**From:** "Hamer, Mike" <mhamer@entergy.com>
**To:** "Larry Scholl" <LLS@nrc.gov>
**Date:** 4/4/04 1:14PM
**Subject:** RE: Mods List

Larry,

Attached are the descriptions and 50.59s for the Power Up-rate modifications that you requested with the following exceptions listed below. You will be receiving a CD with the entire packages this week.

Power Uprate Mods for DRS Review:

| | |
|---|---|
| Low Feedwater Suction Pressure Trip | MM2003-015 |
| AST Mods (Install SJAE Line Check Valve) | MM2003-026 |
| Add Main Steam Safety Valve | VYDC 2003-013 |
| Main Steam Safety Valve Capacity Increase | MM2003-030 - cancelled |
| Recirc Pump Runback (Feedwater Pump Trip) | MM2003-016 |
| APRM Flow Controlled Trip Reference Card (A/M) | MM2003-028 |
| NSSS/BOP Instruments (Main Steam High Flow Trip) | MM2003-039 |
| 345 kv 381 Line Overload Relay Setting | MM2003-053 |
| Steam Dryer Strengthening | VYDC 2003-012 - currently not approved |
| Flow Induced Vibration Monitoring | TM 2003-022 |

A-231

# VERMONT YANKEE

MM No. 2003-015

# MINOR MODIFICATION PACKAGE

**SAFETY CLASSIFICATION:**
☐ SC-1 ☐ SC-2 ☐ SC-3 ☐ SCE ☒ All NNS SSCs ☐ OQA/Vital Fire

**TITLE:** REACTOR FEED PUMP SUCTION PRESSURE TRIP CHANGES FOR EPU

**ORIGINATOR/DEPARTMENT:** (Print Legibly) William Fadden, E/I&C

**PURPOSE/REASON FOR CHANGE:** (See Note 1)

Operation at Extended Power Uprate (EPU) conditions of 1950.9 MWt requires the operation of three Condensate Pumps (CP) and three Reactor Feed Pumps (RFP). Trip of a CP reduces RFP suction pressure to below the existing low suction pressure trip setpoint and all RFP will trip after a short time delay. De-energization of Instrument AC, Ckt. 48, will trip all operating RFPs when the low suction flow trip circuit de-energizes, and open the RFP and condensate system minimum flow valves. Loss of Bus 2 results in 1 CP/2 RFP operation that would result in a rapid suction pressure decrease that would result in boiling, column separation, and the potential for water hammer if the saturation pressure is reached.

This MM maximizes RFP availability to support plant operation and minimizes the possibility for water hammer events by:

1. Adding a second low suction pressure RFP trip setpoint with longer, staggered time delays, and lowering the setpoint, and shortening the time delay, of the existing, short time delay, trip.
2. Changing the low suction flow RFP trip to energize-to-trip.
3. Adding a trip of RFP B if Bus 2 is de-energized when RFP A is running.

Making various corrective updates and minor changes. All components and systems are NNS. There are no ALARA considerations since the RFP suction pressure switches and Rack 18, the only components inside the RCA, are in a low radiation area.

**SCOPE/DESCRIPTION OF CHANGES:** (See Note 2)

BACKGROUND

1. Suction Pressure Protection

Three CP and two RFPs are normally operating to provide 6.41 X $10^6$ lbm/hr heated feedwater to the vessel at the current licensed thermal power of 1593 MWt (Reference 3). Full power operation is marginally possible following the trip of a CP.

Studies by GE and S&W, References 1 and 2, have determined that operation at EPU conditions of 1950.9 MWt and 8.05 X $10^6$ lbm/hr feed flow is possible with 3 CP and 3 RFP. Detailed analysis, Reference 3, has determined that the trip of a CP reduces the RFP suction pressure to approximately 124psig, below the low suction pressure switch trip setpoint of 150 psig↓ (PSL-102-20A, 20B, & 20C that monitor each feed pump) for more than 2.15 seconds (30T1 time delay for each breaker) and

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# 50.59 SCREEN

| | | | | |
|---|---|---|---|---|
| I. | Activity/Document Number: | MM 2003-015 | Revision Number: | 0 |
| | Title: | REACTOR FEED PUMP SUCTION PRESSURE TRIP CHANGES FOR EPU | | |

Provide or attach a brief description of activities (section 6.3 of RM)

Operation at Extended Power Uprate (EPU) conditions of 1950.9 MWt requires the operation of three Condensate Pumps (CP) and three RFPs. Trip of a CP reduces RFP suction pressure to below the existing low suction pressure trip setpoint and all RFPs will trip after a short time delay. De-energization of Instrument AC, Ckt. 48, will trip all operating RFPs when the low suction flow trip circuit de-energizes, and open the RFP and condensate system minimum flow valves. Loss of Bus 2 results in 1 CP/2 RFP operation that would result in a rapid suction pressure decrease that would result in boiling, column separation, and the potential for water hammer if the saturation pressure is reached.

This MM maximizes RFP availability to support plant operation and minimizes the possibility for water hammer events by:

1. Adding a second low suction pressure RFP trip setpoint with longer, and staggered time delays, and lowering the setpoint, and shortening the time delay, of the existing trip.
2. Changing the low suction flow RFP trip to energize-to-trip.
3. Adding a trip of RFP B if Bus 2 is de-energized when RFP A is running.
4. Making various corrective updates and minor changes.

Reactor Feed Pump (RFP) operation is not credited in safety analyses and it does not support a SSC function credited in the safety analyses. It does impact a SSC function credited in the safety analyses because the loss of feedwater flow is a plant transient that is evaluated in UFSAR Section 14.5.4.3, LOSS OF FEEDWATER FLOW.

II. Applicability Determination

Other applicable processes identified during the applicability determination: NA, determination not required IAW AP 6002, Section 4.

| | | | | |
|---|---|---|---|---|
| III | 50.59 Screening Questions (Section 5.2.2 of the 50.59 Resource Manual (RM) provides additional guidance) (Check correct response and provide a brief response to each question answered "No". If "YES" is checked for any question, the 50.59 Screen does not need to be completed since a 50.59 Evaluation is required): | | | |
| | 1. | Does the proposed activity involve a change to an SSC that adversely affects an UFSAR described *design function*? (Section 5.2.2.1 of the RM) | ☐ YES | ☒ NO |
| | Low flow and low suction pressure protection of the reactor feed pumps and response to a loss of Bus 2 event is not discussed in the UFSAR. The changes implemented by this MM reduce the probability of a plant transient by minimizing the probability of a RFP trip during condensate system transients or the loss of Instrument AC supply while maintaining adequate low suction pressure and low flow protection for the RFPs. The immediate trip of RFP B on the loss of Bus 2 minimizes the potential for RFP suction pipe water hammer or the trip of RFP A that would result in the loss of all feedwater. The changes do not introduce new failure modes. Since the probability of a partial or complete loss of feedwater is reduced, implementation of the MM does not adversely affect an UFSAR described design function. | | | |
| | 2. | Does the proposed activity involve a change to a procedure that adversely affects how UFSAR described SSC design functions are performed or controlled? (Section 5.2.2.2 of the RM): | ☐ YES | ☒ NO |
| | The procedure changes resulting from this MM only pertain to changes that reflect the revised design. All changes will improve the availability of the RFPs to support reactor operation and shutdown. | | | |
| | 3. | Does the proposed activity involve revising or replacing an UFSAR described evaluation methodology that is used in establishing the *design bases* or used in the *safety analyses*? (Section 5.2.2.3 of the RM) | ☐ YES | ☒ NO |
| | Implementation of this MM does not involve or affect UFSAR described evaluation methodologies. | | | |
| | 4. | Does the proposed activity involve a *test or experiment not described in the UFSAR*, where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the UFSAR? (Section 5.2.2.4 of the RM): | ☐ YES | ☒ NO |
| | There is no test or experiment associated with this MM. Post-modification testing is considered a maintenance activity that is subject to 10CFR50.65(a)(4) and evaluated by the Initial Risk Assessment Screen. | | | |
| | 5. | Does the proposed activity require a change to the Technical Specifications? (Section 5.2.2.5 of the RM). | ☐ YES | ☒ NO |
| | The reactor feed pumps are not discussed in the Technical Specifications. | | | |

VERMONT YANKEE MINOR MODIFICATION PACKAGE MM No. 2003-015 (Continued) Att. A, P. 3

| | |
|---|---|
| V. | List the documents reviewed including section numbers and key words (UFSAR, Technical Specifications and associated bases, TRM and associated bases, DBDs and other controlled documents) where related information was found. If changes to controlled documents, including plant procedures, are identified, ensure that changes are initiated in accordance with the controlling plant procedures (e.g. FSAR changes are initiated per AP 6036, DBD changes per AP 6007). (ER960591 02) |
| | UFSAR SECTIONS: All sections searched, Section 12.2.4 identified; Keywords: feed, feed pump, feedwater pump<br><br>TECHNICAL SPECIFICATIONS: All sections searched, no instances found. Keywords feed, feed pump, feedwater pump |

50.59 Screen Signoffs: Preparer: W. FADDEN (Print name) W. Fadden (Sign) Date: 8/24/03

Co-Preparer: L. SPENCER (Print name) Larry Spencer (Sign) Date: 8/25/03

Reviewer: W. MATHIS (Print name) (Sign) R.T. VIBERT P.T. Vibert Date: 9/4/03 9/4/03.

