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QUESTION REQUEST FORM
ENVY NRC 2004 INSPECTION

REQUEST# 237 DATE 8-26-2004

NRC INSPECTOR Bower

ENVY COUNTERPART: Flynn

ENVY ASSIGNED PERSON K. Sweet

Info Request Question Potential CR

CR-VTY-2004-02741 written to include in the PM data base ^{to} this work done in the early 90's to improve the switchyard program.

QUESTION/REQUEST:

Provide copies of maintenance procedures to address to the switchyard issues identified in NRC Information Notice 91-81; Switchyard problems that contribute to loss of offsite power.

LIST OF ATTACHMENTS:

- 1) Battery Chargers and Batteries: PM Basis: E087 & E093, Proc OP 4210 & OP 5247
- 2) Switchyard Protective Relays: PM Basis E044, Proc RP 5226, OP 5243, RP 5257, RP 5258, RP 5259, OP 5260,
- 3) Breakers: PM Basis EO39, E041
- 4) Insulators & Arrestors, Thermography: PM Basis E005, E052, E053, Proc AP 0211
- 5) Vernon Tie: PM Basis E125, E133 OP4142, Proc OP5216, OP5222
- 6) Transformers: PM Basis E051, E126, E128, E130 Proc DP0216

RESOLUTION COMPLETE: X YES _____ NRC Review

K. Sweet / 8/30/2004
ENVY ASSIGNED PERSON SIGNATURE / DATE

NA / _____
INDEPENDENT TECH REVIEW / DATE
(N/A FOR DOCUMENT REQUEST)

A. M. Mitchell / 8/30/04

G-1

ENVY TEAM LEADER

/ DATE

DATABASE UPDATED

/ DATE

***NOTE:**

- INFORMATION PROVIDED TO THE NRC IS ONLY AFTER ENVY TEAM LEADER SIGNATURE
- VY TEAM LEADER DECIDES WHO IT WILL BE ASSIGNED QUESTION/REQUEST
- RETURN SIGNED OFF FORM TO ADMINISTRATIVE SUPPORT FOR DATABASE UPDATE.

Handwritten initials and arrow pointing down.

To: Rick McCullough, Assess. Coord. December 16, 1991

From: Craig Nichols, Maint. Prod. Supervisor, Electrical

Subject: Response to Commitment BVY 91-068 MT8

The Maintenance Department has evaluated the subject commitment and has the following response:

COMMITMENT:

AN EVALUATION OF THE ADEQUACY OF MAINTENANCE AND SURVEILLANCE PROGRAMS FOR NON-NUCLEAR SAFETY (NNS) TECHNICAL SPECIFICATION EQUIPMENT WILL BE PERFORMED TO ENSURE THAT OTHER SWITCHYARD AND PLANT COMPONENTS SIMILAR TO THE BATTERY CHARGERS MEET THE APPROPRIATE RELIABILITY REQUIREMENTS.

RESPONSE:

Plant equipment under the cognizance of the Maintenance Department required to be operable by Technical Specification, but which are not Nuclear Safety Related, have been evaluated for adequacy of surveillance and preventive maintenance requirements and all appropriate changes have been submitted for review under the AP 0200 process for PM changes.

Handwritten note: "Protect" with an arrow pointing to the Diesel Fire Pump section.

Diesel Fire Pump, Switchyard and Neutron Monitoring Batteries & Chargers - This equipment, which is required to be operable to meet Technical Specifications 3.13.B.1.a and 3.10.A.2 is maintained in accordance with OP 4210, Maintenance and Surveillance of Lead Acid Storage Batteries, and OP 5245, Maintenance of Battery Chargers, the same procedures used for maintenance and surveillance of safety related batteries and chargers. The frequency of testing and surveillance is also the same as for safety related batteries and chargers. ~~PM changes have been submitted for all chargers to make them consistent with the Electrical Department recommendations.~~

Handwritten circled "1" with an arrow pointing to the Diesel Fire Pump section.

Handwritten notes: "E993", "E087", "PROC OP 4210", "OP 5247".

