



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
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August 31, 2010

EA 09-249
EA 09-049

Mr. John T. Carlin
Vice President, R.E. Ginna Nuclear Power Plant
R.E. Ginna Nuclear Power Plant, LLC
1503 Lake Road
Ontario, New York 14519

**SUBJECT: R.E. GINNA NUCLEAR POWER PLANT - NRC SUPPLEMENTAL INSPECTION
REPORT 05000244/2010007 WITH ASSESSMENT FOLLOW-UP LETTER**

Dear Mr. Carlin:

On July 23, 2010, the U.S. Nuclear Regulatory Commission (NRC) staff completed a supplemental inspection pursuant to Inspection Procedure 95002, "Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," at your R.E. Ginna Nuclear Power Plant (Ginna). The enclosed inspection report documents the inspection results, which were discussed at the exit meeting on August 4, 2010, with Ms. Maria Korsnick, yourself and other members of your staff.

As required by the NRC Reactor Oversight Process Action Matrix, this supplemental inspection was performed because two findings of moderate safety significance (White) were identified; one finding in the 1st quarter of 2009 and another in the 4th quarter of 2009. Also, an associated performance indicator (PI) (MS08, Heat Removal System) crossed a threshold from Green to White safety significance in the 3rd quarter of 2009. Because the second White finding, identified in the 4th quarter 2009, shared the same underlying causal factors as the White PI, these two issues have not been double-counted during plant performance assessments in accordance with Manual Chapter 0305. The two White findings and White PI were associated with multiple failures of the turbine-driven auxiliary feedwater pump and documented in NRC Inspection Reports 05000244/2009002 and 05000244/2009008. The NRC staff was informed on May 3, 2010, of your staff's readiness for this inspection.

The objectives of this supplemental inspection were to provide assurance that: (1) the root and contributing causes for the risk-significant issues were understood; (2) the extent of condition and extent of cause of the issues were identified; and (3) corrective actions were or will be sufficient to address and preclude repetition of the root and contributing causes. This inspection also included an independent NRC review of the extent of condition and extent of cause for the issues associated with the two White findings and an assessment of whether any safety culture component caused or significantly contributed to the White findings. The inspection consisted of the examination of activities conducted under your license as they related to safety, compliance with the Commission's rules and regulations, and the conditions of your operating license.

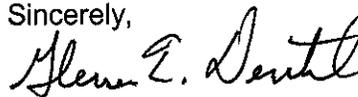
Your staff conducted three root cause evaluations for: (1) the TDAFW pump failure on December 8, 2009; (2) the two TDAFW pump failures on May 26 and July 2, 2009; and (3) repeated failures of the TDAFW pump which resulted in a Degraded Mitigating Systems Cornerstone. The causes documented by your staff were related to both equipment and organizational deficiencies. The primary equipment causes were inadequate governor control linkage maintenance and control valve binding caused by valve leakage and corrosion. The primary organizational causes were a lack of rigor and depth in preventive maintenance scoping, technical detail and procedural guidance for maintenance, vendor manual maintenance, and corrective action program implementation. Your staff also identified that critical decision-making team members and team leads did not challenge the use of inadequate investigative evidence and did not effectively review and challenge the failure-modes analyses. Your staff's third root cause identified additional causes related to station response to emerging issues, the decision-making process, and resolution.

Constellation has taken or planned appropriate actions to address the root and contributing causes. These actions include maintenance, material and equipment changes to the TDAFW pump control valve, linkage and steam admission valves, and process changes to critical PI&R programs. The inspectors determined that Constellation's identified actions, including the scope and timing of remaining planned actions, are appropriate to address the identified causes. The inspectors determined overall that Constellation performed a comprehensive evaluation of the individual and collective causes related to the two White findings and related White PI.