VYAPF 6002.04
AP 6002 Rev. 8
Page 3 of 2

# VERMONT YANKEE

MM No. 2003-026

# MINOR MODIFICATION PACKAGE

**SAFETY CLASSIFICATION:**
☐ SC-1 ☐ SC-2 ☐ SC-3 ☐ SCE ☒ All NNS SSCs ☐ OQA/Vital Fire

**TITLE:** Alternate Source Term (AST) Implementation Modification

**ORIGINATOR/DEPARTMENT:** (Print Legibly) Paul Rainey / Fluid Systems Design Engineering

**PURPOSE/REASON FOR CHANGE:** Source

Extended Power Uprate (EPU) requires implementation of the Alternate Source Term (AST) radiological methodology to assure that the dose rate to personnel in the control room and technical support center are within licensing requirements following a Design Basis Accident. The establishment of Alternate Leakage Treatment (ALT) boundaries is required to provide the required holdup volumes and letdown paths required by AST. The ALT boundary is defined in TE 2003-012 and one of the boundary requirements is for boundary piping and components/valves to meet seismic ruggedness requirements. The known system modification required to assure ALT boundary isolation is the addition of a small check valve in a small bore steam drain line near the condenser. The close proximity of the check valve to the condenser eliminates the need for additional pipe supports.

The seismic ruggedness evaluations of the other ALT boundary lines will require confirmatory walk downs during RFO 24 that may identify the need to add new, or modify existing, NNS pipe supports.

**SCOPE/DESCRIPTION OF CHANGES:** See NOTE 1

TE 2003-012 requires that a check valve (OG-779) be installed in line ¾"-MS-189-D3 which is shown on Dwg. 33600-A-217. This line is the AOG building steam supply line steam trap condensate line and it tees into MS drain line 3"-MSD-4 near the condenser as shown on Dwg. 33600-A-13012. The check valve will prevent significant backflow from the condenser back toward piping in the turbine and AOG buildings that will not be evaluated for seismic ruggedness. Installing this valve will help to bottle up any MSIV leakage in the condenser as required by ALT. Marked up drawings show the valve location on the P&ID (A-217 and G-191156) and the piping arrangement and isometric drawings (A-13012 and 5920-12723).

The new check valve installation minimizes the piping required in the ALT boundary since the check valve is located close to the condenser. Calculation VYC-2309 technically demonstrates the seismic ruggedness of the new check valve installation in line ¾"-MS-189-D3. The results of the calculation indicate that additional pipe supports are not required on line ¾"-MS-189-D3.

OG -779 and any pipe support material required to support other ALT boundary lines will be purchased as NNS and will be installed to the applicable code requirements.

The expected operating pressure at the valve ranges from approximately a full vacuum (condenser vacuum) the majority of the time to approximately 120 psig following trap operation. Following the piping modifications to install the new check valve, the check valve will be verified operable via internal inspection and the welds will be visually inspected. In addition, enhanced NDE (PT or MT) shall be performed on the welds since an initial in service leak test on this line while under vacuum is not appropriate.

The seismic ruggedness evaluation of the remaining ALT boundary will require a confirmatory walk down by ABS per direction of Mechanical/Structural engineering at the beginning of RFO 24. The evaluations for

VERMONT YANKEE MINOR MODIFICATION PACKAGE MM No. 2003-026 (Continued)

seismic ruggedness will be in accordance with the requirements of AST which are per NRC approved BWROG methods contained in report GE NEDC-31858PA Class III, DRF B21-00461, August 1999.

The walk downs may identify the need to add new, or modify existing pipe supports. Any required modifications will be NNS, passive structural type mods and will be implemented via change request using materials that are already on site or that are obtainable within a very short time frame.

The new valve is stainless steel. There is no need to paint the new valve and connecting piping. Piping support modifications will receive at least a primer coat of paint matching similar configurations in the Condenser Bay.

As previously described, the valve will be located in the turbine building near where 3" MSD-4 enters the south east end of the E-6-1A condenser. The building location and configuration has been reviewed with Operations and Fire Protection and there are no outstanding issues.

Implementation will be under the direction of Project Engineering using NPS personnel.

Other Entergy Vermont Yankee resources needed for project implementation are: 1) Radiation Protection to provide required radiological surveys, 2) Operations to implement Tagging Requests, 3) Fire Protection and the Shift Engineer to issue permits for required welding.

EVALUATION OF MM CHANGES

The valve and any required pipe support material will be purchased as NNS and will be installed to the applicable codes (ANSI B31.1-1977 edition for piping and ANSI B16.34 for valves). The design pressure and temperature of line ¾"-MS-189-D3 is 135 psig and 350 °F. Any welding associated with support modifications (that do not involve welding to the pressure boundary) will be performed and inspected to AWS D1.1 2000 edition criteria. There is no lead paint on the ¾" piping where OG-779 will be installed. However, if welding is required for support modifications, then lead paint must be dealt with per AP-0549.

The proposed change has no adverse impact on any system or PRA model and does not introduce any new hazards. The check valve is in series with the condensate steam trap. There are no changes to the normal operation of the drain system, i.e., the line still functions as a steam condensate drain. Failure of the check valve to open is unlikely but no worse than failure of the steam trap to open. Failure of the check valve to close following a LOCA is beyond design requirements. The system to be modified and the areas to be worked are located in the turbine building. No plant equipment important to safety is near any proposed work area.
This MM will be implemented during RFO 24. The installation requirements will assure that the piping is properly isolated prior to physically cutting into the piping.

This modification does not change the potential or consequences of fire or internal flooding.

# APPLICABILITY DETERMINATION

*APPLICABILITY DETERMINATION*

**Activity/Document Number:** MM- 2003-026 **Revision Number:** 0

**Title:** Alternate Source Term (AST) Component Modification

**Provide or attach a brief description of activities (section 6.3 of RM):**

This MM adds a check valve (OG-779) in line ¾"-MS-189-D3 which is the AOG building steam supply line steam trap condensate line. This piping and the check valve are NNS and are located in the turbine building. This modification will prevent significant back flow from the condenser through the line toward the AOG Building during Post LOCA operation thereby helping to bottle up any MSIV leakage in the condenser. There are no changes to the normal operation of the drain system, i.e., the line still functions as a steam condensate drain.

The seismic ruggedness evaluation of the ALT boundary will require a confirmatory walk down that may identify the need to add new, or modify existing small bore pipe supports. Any required modifications will be NNS, passive structural type modifications.

