EA No. 08-213 September 11, 2008

Mr. Keith J. Polson
Vice President Nine Mile Point
Nine Mile Point Nuclear Station, LLC
P.O. Box 63
Lycoming, NY 13093

SUBJECT: NINE MILE POINT NUCLEAR STATION - NRC PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000220/2008007 and 05000410/2008007

Dear Mr. Polson:

On July 31, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Nine Mile Point Nuclear Station, Units 1 and 2. The enclosed integrated inspection report documents the inspection results discussed on June 4, 2008 and July 31, 2008, with you and members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents one self-revealing finding of very low safety significance (Green) concerning a piping failure in the Unit 2 instrument air system due to stress corrosion cracking of unannealed red brass piping on March 26, 2008. The very low safety significance of this finding is based on the piping failure occurring with the unit in cold shutdown; however, the NRC concluded that the failure could have happened with the unit at power, which would have resulted in a loss of feedwater and main condenser initiating event. The NRC staff noted the potential for such an event at power and, therefore, will conduct followup as necessary through routine baseline inspections to verify that your corrective actions in response to this inspection are thorough and effective.

No violation of regulatory requirements occurred. If you contest the finding noted in this report, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-001; and the NRC Senior Resident Inspector at Nine Mile Point Nuclear Station.

In accordance with 10 CFR Part 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web Site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Richard Conte, Chief
Engineering Branch 1
Division of Reactor Safety

Docket No.: 50-220, 50-410
License No.: DPR-63, NPF-69

Enclosure: Inspection Report 05000220/2008007 and 05000410/2008007
w/Attachment: Supplemental Information

cc w/encl:
M. Wallace, Vice – Chairman, Constellation Energy
H. Barron, President, CEO & Chief Nuclear Officer, Constellation Energy Nuclear Group
C. Fleming, Esquire, Senior Counsel, Nuclear Generation, Constellation Energy Group, LLC
M. Wetterhahn, Esquire, Winston & Strawn
T. Syrell, Director, Licensing, Nine Mile Point Nuclear Station
P. Tonko, President and CEO, New York State Energy Research and Development Authority
J. Spath, Program Director, New York State Energy Research and Development Authority
P. Eddy, New York State Department of Public Service
C. Donaldson, Esquire, Assistant Attorney General, New York Department of Law
Supervisor, Town of Scriba
P. Church, Oswego County Administator
T. Judson, Central NY Citizens Awareness Network
D. Katz, Citizens Awareness Network
G. Detter, Manager, Nuclear Safety and Security, Constellation Energy

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.:	50-220, 50-410
License No.:	DPR-63, NPF-69
Report No.:	05000220/2008007 and 05000410/2008007
Licensee:	Nine Mile Point Nuclear Station, LLC (NMPNS)
Facility:	Nine Mile Point, Units 1 and 2
Location:	Lake Road Oswego, NY
Dates:	May 12, 2008 through July 31, 2008
Inspectors:	D. Tifft, Reactor Inspector
Approved by:	Richard J. Conte, Chief Engineering Branch 1 Division of Reactor Safety

SUMMARY OF FINDINGS

IR 05000220/2008007, 05000410/2008007; 05/12/08 - 07/31/08; Nine Mile Point Nuclear Station, Units 1 and 2; Identification and Resolution of Problems.

The inspection was performed by one region-based inspector. One Green finding was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC Identified and Self-Revealing Findings

Cornerstone: Initiating Events

Green. A self revealing Green finding was identified because Constellation failed to either perform a technical evaluation or restore a nonconforming condition to the original design requirement which resulted in a failure of the Unit 2 instrument air piping on March 26, 2008. The nonconforming condition was unannealed red brass piping which was installed in the Unit 2 instrument air system. Subsequent to the piping failure, the licensee performed corrective actions which included replacing all unannealed red brass piping that is not protected by an excess flow check valve and began closely monitoring for water in the instrument air system. Additionally, the licensee plans to replace the instrument air dryers and replace the remaining unannealed red brass piping in the instrument air system.

The finding was greater than minor because it is associated with the design control attribute of the initiating events cornerstone and the associated cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations in that a loss of instrument air could cause a plant scram with complications. The finding was determined to be of very low safety significance in accordance with IMC 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," based on a Phase 3 analysis. The Region I senior reactor analyst (SRA) used the Nine Mile Point Unit 2 Standardized Plant Analysis Risk (SPAR) model to determine the risk significance. (Section 4OA2)

B. Licensee-Identified Violations

None.