Based on the results of this inspection, no findings of significance were identified. The NRC determined that Constellation's actions addressing these issues were appropriate. Therefore, the first White finding associated with these issues will be removed from the assessment process when this supplemental inspection report is issued and Ginna will return to the Regulatory Response Column of the NRC's Action Matrix. The second White finding associated with these issues will only be considered in assessing plant performance for four quarters in accordance with Manual Chapter 0305, "Operating Reactor Assessment Program." The White PI will continue to be considered in assessing plant performance until it returns to Green. The NRC determined that no additional agency follow-up beyond the baseline inspection program is necessary.

In accordance with 10 CFR 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 Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,



Glenn T. Dentel, Chief
Projects Branch 1
Division of Reactor Projects

Docket No. 50-244

License No. DPR-18

Enclosure: Inspection Report No. 05000244/2010007
w/ Attachment: Supplemental Information

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Constellation has taken or planned appropriate actions to address the root and contributing causes. These actions include maintenance, material and equipment changes to the TDAFW pump control valve, linkage and steam admission valves, and process changes to critical PI&R programs. The inspectors determined that Constellation's identified actions, including the scope and timing of remaining planned actions, are appropriate to address the identified causes. The inspectors determined overall that Constellation performed a comprehensive evaluation of the individual and collective causes related to the two White findings and related White PI.

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Sincerely,
Glenn T. Dentel, Chief */RA/*
Projects Branch 1
Division of Reactor Projects

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.: 50-244

License No.: DPR-18

Report No.: 05000244/2010007

Licensee: Constellation Energy Nuclear Group, LLC

Facility: R.E. Ginna Nuclear Power Plant

Location: Ontario, New York

Dates: July 12 through 23, 2010

Inspectors: D. Werkheiser, Senior Resident Inspector (Team Lead)
M. Balazik, Reactor Engineer, Division of Reactor Safety
J. Bream, Project Engineer, Division of Reactor Projects (DRP)
J. Hawkins, Project Engineer, DRP

Approved by: Glenn T. Dentel, Chief
Projects Branch 1
Division of Reactor Projects

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SUMMARY OF FINDINGS

Inspection Report (IR) 05000244/2010007; 07/12/2010-7/23/2010; R.E. Ginna Nuclear Power Plant; Supplemental Inspection-Inspection Procedure (IP) 95002

This inspection was conducted by a senior resident inspector and three region-based inspectors. 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.

No findings of significance were identified.

Cornerstone: Mitigating Systems

The NRC staff performed this supplemental inspection in accordance with IP 95002, "Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," to assess Constellation's evaluation associated with three turbine-driven auxiliary feedwater (TDAFW) pump failures which resulted in two White inspection findings, and a related White performance indicator (PI). The first White finding, originating in the first quarter 2009, was related to the inadequate implementation of a preventive maintenance (PM) program for the TDAFW pump governor causing the pump to fail. The second White finding, originating in the fourth quarter 2009, was related to inadequate corrective actions which led to binding of the governor control valve and failure of the same TDAFW pump. Additionally, the assigned White PI resulted from exceeding the White significance threshold for the Mitigating Systems Performance Index (MSPI), Heat Removal Systems PI, in the third quarter 2009, due to the reliability and availability issues associated with the TDAFW pump. Because the second White finding affected the mitigating systems cornerstone, and shared the same underlying causal factors as the White PI, these two issues have not been double-counted during plant performance assessments in accordance with the guidance in Manual Chapter 0305.

The inspectors determined that Constellation identified the issues and performed a comprehensive evaluation of individual and collective causes of the three White issues. For the first White finding documented in NRC Inspection Report 05000244/2009002, Constellation's evaluation identified the primary root cause as inadequate PM program controls which resulted in degraded governor control linkages for the TDAFW. Maintenance procedures were corrected and the control linkage was refurbished, lubricated, and retested. However, the inspectors determined that Constellation was slow to recognize the full cause of the TDAFW pump failure which revealed itself in two subsequent failures. As a result, all of the root and contributing causes were not identified for more than six months after the initial failure occurred which delayed implementation of broader corrective actions.