Address the questions below for all aspects of the activity. If the answer is "YES" for any portion of the activity, apply the identified process to that portion of the activity. It is not unusual to have more than one process apply to a given activity. For example, a change to a door that is a fire door, a security door and a secondary containment door would require an evaluation to the Fire Protection license condition, 10CFR50.54 (p) and a 50.59 screen. See Section 4 of the "50.59 Resource Manual" (RM) for additional guidance.

| I. Does the proposed activity involve a change to the: | | Section 4.2.1 of the RM |
|---|---|---|
| 1. Technical Specifications or Operating License (10CFR50.90)? Note that stand-alone changes to the TS Bases are evaluated in accordance with 10CFR50.59 per AP 0063. | (see Note 1) ☒ NO ☐ YES | (If YES process per AP 0063) |
| 2. Quality Assurance Plan, related implementing procedures identified in PP 7802 or facility changes (10CFR50.54(a))? | ☒ NO ☐ YES | (If YES contact QA for 10CFR50.54(a)(3) assessment) |
| 3. Security Plan, related implementing procedures or facility changes (10CFR50.54(p))? | ☒ NO ☐ YES | (If YES contact Security for 10CFR50.54(p) assessment) |
| 4. Emergency Plan, related implementing procedures or facility changes (10CFR50.54(q))? | ☒ NO ☐ YES | (If YES contact E-Plan for 10CFR50.54(q) assessment per AP 3532) |
| 5. IST Program Plan, related implementing procedures or facility changes (10CFR50.55a(f))? | (see Note 2) ☒ NO ☐ YES | (If YES, and a deviation from the code requirement is required, contact Licensing to ensure applicable NRC approval is obtained per AP 0058) |
| 6. ISI Program Plan, related implementing procedures or facility changes (10CFR50.55a(g))? | ☒ NO ☐ YES | (If YES, and a deviation from the code requirement is required, contact Licensing to ensure applicable NRC approval is obtained per AP 0058) |
| 7. Fire protection program, related implementing procedures or facility changes (License Condition 3.F)? | ☒ NO ☐ YES | (If YES provide an evaluation that satisfies License Condition 3.F) |

## APPLICABILITY DETERMINATION

| | | |
|---|---|---|
| II. Does the proposed activity involve: | | Section 4.2.2 of the RM |
| 1. Maintenance which restores SSCs to their original condition. | ☒ NO ☐ YES | (If YES perform maintenance in accordance with plant procedures (e.g. AP 0021, AP 0049, AP 0050) |
| 2. A temporary alteration supporting maintenance that will be in effect during at-power operations for 90 days or less that has been (or will be) evaluated under 10CFR50.65 (a) (4) prior to implementation? | ☒ NO ☐ YES | (If YES process in accordance with AP 0091.) |
| III. Does the proposed activity involve a change to the UFSAR (including documents *incorporated by reference*) excluded from the requirement to perform a 50.59 Review (NEI 96-07 or NEI 98-03)? | ☒ NO ☐ YES | Section 4.2.3 of the RM<br>(If YES, process FSAR change per AP 6036 "FSAR Revision Process". Include basis for excluding 10CFR50.59 evaluation below.) |
| IV. Does the proposed activity involve a change to the: | | Section 4.2.4 of the RM |
| 1. Managerial or administrative procedures governing the conduct of Facility operations, maintenance and training (subject to the control of 10CFR50, Appendix B) (RM section 4.2.4). Some procedures may be VOQAM implementing procedures requiring evaluation per 10CFR50.54 (a) (3) (prompted above). Also, Maintenance procedure changes that include changes to Design Information, not evaluated under a design change process, shall be evaluated in accordance with 10CFR50.59 | ☒ NO ☐ YES | (If YES process per procedure change process (e.g. AP 0095, AP 0096, AP 0097)) |
| 2. Regulatory commitment where changing commitment is not covered by another regulation based change process (NEI 99-04)? | ☒ NO ☐ YES | (If YES process per AP 0055 "Regulatory Commitment Management".) |
| V. Does the activity impact other plant specific programs (e.g., The ODCM and PCLRTP controlled per TS 6.7 and the PCP controlled per TRM Section 6) which are controlled by regulations, the Operating License, the Technical Specifications or TRM? | ☒ NO ☐ YES | (If YES process per the procedure(s) for the appropriate activity.) |
| VI. Is the activity covered by any other specific regulatory change process not discussed above that would preclude the need to evaluate under 10CFR50.59? (e.g., 10CFR50.46 for changes to ECCS models and PCT changes, 10CFR50.12 for Exemption Requests, etc) | ☒ NO ☐ YES | (If YES document below and process per applicable regulatory requirements.) |
| VII Does the activity require a 50.59 Screen based on the following Generic NRC correspondence? GL 95-02 for performing Analog-to-Digital upgrades, IEB 80-10 for Contamination of non-radioactive systems, IEC 80-18 for changes to radioactive waste systems and GL 91-18 for compensatory actions including using manual actions in-lieu of automatic actions or use-as-is dispositions affecting the FSAR. GL 95-02 assessments need to look at both system and component level failures (ER20000558_01) | ☒ NO ☐ YES | (If YES complete 50.59 Screen for the subject activity.) |

## VERMONT YANKEE DESIGN CHANGE VYDC #2003-013

### Objective and Project Definition Summary

See Project Definition Document (Enclosure D)

The Objective of this task is to provide additional overpressure capacity to satisfy ASME code requirements at 120% power with MELLLA+. Without additional overpressure capacity, the ASME emergency overpressure limit of 1500 psig would be exceeded at 120% power and MELLLA+ during an ATWS event.

The scope of work requires the addition of a third larger capacity main steam safety valve (SV) and modifications to increase the capacity of the existing SV's. A new spare valve will also be purchased.

The 3rd valve is required for ARTS/MELLLA and therefore will be installed in RFO24. The increased capacity of the existing valves is required for EPU and MELLLA+ and therefore the higher capacity of the existing valves is not required to be installed until RFO25. Nonetheless, the two spare valves will be modified prior to RFO24 and installed in RFO24 by a separate MM. The two currently installed safety valves will be removed from service in RFO24 and modified by separate MM prior to RFO25 and installed in RFO25. Once the MM's have been implemented, all 6 SV's ( 3 installed, 3 rotating spares) will have identical capacities and physical dimensions/characteristics.

Both new valves and modified valves will be tested prior to arrival at Vermont Yankee. The new SV (SV-2-70C) will be essentially identical to the existing SV's except that internal orifice assembly (nozzle and spring) will increase the valve capacity 20% compared to the existing SV's. Separate Minor Modifications will be written to replace the internals of the four existing SV's (two are currently installed and two are spares) to increase their capacity by 20%.

The new valves and internals for the existing valves are being purchased from Dresser per the requirements of Specification VYSP-FS-074 "Main Steam Safety Valves". The specification provides the detailed requirements for design, material, fabrication, testing and inspection of the MS SVs and replacement parts for the existing valves. All required testing will be performed prior to their arrival at Vermont Yankee for installation during RFO24.

The 3rd SV will be installed on a spare existing flange that is currently blanked off located on the "C" MS line. New metal reflective insulation will be required to be built to insulate the valve. A flanged SC3 tee will be bolted to the valve outlet to direct the discharge path and balance the loading when the valve is open. The tee arrangement will be identical to the arrangement of the existing SVs. The existing tees will be reclassified from NNS to SC3.

The existing SV configuration has both temperature detection and an acoustic monitor attached to the valve/tee for position indication and leakage detection. The instrumentation for the new SV will be identical to the existing instrumentation.

Presently, TS table 3.2.6 requires position indication (acoustic monitor) for the existing SVs for Post-Accident Monitoring Instrumentation IAW NUREG-0578 and 0737 requirements. Discharge temperature indication is included in the applicable TS Note to provide backup indication if the acoustic monitor is not available. A proposed Technical Specification change has been submitted to the NRC to move the SV position indication requirement to the Technical Requirements Manual (TRM). The requirements for the 3rd MS SV instrumentation will be added to the TRM. Per the Reg Guide 1.97 Program Manual, these instruments are not Reg Guide 1.97 instruments.

A metal shipping box will be procured to facilitate valve shipping to the test facility for future testing of the new valve after they are rotated/removed from service.

The two existing spare valves will be modified with Dresser parts at NWS Technologies per the direction of Maintenance Support/Component Engineering at the NWS South Carolina Testing facility. NWS presently repairs and tests the existing SVs. Following RFO24 the two presently installed SVs will also be modified and tested at NWS for installation during RFO25.

The additional weight and loading effects of the new safety valve and larger existing safety valves on the Main Steam piping

## VERMONT YANKEE DESIGN CHANGE VYDC #2003-013

when the SVs are open has been analyzed by Stone & Webster and the loading does not exceed the design requirements of the MS piping/supports.

Early in RFO24 a walk down will be performed to determine conduit routing and to assess the need for additional rigging points to facilitate SV installation on the "C" MS line. If additional points are required, it is anticipated that lead paint removal will be required.

Since a SV weighs approximately 1300#, they are considered a heavy load. Since the 3rd SV will be installed at a new location, an assessment to ensure that requirements of PP 7023, "Control of Heavy Loads Program Document" are met was performed and the requirements of PP 7023 are met.

# VERMONT YANKEE

MM No. 2003-016

# MINOR MODIFICATION PACKAGE

SAFETY CLASSIFICATION:
☐ SC-1 ☐ SC-2 ☐ SC-3 ☐ SCE ☐ All NNS SSCs ☒ OQA/Vital Fire

TITLE: REACTOR RECIRCULATION SYSTEM RUNBACK FOR FDW AND C SYSTEM TRANSIENTS

ORIGINATOR/DEPARTMENT: (Print Legibly) William Fadden, E/I&C

PURPOSE/REASON FOR CHANGE: (See Note 1)

Operation at Extended Power Uprate (EPU) conditions requires the operation of 3 Condensate Pumps (CP) and 3 Reactor Feed Pumps (RFP). If a CP or RFP trips, feed flow will be significantly less than steam flow and the reactor will trip on low vessel level before the operator can take action to reduce power.