Switchyard Protective Relays - Protective relays are required to support the availability of offsite power as required in Section 3.10.A.4. All protective relays associated with the switchyard, main generator and major transformers, T-1, T-2, T-3A, T-3B, and T4, are calibrated each refueling outage (approximately every 18 months). This frequency exceeds the Northeast Power Coordinating Council (NPCC) recommendations of once per two years.

Handwritten circled "2" with an arrow pointing to the Switchyard Protective Relays section.

Handwritten notes: "E044", "OP 5243", "OP 5226", "RP 5257", "RP 5258", "RP 5259", "OP 5260", "RP 5264".

Handwritten number "27" at the bottom right of the page.

Mechanics
↓

Switchyard breakers - Switchyard breakers are required to support the availability of offsite power as required in Section 3.10.A.4. All 115KV and 345KV breakers are tested each outage. All breakers are trip tested. Breakers and associated air compressors are maintained in accordance with the vendor instruction manuals at a maintenance interval which experience has shown to be appropriate and which reflects the 18 month operating cycle. Breakers are leak tested and refilled with SF-6 as necessary. Compressors are overhauled as necessary based on run time. ~~Proposals have been submitted for switchyard breakers to reflect the PM's presently performed and those reflected in the vendor manuals.~~

E039
E041
AP024
DP0211
SM E053

Switchyard Insulators and lightning arresters - This equipment is required to support the availability of offsite power as required in Section 3.10.A.4. Although there is no preventive maintenance required or recommended by the insulator and lightning arrester vendors, ~~we will periodically inspect insulators and will replace all porcelain insulators within four refueling outages.~~

E005
E052
E053
AP0211



Major Transformers - This equipment is required to support the availability of offsite power as required in Section 3.10.A.4. Major transformers such as the Main Step-up T-1-1A, Auxiliary T-2-1A, Startup T-3A, T-3B, and Auto-transformer T4 are visually inspected weekly by VY electricians and a more thorough inspection is performed by contractors bimonthly. Oil is sampled for combustible gas analysis monthly and the results are part of the Maintenance Department trending program. The Main transformer has a major inspection each refueling outage including Doble and TTR testing. Other major transformers have major inspections ever other refueling outage. ~~Proposals have been submitted to reflect the PM's presently performed and those reflected in the vendor manuals.~~

E133
E125
DP4142
DP5216
DP0211
DP5222

~~This paragraph is obsolete and should be removed from the NNS Electrical Technical Specification. It is not performed every 18 months.~~

E051
E126
E128
E130
DP0211
AP0211

This level of maintenance of NNS Electrical Technical Specification related equipment is adequate to ensure the reliability of the equipment since it meets or exceeds vendor recommendations. Maintenance frequencies may be adjusted as necessary based on the results of inspections or vendor/industry recommendations.

E005
AP0211

A review of mechanical equipment required to be operable by Technical Specifications that are classified as NNS identified two areas of concern:

1. FCV-102-35 - Air operated suction isolation for the Mechanical Vacuum Pump (P-53-1A) required to be operable per Section 3.2.F.1 has no currently identified preventive maintenance other than the required annual surveillance test.

2. All Vital Fire Protection system components identified in Sections 3.13.B, C, D, E, F, & G including fire pumps, valves, hydrants, hose stations, CO2 system, penetration seals, sprinklers, etc. Some new PM's have been added to these components but no comprehensive assessment has been made on the reliability and effectiveness of these programs.

Additional review of maintenance histories and vendor recommendations for all the above mechanical components is required to assess the adequacy of the existing or newly implemented PM programs.

This assessment has not yet been completed and will be undertaken as a specific project in 1992. A branch commitment should be established to complete this review by 6/1/92.

Subject to Operations Superintendent concurrence, this commitment is considered closed.

