable for establishing qualification (see (f)4 of 10CFR 50.49) and was further substantiated by a later test report on the low voltage penetration which exposed the penetration to  $1.1 \times 10^8$  rads prior to the LOCA test. Report PEN-TR-81-49 contains this information and has been added to the QID file. In short, the Supply System maintains that this concern does not constitute a violation of 10CFR50.49 and has no safety significance. Accordingly, the new EQ Enforcement Policy is not applicable.

5. With respect to Item 50-397/86-12-5 regarding implementation of procedures to document qualification of equipment and implementation of





procedures regarding installation and documentation of installation of a Rosemount level transmitter:

This unresolved item is identified as an Appendix B item in the inspection report, not as a 10CFR50.49 deficiency and is, therefore, not within the scope of the special enforcement policy. In any event, as noted above, the Supply System maintains that no deficiency existed on November 30, 1985, to invoke this special policy.

#### CONCLUSION

In conclusion, the five potential deficiencies identified in Audit 86-12 did not identify qualification deficiencies which the Supply System clearly knew of at November 30, 1985, nor did it identify deficiencies which the Supply System clearly should have known of at that date. Therefore, these deficiencies should be evaluated for enforcement action under the Commission's Appendix to 10CFR Part 2, and not pursuant to the Commission's special EQ Enforcement Criteria.