This MM adjusts the scoop tube actuators for maximum stroke speed and provides a Reactor Recirculation System (RRS) runback of both individual controllers (single output) if any CP or RFP is stopped at high power. These changes will result in automatic rapid reduction in core flow that will reduce reactor power to a level that can be supported by the feed and condensate system to prevent a reactor trip on low vessel level. It also makes enhancements to the RRS speed controllers and corrective updates to documents.

All systems directly affected by this MM are NNS. Wiring and mounting of new NNS relays is performed in the SCE control room panels. There are no ALARA considerations since the only work performed inside the RCA is by the RRS M/G sets, a low radiation area.

SCOPE/DESCRIPTION OF CHANGES: (See Note 2)

BACKGROUND

1. Feed and Condensate System Capability

Three CP and two RFPs are normally operating to provide 6.41 X $10^6$ lbm/hr heated feedwater to the vessel at the current licensed thermal power of 1593 MWt.

Studies by GE and S&W, References 1 and 2, have determined that operation at 122% EPU conditions of 1950.9 MWt and 8.05 Mlbm/hr feed flow is possible with 3 CP and 3 RFP. Table 5-2, copy attached, of the detailed feed and condensate system hydraulic analysis, Reference 3, has determined that the trip of a CP or RFP at EPU conditions will result in feed flow that is about 0.7 Mlbm/hr less than the EPU steam flow. This will result in a rapid decrease in vessel level and low vessel level reactor trip if reactor power/steam flow is not reduced rapidly to values that can be supported by the operating pumps. Project Definition Document (PDD), Reference 4, copy attached, provides additional discussion.

Reference 5 provided the input to the GE transient analysis of the limiting transient determined from Reference 3, trip of a RFP with maximum condensate demineralizer dp. It included the maximum



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## 50.59 SCREEN

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|---|---|---|---|---|
| I. | Activity/Document Number: | MM 2003-016 | Revision Number: | 0 |
| | Title: | REACTOR RECIRCULATION SYSTEM RUNBACK FOR FDW AND C SYSTEM TRANSIENTS | | |

Provide or attach a brief description of activities (section 6.3 of RM)

Operation at Extended Power Uprate (EPU) conditions requires the operation of 3 Condensate Pumps (CP) and 3 Reactor Feed Pumps (RFP). If a CP or RFP trips, feed flow will be significantly less than steam flow and the reactor will trip on low vessel level before the operator can take action to reduce power.

This MM adjusts the scoop tube actuators for maximum stroke speed and provides a Reactor Recirculation System (RRS) individual controller runback (single output) if any CP or RFP is stopped at high power. These changes will result in rapid reduction in core flow that will reduce reactor power to a level that can be supported by the feed and condensate system to prevent a reactor trip on low vessel level. It also makes enhancements to the RRS speed controllers, corrective updates to documents, and provides changes to the UFSAR (FCR 19/019) and the Condensate & Reactor Feedwater System DBD.

There is no change to the digital component hardware installed by VYDC 2000-002, RECIRCULATION PUMP SPEED CONTROLS MODIFICATION. The 50.59(a)(2) Safety Evaluation prepared for this VYDC, including the evaluation of the impact of the Generic Letter (GL) 95-02 issues when performing analog-to-digital component replacement, remains valid.

All components and systems are NNS, some work is performed in the control room panels.

II. Applicability Determination

Other applicable processes identified during the applicability determination: NA, determination not required IAW AP 6002, Section 4.

III 50.59 Screening Questions (Section 5.2.2 of the 50.59 Resource Manual (RM) provides additional guidance) (Check correct response and provide a brief response to each question answered "No". If "YES" is checked for any question, the 50.59 Screen does not need to be completed since a 50.59 Evaluation is required):

| | | | |
|---|---|---|---|
| 1. | Does the proposed activity involve a change to an SSC that adversely affects an UFSAR described *design function*? (Section 5.2.2.1 of the RM) | ☐ YES | ☒ NO |

RECEIVED
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BY: LMN

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Adding the RRS runback function and increasing the speed of the scoop tube actuators reduces the risk to generation by minimizing the possibility of a low vessel level reactor trip if a CP or RFP is stopped at high power. There are single failures that could result in a spurious runback that is less severe than a runback to minimum speed that would result from spurious actuation of the low feedwater flow (two loop runback)/discharge valve not full open (single loop runback) function.

Increased actuator speed for either runback function is bounded by the trip of single or two recirculation pump trip or single recirculation pump seizure; therefore, UFSAR Sections 14.5.4.3, Loss of Feedwater Flow, and 14.5.5.1, Recirculation Flow Control Failure – Decreasing Flow are not affected.

The maximum actuator speed of approximately 3.3% of calibrated stroke per second will produce about 2.9% of full speed per second (0 to 100% stroke = 20 to 107% full speed) that is bounded by the 25% of full speed per second acceleration assumed in UFSAR Section 14.5.6.1, Recirculation Flow Controller Failure – increasing Flow for a single pump runout. Protection for two pump runout is provided by the rate limiter in each individual controller that is applied to the input from the master controller and does not rely on scoop tube actuator speed limits.

Corrective updates to drawings and the UFCR do not affect any design function.

| | | | |
|---|---|---|---|
| 2. | Does the proposed activity involve a change to a procedure that adversely affects how UFSAR described SSC design functions are performed or controlled? (Section 5.2.2.2 of the RM): | ☐ YES | ☒ NO |

The procedure changes resulting from this MM only pertain to changes that reflect the revised design that reduces the risk to generation.

| | | | |
|---|---|---|---|
| 3. | Does the proposed activity involve revising or replacing an UFSAR described evaluation methodology that is used in establishing the *design bases* or used in the *safety analyses*? (Section 5.2.2.3 of the RM) | ☐ YES | ☒ NO |

Implementation of this MM does not involve revising or replacing UFSAR described evaluation methodologies for the reasons detailed in the response to Question 1.

| | | | |
|---|---|---|---|
| 4. | Does the proposed activity involve a *test or experiment not described in the UFSAR*, where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the UFSAR? (Section 5.2.2.4 of the RM): | ☐ YES | ☒ NO |

There is no test or experiment associated with this MM. Post-modification testing is considered a maintenance activity that is subject to 10CFR50.65(a)(4) and evaluated by the Initial Risk Assessment Screen.

| | | | |
|---|---|---|---|
| 5. | Does the proposed activity require a change to the Technical Specifications? (Section 5.2.2.5 of the RM). | ☐ YES | ☒ NO |

RRS speed controls are not mentioned in the Technical Specifications.

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VERMONT YANKEE MINOR MODIFICATION PACKAGE MM No. 2003-016 (Continued) Att. A, P. 3

| | |
|---|---|
| IV. | If all questions are answered NO, then implement the activity per the applicable plant procedure for the type of activity without obtaining a License Amendment.<br>If screen question 5 is answered YES, then request and receive a License Amendment to support the activity.<br>If screen question 5 is answered NO and question 1, 2, 3 or 4 is answered YES, then a 50.59 Evaluation shall be performed.<br>If only question 3 is answered YES, then only question 8 of the 10CFR50.59 Evaluation needs to be answered. |
| V. | List the documents reviewed including section numbers and key words (UFSAR, Technical Specifications and associated bases, TRM and associated bases, DBDs and other controlled documents) where related information was found. If changes to controlled documents, including plant procedures, are identified, ensure that changes are initiated in accordance with the controlling plant procedures (e.g. FSAR changes are initiated per AP 6036, DBD changes per AP 6007). (ER960591_02) |
| | UFSAR: All sections searched, Sections 7.1, 7.9, and 11.8 are affected by FCR 19/019. Keywords: recirc, recirculation<br><br>Condensate & Reactor Feedwater System DBD: All sections searched, there is no Reactor Recirculation System DBD, Section 4, System Interfaces, is affected by Pending Change ____. Keywords: recirc, recirculation<br><br>TECHNICAL SPECIFICATIONS/TRM: All sections searched, no instances found. Keywords: recirc, recirculation, condensate, feed |

50.59 Screen Signoffs: Preparer: W. FADDEN (Print name) (Sign) Date: 9/4/03

Co-Preparer: L. SPENCER R-T-Vibert for L-Spencer (Print name) (Sign) Date: 9/4/03