APPROVED:

Don E. Jones 12/17/91
Projects Supervisor


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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

May 19, 1994

NRC INFORMATION NOTICE 91-81, SUPPLEMENT 1: SWITCHYARD PROBLEMS THAT
CONTRIBUTE TO LOSS OF OFFSITE
POWER

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this supplement to Information Notice (IN) 91-81, "Switchyard Problems That Contribute To Loss Of Offsite Power," dated December 16, 1991, to alert addressees to a possible zener diode failure that could cause false operation in stuck breaker failure unit (SBFU) relays and certain (SA-1) generator differential relays. The SBFU and differential relays in question were manufactured by Westinghouse Electric Corporation (Westinghouse). It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Background

The original information notice (IN 91-81) described an event on April 23, 1991, during which the Vermont Yankee Nuclear Power Station (Vermont Yankee) experienced a loss of offsite power when the 345-kV and 115-kV circuit breakers in the switchyard opened. An NRC augmented inspection team sent to investigate this event determined that zener diodes installed in the SBFU relays failed due to a voltage spike in the direct current control system, causing the 345-kV and 115-kV circuit breakers to open.

In a separate event on October 22, 1984, at Vermont Yankee, SA-1 relays used in a diesel generator protection circuit failed and caused the diesel generator breaker to trip and lock out. The failure of the SA-1 relays was attributed to the shorting of zener diodes.

Discussion

In both instances, Vermont Yankee, with the help of the vendor, installed a redesigned circuit, eliminating the zener diodes that were vulnerable to shorting. Similar vulnerable zener diodes could still be in use in the SBFU

9405160196.

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relays protecting switchyard circuit breakers and SA-1 relays in safety-related circuit breakers at other operating reactors. The failure of these zener diodes could result in failures that affect the availability of either the offsite or onsite power source that would be required during normal plant operation or under accident conditions.

In 1990, Westinghouse sold its relay division, which manufactures the SBFU and SA-1 relays, to ASEA Brown Boveri (ABB). ABB, which now has the 10 CFR Part 21 reporting responsibility, is not certain that all potentially affected licensees have been alerted to the problem with the zener diodes. The relay division of ABB mailed the attached product advisory letter (PAL 94-98) to its known customers. The NRC is forwarding PAL 94-98, without attachments, as an attachment to this information notice to ensure that all nuclear power plants using these relays are aware of the problem.

Related Generic Communications

The NRC has issued the following generic communications related to this problem:

1. Information Notice 83-63, "Potential Failures of Westinghouse Electric Corporation Type SA-1 Differential Relays," September 26, 1983
2. Information Notice 83-63, Supplement 1, February 15, 1984

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

/s/'d by BKGrimes

Brian K. Grimes, Director
Division of Operating Reactor Support
Office of Nuclear Reactor Regulation

Technical contact: Kamalakar R. Naidu, NRR
(301) 504-2980

Attachments:

1. ABB Product Advisory Letter PAL 94-98, w/o atts
2. List of Recently Issued NRC Information Notices

Attachment 1
IN 91-81, Supp. 1
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Page 1 of 2

Dear Customer,

This Product Advisory Letter (PAL 94-98) has been sent to advise you of a possible component failure that can cause a false operation in the commercial grade SA-1 Generator Differential relay and the SBFU Static Breaker Failure relay. (Class 1E SA-1 is not affected--see note below).

The SA-1 relay was first manufactured during 1959. In 1964 the SA-1 relay was re-designed with a zener diode (Z3) in parallel with the trip SCR for additional transient protection. During the years 1964 to 1974, various false operations were reported with some other solid-state relays that had similar thyristor (SCR) trip output circuits with zener protection due to the failure (shorting) of the zener and as a result, this component was removed from the production SA-1 in 1974. In 1984 a false trip of a pre 1974 SA-1 was again traced to the failure of the zener protection diode with the recommendation to that user at that time, by Westinghouse, to remove the device.

While there have been no additional reported false operations due to zener failure since 1984, ABB believes you should be aware of this problem on any SA-1 relay you purchased between 1964 and 1974 that may still be in service, as it is recommended this zener (Z3) diode be removed. Please refer to the attached information for the location of zener diode (Z3).

Note: The Class 1E SA-1 (S/N 1329D62A01) was designed in 1977 without SCR zener protection and is not effected with the problem outlined in this PAL.