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA2 Identification and Resolution of Problems (71152 - One sample)

Annual Sample - Corrosion in Unit 2 Instrument Air System

a. Inspection Scope

The inspectors performed a detailed review of the Unit 1 and Unit 2 instrument air systems based on an increasing number of condition reports identifying water in the Unit 2 instrument air system. Additionally, the piping in this system ruptured due to a stress corrosion crack while shut down for the March 2008 refueling outage. The inspectors reviewed condition reports associated with water in the instrument air system, the recent rupture, and past ruptures of the instrument air system. The inspectors also reviewed corrective actions associated with the condition reports.

b. Findings

Introduction.

A self revealing Green finding was identified because Constellation failed to either perform a technical evaluation or restore a nonconforming condition to the original design requirement which resulted in a failure of the instrument air piping on March 26, 2008.

Description.

On March 26, 2008 at 5:50 pm, while shutdown for a refueling outage, Nine Mile Point Unit 2 instrument air pressure dropped from 110 psig to 80 psig, as measured at the air receivers. Pressure in the air header near the break location dropped to 0 psig. The reason for the pressure drop was determined to be a 41-inch fish mouth rupture in a 2-inch diameter unannealed red brass pipe. The cause of the rupture was determined to be stress corrosion cracking.

Stress corrosion cracking occurs when three conditions exist; a susceptible material, tensile stress, and a conducive environment. Red brass is the susceptible material, and in the unannealed state there are internal residual stresses from the manufacturing process. The conducive environment is ammonia or amines. Only a very small amount of ammonia can result in cracking of unannealed red brass piping. Moisture within the system can promote cracking as the ammonia will concentrate into a solution.

The licensee has previous experience with stress corrosion cracking originating from the exterior surface of the pipe, but the March 2008 rupture was the first time the licensee experienced stress corrosion cracking which originated from the interior of the pipe. Condition Report NM-2008-2473 was written to investigate the cause of the failure. The condition report stated that the licensee's chemistry department sampled the water in the

system after the failure and obtained positive results for ammonia. The condition report concluded the most likely source of ammonia inside the instrument air piping was from decay of organic matter such as insects. Moisture was in the system because Nine Mile Point Unit 2 instrument air dryers have experienced reduced performance over the last few years.

Prior to the most recent pipe failure, on August 15, 2005, condition report NM-2005-3148 was written that identified a nonconformance between the installed piping material in the instrument air system and the designed material as described in the FSAR. Specifically, the FSAR stated that the non-safety related portions of the instrument air piping system are fabricated and installed in accordance with the requirements of ANSI B31.1. Unannealed red brass does not meet the ANSI B31.1 standard, however, it is installed in the Unit 2 instrument air system. Corrective actions from the condition report included coating the unannealed pipe and changing the FSAR to allow this coating in lieu of complying with ANSI B31.1.

This condition report evaluated the corrective actions as a "rework/replacement." However, per the licensee's procedure NIP-ECA-01, "Corrective Action Program," revision 38, to be considered a rework/replacement, the pipe needed to be restored to "existing design or procurement requirements." Since the licensee's corrective actions were to coat the unannealed pipe and revise the FSAR to allow the use of non-annealed red brass pipe with a coating in lieu of complying with ANSI B31.1, the licensee should have performed a technical evaluation according to their corrective action program procedure. Specifically, NIP-ECA-01, "Corrective Action Program," revision 38 defines a "repair" as an activity that requires a change to or deviation from existing design or procurement requirements and requires a technical evaluation to be performed.

The performance deficiency associated with the March 26 pipe rupture is the failure to follow procedure NIP-ECA-01, "Corrective Action Program" by failing to either restore the nonconforming item to existing design requirements or to perform a technical justification approved by the licensee's engineering department to justify not restoring the nonconformance to existing design requirements. The inspector determined that the failure to perform a technical justification was a missed opportunity for the licensee to have identified that the observed external stress corrosion cracking could affect the interior surface of the piping.

Analysis. The inspectors determined this issue is more than minor because it is associated with the design control attribute of the initiating events cornerstone and the associated cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations in that a loss of instrument air could cause a plant scram with complications.

Although the rupture occurred while the unit was shutdown for refueling, the finding was evaluated using the Significance Determination Process (SDP) for at-power situations because the staff concluded that the rupture could have occurred while the plant was operating at full power, thus resulting in a reactor trip. Phase 1 of the SDP directs a Phase 2 analysis because the finding contributes to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions will not be available.