Reviewer: W. MATHIS R.T. VIBERT R-T-Vibert 9/4/03 (Print name) (Sign) Date: 9/4/03

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# VERMONT YANKEE

MM No. 2003-028

# MINOR MODIFICATION PACKAGE

SAFETY CLASSIFICATION:
☐ SC-1 ☐ SC-2 ☐ SC-3 ☒ SCE ☐ All NNS SSCs ☐ OQA/Vital Fire

TITLE: APRM FLOW CONTROL TRIP REFERENCE (FCTR) CARD REPLACEMENT

ORIGINATOR/DEPARTMENT: (Print Legibly) William Fadden, E/I&C

PURPOSE/REASON FOR CHANGE: (See Note 1)

Operating restrictions resulting from the existing Average Power Range Monitor (APRM) and Rod Block Monitor (RBM) systems are significantly relaxed or eliminated by the implementation of a series of APRM/RBM/Technical Specifications (ARTS) improvements, in conjunction with Maximum Extended Load Line Limit Analyses (MELLLA) mode of operation, IAW VYDC 2003-015, "ARTS/MELLLA Implementation." The existing analog APRM Flow Control Trip Reference (FCTR) Cards cannot provide the multiple equation flow bias for the APRM high flux trip and Rod Block that is required by the MELLLA mode of operation.

During plant shutdown, this MM will replace the analog APRM FCTR cards with digital cards that have been reviewed and accepted by the NRC for use in this application to provide the multiple equations required for the flow bias for the APRM high flux trip and Rod Block. The RBM setpoint is changed to maximize operational flexibility, reflecting the change in analysis methodology that no longer credits the RBM function. Changes to documents that are also affected by VYDC 2003-015 (DBD, TRM, and UFSAR) will be part of the VYDC.

The FCTR cards and APRM A thru F are SCE and the RBM is NNS. The new digital FCTR cards are direct replacement for the existing analog cards. There are no ALARA considerations since all work is performed in the Main Control Room, a low radiation area.

SCOPE/DESCRIPTION OF CHANGES: (See Note 2)

## I. BACKGROUND

### APRM Functions

The functions of the APRM system affected by this MM are to:

1. Generate trip signals to automatically scram the reactor during core-wide neutron flux transients before the actual core-wide neutron flux level exceeds the safety analysis design bases. This prevents exceeding design bases and licensing criteria from single operator errors or equipment malfunctions.
2. Block control rod withdrawal whenever operation occurs in excess of set limits in the operating map and before core power approaches the scram level.

VY's APRM system calculates an average of the in-core Local Power Range Monitor (LPRM) chamber signals that is periodically normalized to the core thermal power measurement. The

## 50.59 SCREEN

I. Activity/Document Number: MM 2003-028 Revision Number: 0

Title: APRM FLOW CONTROL TRIP REFERENCE (FCTR) CARD REPLACEMENT

Provide or attach a brief description of activities (section 6.3 of RM)

Operating restrictions resulting from the existing Average Power Range Monitor (APRM) and Rod Block Monitor (RBM) systems are significantly relaxed or eliminated by the implementation of a series of APRM/RBM/Technical Specifications (ARTS) improvements, in conjunction with Maximum Extended Load Line Limit Analyses (MELLLA) mode of operation, IAW VYDC 2003-015, "ARTS/MELLLA Implementation." The existing analog APRM Flow Control Trip Reference (FCTR) Cards cannot provide the multiple equation flow bias for the APRM high flux trip and Rod Block that is required by the MELLLA mode of operation.

During plant shutdown, this MM will replace the analog APRM FCTR cards with digital cards that have been reviewed and accepted by the NRC for use in this application to provide the multiple equations required for the flow bias for the APRM high flux trip and Rod Block. The RBM setpoint is changed to maximize operational flexibility, reflecting the change in analysis methodology that no longer credits the RBM function. Changes to documents that are also affected by VYDC 2003-015 (DBD, TRM, and UFSAR) will be part of the VYDC.

The FCTR cards and APRM A thru F are SCE and the RBM is NNS. The new digital FCTR cards are direct replacement for the existing analog cards. There are no ALARA considerations since all work is performed in the Main Control Room, a low radiation area.

II. Applicability Determination
Other applicable processes identified during the applicability determination:

NA, determination not required IAW AP 6002, Section 4.

III 50.59 Screening Questions (Section 5.2.2 of the 50.59 Resource Manual (RM) provides additional guidance) (Check correct response and provide a brief response to each question answered "No". If "YES" is checked for any question, the 50.59 Screen does not need to be completed since a 50.59 Evaluation is required):

1. Does the proposed activity involve a change to an SSC that adversely affects an UFSAR described *design function*? (Section 5.2.2.1 of the RM) ☐ YES ☒ NO

# VERMONT YANKEE

MM No. 2003-039

# MINOR MODIFICATION PACKAGE

**SAFETY CLASSIFICATION:**
☐ SC-1 ☐ SC-2 ☐ SC-3 ☒ SCE ☐ All NNS SSCs ☐ OQA/Vital Fire

**TITLE:** NSSS/BOP Instrumentation Upgrades for EPU

**ORIGINATOR/DEPARTMENT:** (Print Legibly) Design Engineering EI&C

**PURPOSE/REASON FOR CHANGE:** (See Note 1)

Increased flows associated with Extended Power Uprate (EPU) require instrument range modifications to cover the increased flow ranges and to adjust associated set points. The MSL High flow when "not-in-run" set point for EPU is the same absolute d/p value as now exists, but the instrument span is increased. This results in the new set point being only 3.25% of new span (reduced from 5.5%), and it was recommended that this would be too close to the loop accuracy and unreliable results may result. To improve this situation new, more accurate transmitters will be installed in these four instrument loops.

**SCOPE/DESCRIPTION OF CHANGES:** (See Note 2)

The scope of this minor modification is as follows:

1. Replace the existing scales of the Feedwater and Steam flow indicators due to expected increases of flow. Specifically, the four Steam Flow Indicators FI-6-88A/B/C/D will have the existing 0 to 2.0 Mlb/hr scales replaced with 0-2.5 Mlb/hr scales; and the two Feedwater flow indicators FI-6-89A/B will have the existing 0 to 4.0 Mlb/hr scales replaced with 0-5.0 Mlb/hr scales. The scales will be purchased from O'Tek through Southeast Testing Services. The scales shall be installed into the associated new O'Tek digital indicators that have been purchased for VYDC 2002-007 "Feedwater Control System Replacement – Phase 2". These changes will be made at the simulator scheduled such that a full round of operator training can take place on the new equipment.
2. Replace the existing 0 to 8 Mlbs/hr Steam/Feedwater Flow recorder R-6-97 scale and recording paper with to 0 to 10 Mlbs/hr.
3. Calibrate the Feedwater and Steam Flow instrument loops to the above EPU flow ranges. New flow element differential pressure ranges will be input to the associated transmitters under this modification and concurrently the new transmitter outputs will be changed from 10 to 50mAdc to 4 to 20mAdc under VYDC 2002-007. The associated set points will be returned to present values.
4. Re-scale associated ERFIS computer point indications as follows:
   - B015 and B016 Feedwater Flows (to 0 to 5.0 Mlbs/hr)
   - B064 through B067 Steam Flows (to 0 to 2.5 Mlbs/hr) (points added via VYDC 2002-007)
   - B022 Total Steam Flow (to 0 to 10.0 Mlbs/hr)
5. Replace existing transmitters DPT-2-116A, -117B, -118C, and -119D for MSL High Flow with more accurate transmitters. The new transmitters are physically similar to the old such that they can be directly bolted to the old brackets and the tubing will fit up without modification. Technical Evaluation TE 2003-074 shows that the seismic qualification of the instrument racks remains valid for this modification. These loops will be re-scaled during this outage, but the associated set points will be returned to present values.
6. On the 16 MSL High Flow Master Trip Units (MTUs), replace the existing 0 to 120psid local differential pressure indicator scales with 0 to 200psid scales. Replace the scales on the spare units in stock. These loops will be re-scaled during this outage, but the associated set points will be returned to present values.

VERMONT YANKEE MINOR MODIFICATION PACKAGE MM No. 2003-039 (Continued)

**EVALUATION OF MM CHANGES:** (See Note 3)

1. Replacement of the MSL High flow transmitters should be a direct bolt up activity with the possible exception of the conduit entrance. They are SCE, but not EQ, and installation QC steps should be as appropriate. The impact on the seismic qualification of instrument racks 25-56A & B is addressed in Mechanical/Structural department TE 2003-074. There are no load changes and the existing power from the Rosemount Master Trip Units is satisfactory. The new transmitters are much more accurate and have a greater turndown ratio. The transmitters feature remote configuration and calibration via HART calibrator. The software is controlled via the Surveillance Procedure data sheets.