In 1991 a false operation of an SBFU Static Breaker Failure relay was reported. This false operation was traced to the failure (shorting) of the SCR transient protection zeners Z1 and Z2 in the SBFU trip module (S/N

899C826G01). These zener diodes were added to this module in 1970, thus any SBFU purchased before 1970 is not effected with this problem. In 1973 the trip module was re-designed to style number 265C975G01 and these protection zeners were eliminated.

Note: The SBFU was not manufactured as a Class 1E qualified relay. There have not been any additional reported false operations of SBFU's due to zener failures, but ABB recommends the SBFU module (S/N 899C826G01) be examined for zeners Z1 and Z2 if the unit was purchased between 1970 and 1973.

Attachment 1
IN 91-81, Supp. 1
May 19, 1994
Page 2 of 2

If this module has Z1 and Z2, it is recommended these devices be removed. Please refer to the attached figures for the location of Z1 and Z2.

If after review of this information you should have any questions, please contact Russ Gonnam or John Wilson at 305-752-6700 or 305-345-5329 (Fax).

Note: The manufacturer of the product involved in this Advisory is Westinghouse Electric Corporation. ABB Power T&D Company Inc. acquired from Westinghouse in late December of 1989 that portion of Westinghouse's business which manufactures electrical equipment similar to that involved in this Advisory. Although ABB Power T&D Company Inc. is a successor to certain businesses of Westinghouse, Westinghouse has retained complete liability for products manufactured prior to February 14, 1989. The product which is the subject of this Advisory was made by Westinghouse and not ABB Power T&D Company Inc. In providing guidance in the form of this Advisory, ABB Power T&D Company Inc. assumes no responsibility whatsoever for the product manufactured by Westinghouse.

reactor was shutdown and an Unusual Event declared.

A detailed investigation was performed which included discussions with the relay manufacturer (Westinghouse) recently acquired by ABB and performance of an independent failure analysis. A summary of the results are as follows:

CAUSE: The specific cause of the diode failures could not be positively determined. The zener diode failures probably resulted from component end of life or from the cumulative damage from normally experienced switching transients within the DC system.

The zener diode was rated at 200VDC and was applied in the 125VDC circuit. It was determined at the time that the manufacturer had discontinued using the zener surge suppression circuit in 1974 due to reliability problems. Vermont Yankee replaced the relays with new units.

The 1984 event is different in that the failures did not result from a transient or surge. Similarity exists in that zener diode failures occurred and it was subsequently determined that the circuit design was changed by the manufacturer, the same manufacturer of the BFI relays in the 345 KV and 115 KV switchyard.

Due to the fact that in the present case, and in the 1984 Diesel event, it was determined that there had been reliability problems in zener diode surge suppression circuitry in 125 VDC circuits, a review for other similar applications should be performed. This was not a startup issue but will be addressed as a long term corrective action. In both events equipment operated in the safe direction and there is no reason to believe that additional failures will occur.

SUMMARY ROOT CAUSE OF EVENTS

Root Cause

Failure to recognize the implications of operating a DC bus without a connected battery by the repair department. *Failure to consider the programmatic implications of revising a document without proper consideration of previously agreed assumptions.*

Contributing Factors

1. 345KV and 115KV breaker failure relays were susceptible to false initiation due to control voltage transients. Both the 345KV and 115KV breaker BFR's are fed from one bus (DC-4A) making them susceptible to a single system transient.
2. The switchyard battery chargers were in a degraded mode such that they created DC bus control voltage disturbance when the chargers were disconnected from associated batteries. This includes the installation of incorrect capacitor fuses and other degraded components.
3. Lack of switchyard battery charger and overall switchyard preventive maintenance.