The Region I Senior Reactor Analyst (SRA) determined that a Phase 3 analysis was necessary because the site-specific Phase 2 notebook indicated that the finding could be more than of very low safety significance assuming an exposure time of greater than 30 days. For the Phase 3 assessment, the SRA made the following assumptions:

1. Since the condition existed for greater than a year, the exposure period will be capped at a year. During the one year evaluation period, the plant was shutdown for 17 days. Therefore the "at power" percentage is 348/365 = 0.95.

   The plant specific failure data included instrument air piping failures in 1990, 1996, 2000, 2002 and 2008. Only the 1990 and 2008 failures would have led to reactor scrams. All the failures were related to stress corrosion cracking failures of the un-annealed red brass pipe with the first four failures occurring due to external corrosion and the last failure occurring from internal corrosion. The chance that a failure would be significant enough to cause a reactor scram and generate a significant risk increase was equal to 2 significant failures divided by 5 total failures for a 0.4 probability that a piping failure would increase risk. Furthermore the licensee coated the exterior of the pipe which has the effect of reducing by 50% the surface area susceptible to the stress corrosion. Accordingly, the probability that the event could have occurred at power was calculated as:

   (1 event/year[happened at shutdown])X(0.95[percentage of time at power during exposure period]X(0.4 [probability that pipe failure would be significant enough to lead to a scram and risk increase])x(0.5 [factor to account for exterior pipe coating and reduction in available surface area for corrosion]) = 0.19

2. Operations response during plant operating conditions would be similar to that during shutdown conditions and the leak could be isolated in approximately 20 minutes.

3. The loss of instrument air would lead to loss of the power conversion system (PCS) which would not be recoverable. The isolation of the instrument air leak was highly likely, but the return of the PCS would not occur. Condenser vacuum and the remainder of the secondary would remain available for approximately 30 minutes.

4. The main steam isolation valves (MSIVs) would remain open, the air/nitrogen accumulators would keep the MSIVs open until the failed portion of the instrument air header is isolated and pressure restored. The turbine bypass valves have individual accumulators with hydraulic fluid pressure being assisted with nitrogen overpressure.

5. Safety Relief Valve (SRV) operation would not be affected because the N2 accumulators would keep the valves operational.

6. Containment venting would be possible post instrument air isolation and remain at nominal (base case human error probabilities once the leak is isolated and

pressure restored) due to the timing of the need to perform the venting late in the scenario.

7. The performance deficiency evaluation period will be 3/26/07 to 3/26/08. Prior to the evaluation period, the NMP2 plant specific loss of instrument air system (LOIAS) initiating event likelihood (IEL) would be one significant event in approximately 16.16 reactor critical years for a loss of instrument air frequency of 0.062/year. This would represent the base case loss of instrument air frequency prior to the event.

8. The loss of instrument air frequency for the event would be one event in one reactor critical year times the probability factor for a significant event to have occurred at power during the one year exposure period after the initial coating corrective action.

Phase 3 Risk Evaluation

The Senior Reactor Analyst used Saphire Version 7.27 and the NMP2 SPAR model dated October 28, 2005, modified by Idaho National Lab. The modifications included:

1. Eliminated the simplifying assumption by linking the loss of instrument air failed sequence to the ATWS logic instead of assuming core damage.
2. Adjusted the model to give credit for post containment failure injection sources. (Containment failed (CFAILED) from 1.0 to 0.5)
3. Changed selected basic event failure probabilities (failure to align RHR, operator failure to depressurize, operator fails to vent containment) to SPAR industry average values, as follows:
   - RHR-XHE-XM-ERROR from 5E-4 to 1E-4
   - ADS-XHE-XM-MDEPR from 1E-3 to 5E-4
   - CVS-XHE-XM-VENT from 6E-3 to 1E-3

   In addition, the SRA changed logic gate DEP-SS-2 from an OR gate to an AND gate to properly model plant response. All loss of instrument air sequences were run with a truncation value of 1E-13.

Nonconforming Case Modifications

1. IE-LOIAS set to 1.0/yr
2. Duration of 8760 hours

The SPAR model Nonconforming Case Resultant CDF = 1.45E-6/yr

However, this value should be adjusted by a factor to account for the probability that a significant instrument air failure could occur at power on the coated piping. A 0.19 probability factor (as discussed in Assumption 2 above) was estimated as the likelihood for the event to occur at power. Resultant adjusted delta-CDF is (0.19)(1.45E-6/yr) = 2.76 E-7/yr.