NOTE: The calibrations and set point adjustments in the following steps should be accomplished such that these activities fulfill the requirements of the Surveillance Procedure OP 4323 for the required Tech. Spec. surveillance.

2. Calibration of these four new transmitters and the remaining 12 MSL High flow transmitters will be done to the EPU revised spans as indicated on the included calibration data sheets and Surveillance Procedure OP 4323 (marked up).

3. New scales will be installed in the local indicators of the 16 Master Trip Units (MTU) associated with MSL High flow trips. The scale is replaced as follows:
   a. Remove the MTU card
   b. Remove the four (4) screws that hold the meter to the card
   c. Slide the meter slightly out of the card front until the two (2) additional screws are accessible
   d. Remove the above two screws and the plastic meter faceplate.
   e. Slide the old scale out
   f. Replace with the new scale
   g. Replace the plastic faceplate and install the two screws
   h. Move the indicator back into the card
   i. Replace the four (4) meter screws
4. The set points for the 16 MTUs 2-116A/B/C/D(M), 2-117A/B/C/D(M), 2-118A/B/C/D(M), and 2-119A/B/C/D(M), will be reset per SCR 2003C-042 included in this MM.

5. The set points for the 4 Slave Units 2-116A(S1), 2-117B(S1), 2-118C(S1), and 2-119D(S1), will be reset per SCR 2003C-043 included in this MM.

6. Replacement scales for the new OTek indicators will be installed via removal of the four small screws on the indicator front. This activity should be done prior to calibration and installation of the indicators. The indicators will be "configured" under VYDC 2002-007, but calibrated to the range indicated on the calibration data sheets in this MM. The Steam Flow indicators will display an amber band from 0 to .5 Mlbs (Reference B). The readability will remain basically the same as before except with 5 major graduations verses 4. The digital readouts remain the same.

7. The two Feedwater Flow and four Steam Flow transmitters will be bench calibrated/checked and installed under VYDC 2002-007, then will be final calibrated per the cal data sheets in this MM. The transmitter dampening setting should be set at 0.1 sec. This setting is the closest possible to the 85ms (.085 sec.) +15% setting that the existing Rosemount 1152 transmitters were purchased

# 50.59 EVALUATION

50.59 Evaluation No. 2003-05 Revision Number: 0

Activity Title: (include applicable document numbers) MM 2003-039 Rev. 0

NSSS/BOP Instrumentation Upgrades for EPU

Summary: (This is a recommended summary to be used in preparation of the annual report submitted pursuant to 10CFR50.59(d)(2). Refer to the "50.59 Resource Manual" for instructions).

Activity Description (section 6.3 of RM):

Due to EPU expected increases of flow; replace the existing 0 to 2 Mlbs/hr scales of the four Steam Flow indicators FI-6-88A/B/C/D with 0 to 2.5 Mlbs/hr scales; and the two Feedwater flow indicators FI-6-89A/B will have the existing 0 to 4.0 Mlb/hr scales replaced with 0-5.0 Mlb/hr scales. Recalibrate the Feedwater and Steam Flow instrument loops to the above spans. Change the existing Steam/Feedwater Flow recorder R-6-97 scale and recording paper from 0 to 8 Mlbs/hr to 0 to 10 Mlbs/hr. Rescale associated ERFIS computer inputs as follows:

- B015 and B016 Feedwater Flows (0 to 4.0 to 0 to 5.0 Mlbs/hr)
- B064, B065, B066, and B067 Steam Flows (0 to 2.0 to 0 to 2.5 Mlbs/hr)
- B022 Total Steam Flow (0 to 8.0 to 0 to 10.0 Mlbs/hr)

Replace existing transmitters DPT-2-116A, -117B, -118C, and -119D for MSL high flow with more accurate transmitters and re-span all transmitters to new EPU d/p ranges.

Summary of Evaluation:

The 50.59 evaluation that follows concluded that this design change will not require prior NRC approval before being implemented. SEE ATTACHED

Based upon the results of this evaluation:

☒ Implement the activity per plant procedures without obtaining a License Amendment.

☐ Request and receive a License Amendment prior to implementation.

Evaluation Preparer: James W. Allen (Printed Name) James W Allen (Signature) Date: 8/14/03

Evaluation Reviewer: JOE GAROZZO (Printed Name) RT-Vickl for E Garozzo (Signature) Date: 9/03/03

MM 2003-025 9/3/03 M.M.Hebert [PORC Meeting Number/date/Secretary] [Plant Manager] Date: 9/11/03

Distribution (by PORC Secretary) when approved or revised: [NSARC, Technical Support for periodic report Licensing]

## 50.59 EVALUATION (Continued)

50.59 Evaluation No. 2003-05 Revision Number: 0

NOTES: If all questions are answered "No," a separate written response providing the basis for the answer to each question below shall accompany this form. The "50.59 Resource Manual" (RM) can be used as guidance to determine the content of each response (see Section 6.2 of the RM for additional guidance). Identify references used to perform the evaluation (either in a single list or within the written responses). If the answer to any of the 50.59 questions is "YES", then the 50.59 Evaluation does not need to be completed since the proposed activity may not be implemented until a License Amendment has been obtained from the NRC in accordance with AP 0063.

Throughout this evaluation, UFSAR refers to the current FSAR as updated per 10CFR50.71, approved pending changes to the FSAR which have not yet been submitted to the NRC and documents incorporated into the FSAR by reference (i.e. the TRM and FSAR Drawings).

DOCUMENTS/REFERENCES REVIEWED

List the documents reviewed including section numbers and key words (UFSAR, Technical Specifications and bases, TRM and bases, DBDs and other controlled documents) where related information was found. If changes to controlled documents, including plant procedures, are identified ensure that changes are initiated in accordance with the controlling plant procedures (e.g. FSAR changes are initiated per AP 6036, DBD changes per AP.6007) (ER960591_02):

UFSAR Sections: 1.7.1, 7.1, 7.3, 7.15, 14.4.4, 14.5.4

Key words = Feedwater+flow, Steam+flow, Main Steam Line High Flow

EFFECT ON ACCIDENTS AND MALFUNCTIONS PREVIOUSLY EVALUATED IN THE UFSAR

1. Does the proposed activity result in more than a minimal increase in the frequency of occurrence of an *accident previously evaluated in the UFSAR*? (Section 6.2.1 of the RM)

   SEE ATTACHED ☐ YES ☒ NO

2. Does the proposed activity result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the UFSAR? (Section 6.2.2 of the RM)

   SEE ATTACHED ☐ YES ☒ NO

3. Does the proposed activity result in more than a minimal increase in the consequences of an accident previously evaluated in the UFSAR? (Section 6.2.3 of the RM)

   SEE ATTACHED ☐ YES ☒ NO

4. Does the proposed activity result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the UFSAR? (Section 6.2.4 of the RM)

   SEE ATTACHED ☐ YES ☒ NO

POTENTIAL FOR CREATION OF A NEW TYPE OF EVENT NOT PREVIOUSLY EVALUATED IN THE UFSAR

5. Does the proposed activity create a possibility for an accident of a different type than any previously evaluated in the UFSAR? (Section 6.2.5 of the RM)

   SEE ATTACHED ☐ YES ☒ NO

6. Does the proposed activity create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in UFSAR? (Section 6.2.6 of the RM) ☐ YES ☒ NO

VERMONT YANKEE MINOR MODIFICATION PACKAGE MM No. 2003-053

# VERMONT YANKEE

MM No. 2003-053

# MINOR MODIFICATION PACKAGE

**SAFETY CLASSIFICATION:**
☐ SC-1 ☐ SC-2 ☐ SC-3 ☒ SCE ☐ All NNS SSCs ☐ OQA/Vital Fire

**TITLE:** *Hydrogen Injection Recombiner Low Flow Trip Bypass*

**ORIGINATOR/DEPARTMENT:** (Print Legibly) Michael Smaga / EFIN

**PURPOSE/REASON FOR CHANGE:** (See Note 1)

The purpose of this MM is to install a manual switch in control panel CRP 9-50 that will bypass the AOG recombiner "Low Flow" trip signal to the Hydrogen Injection System during a manual transfer from one recombiner train to the alternate train, transfer from one steam jet air ejector (SJAE) to the alternate; and to implement a setpoint change to decrease the recombiner "Low Flow" trip setpoint. Only the control panel is safety class O/E, the electrical circuit and switch is NNS.