MASTER LIST
of Commitments

CORRECTIVE ACTIONS/DISPOSITION RECOMMENDATIONS:

Short Term Recommendations

CAR910370P1
CAR910370P4

1. **REMVEC COMMUNICATIONS** - Maintain a once-per-shift communication between the Control Room and REMVEC during any on-going switchyard problems. Assign single Vermont Yankee point of contact (Switchyard Coordinator) to interface with REMVEC. A memo for interim direction was issued to direct Operations and Maintenance to coordinate all switchyard activities and communication during similar events. **RESPONSIBILITY: OPERATIONS - Due 8/31/91. (page 7,8)**
2. **CANCEL GUIDELINE REV** - Cancel the current revision of the Maintenance Department Guideline immediately. **ACTION COMPLETE:** The current revision of the guideline has been removed from the files, declared void, and routed for information to all appropriate personnel. (page 6)
3. **REVIEW GUIDELINE FOR SWYD** - The previous revision of the guideline be reviewed prior to its use for dealing with any evolution requiring switchyard battery removal. **RESPONSIBILITY: MAINTENANCE/ENGINEERING - Due 7/31/91. (page 6)**
4. **OPTIMIZE BACKFEED ABILITIES** - Optimize the time required for the backfeed disconnect to ensure the evolution can be performed within the stipulated time of six hours at all times. An optimization study was completed prior to start-up, see attached addendum to this report. **RESPONSIBILITY: MAINTENANCE - Due 7/31/91.**

CAR91037
MT6

- a. Assign backfeed crews to an inside crew and outside crew positions for as long as the gas problem exists in the plant. This will be handled by on-shift Maintenance supervision as conditions warrant during assignment of tasks. (page 9)
- b. Arrange to have a CVPS bucket truck housed in Brattleboro available for use in this type of event including skilled transformer grounding personnel. See attached addendum to this report. (page 9)
- c. Pursue release of Type C funds to purchase a power lift. (page 9)

CAR910370P2
Any proced
res shall not
require this as
an immediate
action.
Ore
6/24/91
LER9109
millms

NEED FOR BACKFEED INITIATION - Consider the need to revise the Emergency Procedures for Loss of Off-Site Power to direct the effort to initiate the backfeeding operation immediately. A memo was issued to provide interim guidance to consider the need for and time associated with backfeeding during future similar events. **RESPONSIBILITY: OPERATIONS - Due 7/31/91. (page 8)**

CAR910370P3
CAR910370P5

7. **DC BUS SWITCHING** - Review all other plant guidelines and Procedures for battery switching operations. **RESPONSIBILITY: MAINTENANCE AND OPERATIONS - Due 8/31/91. (page 5)**

LER9109EE1

8. **NOTIFICATION OF NRC** - An LER was generated and presented to PORC to notify the NRC of our actions regarding this event. The LER commits to a supplement containing a final list of corrective actions based on the information presented in this CAR. **RESPONSIBILITY: EEC - Due 7/15/91.**

9. **NOTIFICATION OF INDUSTRY** - A Network entry was made to describe this event to the industry. **ACTION COMPLETE.**

Long Term Corrective Actions

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Note: Due date for all long term Corrective Actions is 12/31/91. See additional information below.