The NMP2 plant has an external event notebook and this was reviewed to determine if an external event contribution would be significant for this performance deficiency. The SRA reviewed all of the dependency tables for fire, flooding, and seismic external events and determined that only fire and flooding contained any functions requiring or affected by IA. The only potentially affected functions were containment venting and the ADS valves. The ADS valves have nitrogen accumulators which are not affected by the performance deficiency and thus would not be impacted. The only function would be containment venting for which the outside containment vent valves rely on IA. However, for this issue the containment venting dependency would only occur during a loss of decay heat removal sequences. The piping to the containment vent valves was thus available to be operated using instrument air once instrument air was isolated, which would be in plenty of time before it would be required in the loss of instrument air scenarios (used to establish containment vent paths). Thus the impact on risk of external events would not be significant.

The finding was reviewed for LERF impact. IMC 0609, Appendix H was reviewed for a BWR with Mark II containment which required LERF factor of 0.3 for high pressure sequences and 0.4 for ATWS sequences. The highest ATWS sequence was LOIAS 76 with a probability of 2.09E-7/yr. The LERF value for this sequence was (2.09E-7/yr)(0.19 factor for LOIAS at power)(0.4 LERF factor) = 1.6E-8/yr which would be GREEN for LERF. The largest probability high pressure sequence was LOIAS 73 with a probability of 2.9E-7/yr. The LERF value for this sequence was (2.9E-7/yr)(0.19 factor for LOIAS at power)(0.3 LERF factor) = 1.7E-8/yr which would be GREEN for LERF. Thus the LERF evaluation would not increase the characterization of the finding.

The SPAR model dominant cutsets were: 1) a containment heat removal loss with failure to vent containment and failure to achieve late injection; and 2) a loss of high pressure core spray and reactor core isolation cooling with failure to depressurize. Based on this review, the SRA concluded that the finding was of very low safety significance (Green).

There is no cross-cutting aspect associated with this finding because it is greater than two years old and not reflective of current plant performance.

Enforcement. No violation of regulatory requirements occurred. The inspectors determined that the finding did not represent a violation of NRC requirements because the failure to perform a technical evaluation occurred on a non-safety-related system. **(FIN 05000410/2008007-01, Failure to perform a technical evaluation or restore a nonconformance to the original design requirement)**

4OA6 Meetings, Including Exit

On June 4, 2008 the inspectors presented interim inspection results to Mr. Keith Polson and other members of the NMPNS staff. On July 31, 2008, the inspectors presented the inspection results via a teleconference exit meeting.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel:
K. Polson, Vice President
S. Belcher, Plant Manager
J. Laughlin, Manager, Engineering Services
T. Syrell, Director, Licensing
M. Shanbhag, Licensing

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000410/2008007-01	FIN	Failure to perform a technical evaluation or restore a nonconformance to the original design requirement (Section 4OA2)

LIST OF DOCUMENTS REVIEWED

Section 4OA2: Identification and Resolution of Problems

Procedures
NIP-ECA-01, Corrective Action Program, Rev. 38
N2-PM-@075, Instrument Air Outage – Refuel Outage, Rev. 1

Drawings
PID-19B, Piping & Instrumentation Diagram, Instrument & Service Air, Rev. 32
PID-19C-24, Piping & Instrumentation Diagram, Instrument & Service Air, Rev. 24
12-F-030, Turbine Building, Elevation 250'-0, Isometric Drawing, Rev. 4
PID-19A-15, Piping & Instrumentation Diagram, Instrument & Service Air, Rev. 14

Condition Reports
NM-1996-0937
NM-2000-2752
NM-2002-3507
NM-2002-4481
NM-2003-1052
NM-2003-3996
NM-2005-2458
NM-2005-3148
NM-2005-3540
NM-2006-1042
NM-2006-5859

NM-2007-4402
NM-2008-2473
NM-2008-2473
NM-2008-3226
NM-2008-3255
NM-2008-3346
NM-2008-4131

Miscellaneous

CN No 003709, “Revise UFSAR to Describe How Susceptible Unannealed Red Brass Piping in the NMP2 Instrument Air System May Be Protected From Surface Contamination By Painting/Coating”
Operational Decision Making Checklist, Instrument Air System, Dated March 26, 2008
LSS Report No. 08-0212, NMP2 Instrument Air Header Failure, Dated April 7, 2008
Maintenance Rule Scoping Documents for U1 Instrument Air System
Maintenance Rule Scoping Documents for U2 Instrument Air System
DER-1-2000-2752, Air leak in Waste Disposal System, Dated August 14, 2000
DER-2-46-0937, Instrument Air Header Split Open, Dated April 11, 1996
PORC Presentation Form, Unit 2 IAS Red Brass Piping ODMC and CR 2008-2473, April 13, 2008