Presently a "Low Flow" trip signal is generated, due to a transient condition, to the Hydrogen Injection System, when performing a transfer from one train of AOG recombiner to the alternate recombiner train or from one SJAE to the alternate SJAE. With the recent implementation of hydrogen injection, the hydrogen detectors require additional PM's to maintain calibration. To perform the calibration, transfer of flow from one train of the recombiner line to the other recombiner line is required. During the transfer, the initial steam flow momentarily decreases in both recombiner flow paths resulting in tripping of the hydrogen injection system. In addition, when both trains are in parallel, this configuration results in a reduced flow in each line near the "Low Flow" trip set point. With this decrease in flow, minor fluctuations in flow have resulted with the generation of a trip signal to the hydrogen injection system. The trip of the hydrogen injection system has an affect on plant radiation levels and the potential to affect the chemical properties that are desirable with hydrogen injection.

Set Point Change Requests, SCR-2003C-076 and SCR-2003C-077 are attached to this MM for decreasing the "Low Flow" set point of recombiner flow switches FS-OG-2101A and FS-OG-2101B from 3040lbmass/hr to 1274lbmass/hr. This lower setpoint will reduce the potential for hydrogen injection trips during either recombiner automatic train transfers.

**SCOPE/DESCRIPTION OF CHANGES:** (See Note 2)

The scope of this change is to install a two position GE selector switch on CRP 9-50 and to implement the setpoint changes. This selector switch is wired in parallel with two sets of relay contacts, one set of contacts from each recombiner train. These contacts, from relays CR6 and CR7 are normally closed for flow in its respective recombiner train and open when flow decreases to the low flow set point. When the control switch is placed in the Bypass position an alarm will actuate in Annunciator 9-50-0-1 (AL-B) and the trip signal from relays CR6 and CR7 are bypassed. The annunciator window is engraved with "HWC Trip Bypass". The electrical circuit is NNS, and the installation is NNS and non-seismic. Installation of the switch is in an O/E panel (CRP 9-50) such that there are no seismic interaction hazards and a review the existing analysis of the panel showed there is no need to revise the analysis. This switch will be located as depicted on the marked-up panel arrangement drawing with installation requirements in drawing 5920-11407, detail J.

The second part of this MM is to implement the two (2) attached set point change requests to lower the "Low Flow" set point for tripping hydrogen injection during a recombiner low flow condition. Per ERC 2003- 071 (attached), references show that the current set point (3040 lbmass/hr) can be reset

to 1000 lbmass/hr so that: a) The flow transmitter will be less susceptible to non-threatening flow changes but remain responsive to real significant flow changes and b) The AOG environment (hydrogen, nitrogen, oxygen, radioactive noble gases and steam) will remain non-explosive per GE detonation evaluation. The new set point is 1274lbmass/hr, which includes the tolerance of the instrumentation circuit so that trip set point remains greater than the minimum flow of 1000lbmass/hr provided in ERC 2003-71.

| PARTS | | |
|---|---|---|
| Stock Code # or Part No. | Amount | Description |
| 78009215873 | 1 | GE CR104PSG21B, Oper., 2-position, maintained contact |
| 78009224270 | 2 | GE CR104PXC10R, Reed Switch. Cont Blk , 1 NO |
| 78009224271 | 2 | GE CR104PXC10R, Reed Switch. Cont Blk , 1 NC |
| 45BN198171 / PCR | 50 feet | Size 16 AWG, Single Conductor, Rockbestos Firewall SIS 600V wire |

**EVALUATION OF MM CHANGES:** (See Note 3)

During the manual transfer, steam flow momentarily decreases in both trains and then the normal flow is divided between the two Recombiner trains. The reduced flow in each train is then closer to the trip set point for each train. Due to the transient condition and with the flow perturbations, the flow decreases momentarily below the low flow set point and a trip signal is generated to the Hydrogen Injection System. This design change, the installation of the bypass switch, will prevent an inadvertent trip of the Hydrogen Injection System during a manual transfer while operating both trains in parallel. Since the bypass switch is located on the same control panel as the controls for AOG recombiners and HWC controls, plant operators monitor the process and can move the switch to the normal position when required. With the bypass switch connected to the Annunciator, an alarm will sound and thus prevent operation of the system with the trip function bypassed unknowingly by the plant operators.

The existing conservative "Low Flow" trip set point was based upon a 4% concentration of hydrogen in-air for detonation rather than using a basis of in-steam as the detonation limit. The attached Engineering Record of Correspondence, ERC No. 2003-017, shows the new low flow set point greater 1000lbm/hr is within the range for detonation suppression. A minimum steam concentration of 50% is required and the new minimum low-flow trip occurs at 70% steam concentration or greater. The new set point of 1274lbmass/hr, is greater than 1000lbmass/hr minimum as stated in the ERC, to take into account the tolerance ± 0.1 mA of the instrumentation circuit.

**INSTALLATION REQUIREMENTS:** (May be provided as attachments and identified here)

General Precaution: If an unexpected action results during installation, do not proceed with uncertainty. Place the system or component in a safe condition, if possible. Notify the Shift Manager if plant equipment is impacted. [ER991225_02]

1. **Prerequisites (RWPs, Housekeeping, Fire Permits, Barrier Control Permits, etc.):**

*See Attachment*

2. **Precautions:**

*See Attachment*

3. **Installation Instructions:**

*See Attachment*

4. **Installation Verification/Testing Requirements (see Note 4):**

*See Attachment*

# 50.59 SCREEN

I. Activity/Document Number: MM 2003-053 Revision Number: 0

Title: Hydrogen Injection Recombiner Low Flow Trip Bypass

The purpose of this MM is to install a manual switch in CRP 9-50 that bypasses the AOG Recombiner "Low Flow" trip signal to the Hydrogen Water Chemistry (HWC) System and to decrease the "Low Flow" trip setpoint. This bypass switch is used during manual transfer from one AOG recombiner train to the alternate train or for a manual transfer from one steam jet air ejector (SJAE) to another. This bypass switch ensures that non-threatening system flow disturbances do not unnecessarily trip the HWC system and use of this manual switch is currently planned for only during these manual transfers. This selector switch is wired in parallel with the relay contacts that provide the trip signal, so that during a manual transfer, with the switch in the "Bypass" position, the switch contacts are closed and thus block a "Low Flow" trip signal from the recombiners. In addition, with the control switch in the bypass position an alarm will actuate in Annunciator AL-B located in CRP 9-50. During normal operation, the Bypass switch is in the "Normal" position and a "Low Flow" signal will trip the Hydrogen Injection. The decrease in the "Low Flow" trip setpoint will reduce the potential for inadvertent tripping of hydrogen injection during a recombiner train transfer, initiated either manually or automatically, and steam jet air ejector (SJAE) transfers. The new setpoint is greater than 70% steam concentration well above the 50% steam concentration for hydrogen inflammation. In addition, all of the electrical circuits modified with this design change are NNS while the control panel safety class is O/E..

II. Applicability Determination
Other applicable processes identified during the applicability determination:

Per AP6002 Rev 9 Section 4.5, the applicability determination has been bypassed.

III 50.59 Screening Questions (Section 5.2.2 of the 50.59 Resource Manual (RM) provides additional guidance) (Check correct response and provide a brief response to each question answered "No". If "YES" is checked for any question, the 50.59 Screen does not need to be completed since a 50.59 Evaluation is required):

1. Does the proposed activity involve a change to an SSC that adversely affects an UFSAR described *design function*? (Section 5.2.2.1 of the RM) ☐ YES ☒ NO

   This bypass switch addition and change in the "Low Flow" trip set point do not adversely affect the design function of the Hydrogen Water Chemistry (HWC) system. The addition of the "Low Flow" bypass switch allows the HWC system to continue functioning during momentary, non-threatening AOG recombiner low flow conditions that occur during the manual transfer from one recombiner train to the alternate recombiner train. With the control switch placed in the "Bypass" position an annunciator on CRP 9-50, located in the control room, will provide indication to the plant operators the switch is in the bypass position. The HWC and AOG systems will continue to operate as designed with implementation of this design change.

   The lower "Low Flow" set point will reduce the potential for premature tripping of hydrogen injection and reduce the potential for vessel chemistry metal spikes and conductivity changes. During normal operation, the "Low Flow" trip will occur if the recombiner flow decreases below the setpoint. The electrical circuits for the AOG and HWC Systems are NNS.