1. **USE/APPROVAL OF GUIDELINES** - Review the methods used for controlling and updating Department Guidelines and determining Guideline use versus PORC approved procedures. **RESPONSIBILITY: MAINTENANCE (page 6)**
 CAR91037 MT1
2. **REPLACEMENT OF BFR'S** - Procurement of newer vintage breaker failure relays will be pursued. **ACTION COMPLETE: PO 44979 HAS BEEN ISSUED TO ABB FOR NEW RELAYS. PMR'S HAVE BEEN GENERATED TO COMPLETE THIS REPLACEMENT DURING THE 1992 REFUELING OUTAGE. (page 6)**
 BUY91068MTA
3. **REMVEC COMMUNICATION** - Further investigate communication issue with REMVEC personnel. **RESPONSIBILITY: OSD. (page 7,8)**
 ZNS91130SD1
4. **USE OF CHARGERS AS BATTERY ELIMINATORS** - Verify vendor specifications and VYEM for battery chargers, related to operation without a battery connected to the battery output. This evaluation shall consider the types of loads connected to each affected bus. **RESPONSIBILITY: MAINTENANCE. (page 5)**
 CAR91037MT2
 BUY91068 MT7
 and MT10
5. **RELAY TECH RESPONSE** - Pursue plans for ensuring quicker response from relay technicians. **RESPONSIBILITY: MAINTENANCE. (page 9)**
 SEE BUY91068
 REC.8 (Completed)
6. **DC BUS TRANSIENTS** - Evaluate the potential for voltage transients present when any station DC bus is operated without its battery. **RESPONSIBILITY: MAINTENANCE/OPERATIONS. (page 5)**
 BUY91068MT5
7. **SWYD PM PROGRAM** - Review switchyard preventative maintenance requirements. **RESPONSIBILITY: MAINTENANCE. (page 9,10)**
 BUY91068MT7 + MT10
8. **EMERG. HP AND SAFETY PRACTICES** - ~~Initiate a review of~~ guidelines and procedures for emergency situations relative to RP and safety practices relating to deviation from routine practices. This information will be provided to the Training Department for consideration. **RESPONSIBILITY: PLANT MANAGER/TRAINING. (page 9)**
 CAR91037RP1
Rad Protection
6/2/91
Establish a philosophy regarding OR 6/2/91
9. **BACKFEED OP** - Perform an in-depth review of the backfeeding procedures to ensure the lessons learned from this event are incorporated. **RESPONSIBILITY: MAINTENANCE. (page 8,9)**
 CAR91037MT3
10. **BACKFEED SUPPORT** - Investigate the use of CVPS personnel to provide grounding services in support of Backfeed initiation. **RESPONSIBILITY: MAINTENANCE. (page 9)**
 CAR91037MT4/
 MT8
11. **CHARGER PM'S** - Review and modify as appropriate all battery charger preventive maintenance programs. **RESPONSIBILITY: MAINTENANCE. (page 10)**
 BUY91068
 MT7
 MT10
12. **CHARGER SURVEILLANCE** - Create a battery charger PM and surveillance procedure. **RESPONSIBILITY: MAINTENANCE. (page 10)**
13. **DESIGN REVIEW** - Perform an engineering review of the following (**RESPONSIBILITY: ENGINEERING**):
 - a. Review breaker failure relaying power supply assignments to determine if improvements to reliability can be made by reassigning power supplies. (page 6)
 - b. Review other static protective relays installed at VY to determine if vendor has recommended design changes to increase surge withstand capabilities. (page 6,11,12)
 - c. Review switchyard DC control circuitry for other common mode possibilities. (page 6)
 - d. Review plant off-site power availability for compliance

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- e. *BV491068CE53* to general design criteria #17 issues. (page 6)
A review of the FSAR has been completed with regard to explanations for off-site power access. The need for some revisions to Appendix F was identified. (page 6)
- f. *BV491068EEC2* Review design modifications to BFR's (removal of zeners) and use of incorrect fuses with respect to 10CFR Part 21 applicability. (page 10)
- CAR91037EEC14* ~~NNS TS, QA REQUIREMENTS - Evaluate Technical Specification NNS equipment Quality Assurance requirements relating to switchyard and other plant components.~~ **RESPONSIBILITY: ENGINEERING.** (page 5) *to use appropriate reliability*
- BV491068* 15. **NNS TS MAINTENANCE - Evaluate maintenance and surveillance requirements for other NNS Tech. Spec. equipment.** **RESPONSIBILITY: MAINTENANCE/I&C.** (page 10) *6/24/91*
- ICA and MTS* 16. **SWYD MAINT. PLANNING - Review scheduling of switchyard maintenance during all modes of plant operation.** **RESPONSIBILITY: MAINTENANCE/OPERATIONS.**
- CAR91037MT5* 17. **SWYD PARTS - Review inventory requirements for all switchyard equipment.** **RESPONSIBILITY: MAINTENANCE.** (page 8)
- BV491068MT9* 18. **CONFIGURATION TRAINING - Provide training to appropriate plant personnel on the need to verify and maintain plant conditions, or configuration that provides the basis of a planned activity (MR, TM, OP, etc.).** **RESPONSIBILITY: TRAINING.** (page 5) *design*

All long term corrective actions shall be completed by December 31, 1991. For those items that require implementation after 12/31/91 or continuing efforts a schedule for their completion shall be completed by December 31, 1991.

Reviewed/Approved By: *[Signature]* Date: 6/10/91
Sr. Maintenance Engineer

Independent Review Required By: EEC *[Signature]* 6/12/91

Reviewed/Approved By: *[Signature]* Date: 6/12/91
Maintenance Supervisor

PORC Review: Mtg. No.: 91-41 Date: 06-12-91 Secretary *[Signature]*

Approved By: *[Signature]* Date: 6/24/91
Plant Manager

ADDITIONAL ACTIONS REQUIRED:

- Send to Sr VP, OR for Review.
- LER9109EEC1 • EEC to determine if CER update is req'd.
- LER9109MT2 • OSD to draft letter to NRC on SW and SY CAR's - due to July 15.

Electrical PM Bases Index

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| E085-UPS1A/1B | E088-SCE | E008-SCE | E115-APP R | E079-480/NNS |
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| | E123-TK-115-1 | E097-3-1A/1B | | |
| | | | | |
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| E090-SCEEQ | | E083-T8/T9 | E095-GND | E039-GE ATB |
| E110- | | | E125-VERNTIE | E040-COGENEL |
| E111 | | | E126-STARTUP | E041-115OCB |
| E141 | | | E128-AUTO | E052-DISCONNECTS |
| | | | E130-AUX | E053-BUSSES |
| | | | | E077-ISOPHASE |
| | | | | E092-T/G |
| | | | | E138-GD-1 |
| | | | | |
| <u>Meters/Transducers (Plant)</u> | | <u>Meters/Transducers (Swyd)</u> | | |
| E020 – 4.5 yr. Cal. | | E050 – 1.5 yr. Cal. | | |
| E022 – 3 yr. Cal. | | E143 – No PM | | |
| E055 – 6 yr. Cal. | | E144 – 3 yr. Cal. | | |
| E105 | | E145 – 6 yr. Cal. | | |
| | | E129 | | |

Oct. 29, 1999 – PM Bases Review still in progress

Electrical PM Bases Index

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D/G Relays

E011-BAL
E024-AUX
E025-AGA
E026-DIFF
E027-OV
E029-OC
E030-FIELD
E031-N/GND
E032-REVPWR
E033-C0-7
E034-SYNC
E035-BKR
E036-59OV
E075-HFA

Various Plant Relays

E002-HGA (BUS3&4)
E003-AUX 3YR
E004-UV (BUS3&4)
E006-OC-Sc
E010-OC NNS
E038-OC GND
E042-O/L
E046-AUX NO PM
E049-AUX 4.5YR
E070-LOAD SHED
E072-ASEA
E078-SEQUENCE

Agastat (Plant) Relays

E047-NNS
E122-SCE

Degraded Grid Relays

E015-INSTANT
E017-TD

3 yrs / REPLACE @ 10 yrs

Swyd Relays

E044-2YR
NEW-1.5YR
NEW-NO PM

Agastat (Swyd) Relays

NEW-1.5YR & EQ

4KV Swgr

E018-SCE
E119 (May Delete)
E135-NNS

4KV Breakers

E019-CAT III
E133-CAT I
E134-CAT II
E136-CAT IV
E137-CAT V

480VAC MCC

E059
E060
E061
E062
E063
E064
E065
E066
E096
E106
E107
E108
E109
E117

480VAC Swgr

E057 - NNS
E058 - SCE
E139
E140

Oct. 29, 1999 – PM Bases Review still in progress

Originator: Sweet, Kenneth J**Originator Phone:** 8024513308**Originator Group:** Eng SUP Project Staff**Operability Required:** Y**Supervisor Name:** McKenney, Patrick M**Reportability Required:** N**Discovered Date:** 08/27/2004 18:10**Initiated Date:** 08/27/2004 18:33**Condition Description:**

CAR 91-37 was not used as a source document when the PM basis database was developed.