2. Does the proposed activity involve a change to a procedure that adversely affects how UFSAR described SSC design functions are performed or controlled? (Section 5.2.2.2 of the RM) ☐ YES ☒ NO

   The implementation of this MM requires plant procedures changes however; these changes do not affect system functions as described in the UFASR.

## 50.59 SCREEN (Continued)

methodology that is used in establishing the *design bases* or used in the *safety analyses*? (Section 5.2.2.3 of the RM)

The installation of this design change does not change any evaluation methodology for establishing the design basis or safety analysis.

4. Does the proposed activity involve a *test or experiment not described in the UFSAR*, where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the UFSAR? (Section 5.2.2.4 of the RM) ☐ YES ☒ NO

The installation of design change does not involve any test or experiment of any SSC that directly or indirectly affects the operation of any safety systems during normal plant operation.

5. Does the proposed activity require a change to the Technical Specifications? (Section 5.2.2.5 of the RM) ☐ YES ☒ NO

The installation of the design change requires no change to the Technical Specifications.

IV. If all questions are answered NO, then implement the activity per the applicable plant procedure for the type of activity without obtaining a License Amendment.
If screen question 5 is answered YES, then request and receive a License Amendment to support the activity.
If screen question 5 is answered NO and question 1, 2, 3 or 4 is answered YES, then a 50.59 Evaluation shall be performed.
If only question 3 is answered YES, then only question 8 of the 10CFR50.59 Evaluation needs to be answered.

V. List the documents reviewed including section numbers and key words (UFSAR, Technical Specifications and associated bases, TRM and associated bases, DBDs and other controlled documents) where related information was found. If changes to controlled documents, including plant procedures, are identified, ensure that changes are initiated in accordance with the controlling plant procedures (e.g. FSAR changes are initiated per AP 6036, DBD changes per AP 6007). (ER960591_02)

FSAR: Reference is made to the Advance Off Gas system but this design change does not affect any of the UFSAR statements

Technical Specifications reference hydrogen concentration in the off-gas system downstream of the operating recombiner as 4%, page 173. This design change does not change this limit and the existing hydrogen detectors function remains unchanged.

TRM: No Reference found

Key words: AOG, HWC, Off Gas, Hydrogen, Advance

50.59 Screen Signoffs: Preparer: M. Smaga (Print name) (Sign) Date: 12/16/03

Reviewer: James W. Allen (Print name) James W Allen (Signature) Date: 1/08/04

# VERMONT YANKEE

TM No. 2003-022

# TEMPORARY MODIFICATION PACKAGE

**TM intended to be replaced by a permanent Design Change?** ☐ Yes ☒ No

**SAFETY CLASSIFICATION:**

☒ SC-1 ☐ SC-2 ☐ SC-3 ☐ SCE ☐ All NNS SSCs ☐ OQA/Vital Fire

**TITLE:** Vibration Monitoring Equipment Installation on MS & FW Piping for EPU

**ORIGINATOR/DEPARTMENT:** (Print Legibly) Larry Spencer/Plant Engineering ,Don Johnson / Mech./Struct. Design

**PURPOSE/REASON FOR CHANGE:** (See Note 1)

This TM installs vibration monitoring equipment on the MS & FW lines in the Drywell and Heater Bay that are inaccessible at power. GE postulated that baseline pipe vibrations may increase by more than 50% during EPU operating conditions due to higher flow rates and recommended vibration monitoring of the MS & FW lines (Reference GE EPU Task Report T0318). During EPU power ascension, data obtained from this equipment will be evaluated by M/S Design Engineering and an assessment of the vibration levels made. Any future plant changes required from this assessment will be performed under a separate design change package. The selected monitoring locations are based on identified pipe areas that exhibit the potential for having the highest piping vibration response and the vibration test recommendations from the above GE document. This TM will be installed during RFO24 and will remain in place for at least two complete operating cycles after implementation of EPU.

**SCOPE/DESCRIPTION OF CHANGES:** (See Note 2)

The vibration monitoring system (Refer to Figure 1) included in this TM will consist of accelerometers, remote charge converters, cabling located inside the Drywell and Heater Bay and a data acquisition system (DAS). In addition, a short length of cabling is routed just outside these areas to the DAS which is carried on a moving cart located just outside these areas. Spare terminals in containment terminal box B435 are utilized for the Drywell cabling. The cables routed in the Heater Bay will come out thru the heater bay wire door frame located above the feed pump room. The entire vibration monitoring system is independent of all other plant systems and therefore has no impact on the operation of existing systems & components. The equipment is light-weight and therefore has negligible impact on the piping analysis.

The accelerometers are secured to a mounting block which is strapped directly to the pipe. There is no welding to the pipes, pipe attachments or pipe supports. 35 accelerometers will be installed in the Drywell and 4 in the Heater Bay. For some cases, two or three accelerometers are mounted on the same mounting block. The number of mounting locations is 17 in the Drywell and 2 in the Heater Bay. Table 1 provides accelerometer identification and orientation information. Figures 1 thru 10 provide the accelerometer mounting locations. The pipe insulation type at the locations in the Drywell is the reflective metallic insulation ("Mirror") which will be temporarily removed and replaced after the monitoring equipment is installed. By maintaining the same insulation material, during a postulated pipe break, the ECCS Suction Strainer Head Loss Performance Assessment does not require a re-evaluation. The pipe insulation type at the locations in the Heater Bay is asbestos which will be removed per AP 0509 and the appropriate replacement insulation installed after the monitoring equipment is installed.

VERMONT YANKEE TEMPORARY MODIFICATION PACKAGE TM No. 2003-022 (Continued)

A remote charge converter is provided for each accelerometer. The converter is located 10 feet from the accelerometer and is strapped to the outside surface of the pipe insulation. The cabling connecting the accelerometers to the converters must be securely tied down. The first three feet of the cabling adjacent to the accelerometer shall be secured such that no relative movement can occur between the accelerometer and the cable.

The wiring from the converters shall be temporarily supported to plant piping and structures via removable tie-wraps.

When in use, the DAS unit will be located on Elevation 251' of the containment building near containment terminal box B435 and outside of the Heater Bay door in the lube oil hallway at Elevation 248'-6". At these locations, the DAS unit cart will be secured to prevent seismic interaction with any safety related SCC's. The DAS computer will be secured to the cart. When not in use, the DAS unit will be stored in the "dirty" I&C shop located in the reactor building.

The DAS operates independently and does not electronically connect to any plant system or network. The DAS is powered by house power. The DAS software records and stores the accelerometers' data and compares the data to established acceptance criteria. The DAS unit will undergo calibration checks during the accelerometers' installations and prior to its use at the EPU power ascension stages. The calibration consists of attaching an accelerometer to a hand-held "shaker" that is calibrated to generate 1g acceleration and verifying that the trace for each DAS channel is recording 1g (+/- 1%). I&C will perform the calibration checks via sub-work orders. Because the DAS will be installed and maintained by a calibration program, the Software Quality Assurance (SQA) to ENN-IT-104 is not required (Refer to Attachment 1).

Description of Materials

Accelerometers – ENDEVCO Model 7703A-100 ISOSHEAR piezoelectric. Self-generating device that requires no external power source for operation. Tested in a radiation environment up to 10 to 8th power rads and up to +550°F. Size is approximately 1" diameter by 1" high. Weight is 1 oz. Refer to Figure 11.

Remote Charge Converter – ENDEVCO Model 2771B-1. This device transforms the accelerometer's high impedance charge output to a low impedance voltage proportional to the accelerometer's charge. The signal output from the converter is then less susceptible to noise pick-up because of the low impedance voltage. Tested in a radiation environment up to 1.0 MEG rads and up to 212°F. Size is .5" diameter by 3.2" long. Weight is 2.0 oz. Refer to Figure 12.

Cable Between Accelerometer and Converter – ENDEVCO Model 3075M6-120. 10 ft. length.

Mounting Blocks – stainless steel solid block contoured to pipe diameter, size is 2" x 2" x 2"

Wiring From the Converter - Belden, 88240, Coaxial #22 conductor with a single shield (0.159 OD), approximately 2000 linear feet in Drywell, 700 linear feet in the Reactor Building and 500 linear feet in the Heater Bay.

DAS – A PC-Pentium 4 based high speed, digital data acquisition system. The DAS accepts up to 40 channels of analog dynamic signals. The 40 input channels are low passed (anti-alias) filtered, then fed into the analog-to-digital converter (ADC) where each channel is amplified and digitized at a rate of 1024 samples per second which provides usable bandwidth from 1 to 300 Hz. The ADC is a