On 8/26/2004, the NRC asked for the procedures that address switchyard issues identified in NRC Information Notice 91-18. The subject of the NRC information notice is "Switchyard Problems that Contribute to Loss of Offsite Power." The event described is a Loss of Normal Power (LNP) at Vermont Yankee on April 23, 1991. It is addressed internally by LER 91-09 and CAR 91-37.

VY committed in response to this event to an evaluation of the adequacy of maintenance and surveillance programs for non-nuclear safety (NNS) technical specification equipment will be performed to ensure other switchyard components similar to the battery charger meet the appropriate reliability requirements. Attached is a letter from Craig Nichols to Rick McCullough that responded to this commitment. From a review of the documentation and discussion with maintenance, some of the commitments have been changed. The maintenance letter to the commitment includes a statement that frequencies may be adjusted as necessary based on the results of the inspections or vendor recommendations.

Some examples where the commitments have changed are:

1. **Switchyard Batteries:** In the paragraph on the switchyard battery chargers, the letter states the frequency of testing is the same as for safety related chargers. Switchyard battery charger BC-5A-4A was removed from the preventive maintenance (PM) basis to checkout before use. The charger is the swing charger and infrequently used.
2. **Switchyard Protective Relays:** In the paragraph on switchyard protective relays, it states all protective relays are calibrated each refueling outage, approximately every 18 months. Per PM basis document E044, the relay calibration is performed every two years. A two year calibration is per Northeast Power Coordinating Council (NPCC) requirements. This was confirmed with maintenance. Reference E044.
3. **Switchyard Breakers:** In the paragraph on breakers, it states that compressors are overhauled as necessary on run time. In discussion with maintenance, there is no run-time based overhaul, but the overhauls are based on the condition of the compressors.
4. **Switchyard Insulators and Lightning Arrestors:** In the paragraph on breakers, it states that VY will replace all horizontal insulators in four refueling cycles. This replacement has not been completed and confirmed with maintenance. Instead, an inspection is completed. Reference PM Basis documents E005, E052, and E053.
5. **Major Transformers:** In the paragraph on main transformers, it states a more thorough inspection is done bi-monthly. Per a discussion with maintenance, this was done by CVPS and then stopped. The major transformers do have major inspections per E051, E126, E128, and E130 and weekly inspections by electricians.
6. **Major Transformers:** In the paragraph on main transformers, it states that the oil is sampled for combustible gas. Only recently has a monthly sampling been instituted based on operating experience and for several years, sampling has been less frequent, typically six months. Six months is typically recommended by industry guidance.

Operability Recommendation:

These PM changes do not affect operability because in the cases identified alternate methods have been implemented to meet the CAR 91-37 requirements and the PM basis is used to currently perform the switchyard related PM's. The condition represented is related to including the CAR 91-37 commitments in the PM data base and updating these commitments for changes in implementation.

Immediate Action Description:

None



Suggested Action Description:

Add LER 91-09, CAR 91-37, and NPPC requirements (Document A-4) as source documents to the PM basis.

Per a discussion with maintenance engineer who worked on resolving the commitment, there was project after the event to make the switchyard PM's consistent with CVPS and VELCO practices at the time. Many PM changes were written at the time. Also, the NPCC requirements for maintenance (Document A-4) were used as a basis. In 1991, the PM's were based on Visicards since MPAC was still being developed. The initial PM Basis database was written in about 1994 using MPAC. The PMCR process has then been used for several years to change PM's and this documentation includes a technical basis for changes. LER 91-09 and CAR 91-37 is not listed as a reference in PM basis database except for E053 (busses). NPPC document A-4 is not listed as a basis document for E087 (chargers) and E093 (batteries) but is for E044 (protective relays). Thus, LER 91-09, CAR 91-37, and NPPC eqirements (Document A-4) should be added as source documents to the PM basis for the applicable PM's.

Attachments:

Condition Description

Letter from Nichols to McCullough for CAR 91-37