The two subsequent failures resulted in the second White finding, as documented in NRC Special Inspection Team report 0500244/2009008, and caused the associated PI to cross the White threshold. Constellation performed additional equipment evaluations, a broad extent of condition and extent of cause, and an organizational assessment. Constellation identified a primary equipment root cause to be the governor control valve binding caused by corrosion on the valve stem and a primary organizational root cause to be a lack of rigor and depth in a number of critical processes (PM scoping, technical detail and procedural guidance for maintenance, vendor manual maintenance, and corrective action program implementation). Constellation also identified that critical decision-making team members and team leads did not

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challenge the use of inadequate evidence and did not effectively review and challenge the failure-modes analyses. Constellation concluded this resulted in the missed opportunity to avoid the subsequent TDAFW pump failures.

In addition, Constellation conducted a separate collective review of all the TDAFW pump issues and determined that the primary causes were: (1) Issue Response Team (IRT) process and implementation lacked rigor and provided less than adequate information to the root cause team which led to insufficient corrective actions; (2) Non-conservative decision-making by the management team allowed for repeat failures of the third most risk-significant system (TDAFW) in the plant; (3) Inconsistent requirements and a lack of rigor in applying problem identification and resolution (PI&R) principles led to the failure to identify root causes and implement corrective actions to prevent the subsequent failures, and; (4) an inadequate review and incorporation of Operating Experience (OE) which led to missed opportunities to identify potential root and contributing causes.

The inspectors concluded that Constellation has taken or planned appropriate actions to address the root and contributing causes. These actions include material and equipment changes to the TDAFW pump control valve, linkage and steam admission valves, and process changes to critical PI&R programs. The inspectors determined that Constellation's identified actions, including the scope and timing of remaining planned actions, were appropriate to address the identified causes.

Findings

No findings of significance were identified

REPORT DETAILS

4. OTHER ACTIVITIES

4OA4 Supplemental Inspection (95002)

.01 Inspection Scope

The NRC staff performed this supplemental inspection in accordance with IP 95002, "Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," to assess Constellation's evaluation associated with two White inspection findings, and a related White performance indicator (PI), resulting from repeated failures of the turbine-driven auxiliary feed water (TDAFW) pump, a safety-related pump. These two White findings and one White PI affected the mitigating systems cornerstone in the reactor safety strategic performance area. The inspection objectives were to:

- Provide assurance that the root and contributing causes of risk-significant issues were understood;
- Provide assurance that the extent of condition and extent of cause of risk-significant issues were identified and to independently assess the extent of condition and extent of cause of individual and collective risk-significant issues;
- Independently determine if safety culture components caused or significantly contributed to the risk-significant issues; and
- Provide assurance that Constellation's corrective actions for risk-significant issues were or will be sufficient to address the root and contributing causes and to preclude repetition.

R. E. Ginna Nuclear Power Plant (Ginna) entered the Regulatory Response Column of the NRC's Action Matrix in the first quarter of 2009 as a result of one inspection finding of low to moderate safety significance (White). The finding was associated with Ginna's inadequate implementation of a preventive maintenance (PM) program for the TDAFW pump governor and subsequent failure of the pump. On December 2, 2008, the TDAFW pump did not develop the minimum acceptable discharge flow and pressure during a Technical Specification Surveillance Requirement (TSSR) test. The finding was characterized as having White safety significance based on the results of a Phase 3 risk analysis performed by a region-based Senior Reactor Analyst (SRA), as discussed in NRC inspection report (IR) 05000244/2009002. The failure was mainly attributed to binding of the TDAFW governor control linkage due to lack of proper lubrication because steps in the maintenance procedure to lubricate the linkages were deleted during the maintenance planning process. The procedure was corrected and the linkage was then disassembled, cleaned, and lubricated. A surveillance test was performed satisfactorily and the TDAFW pump was restored to an operable condition.

On May 26, 2009, the TDAFW pump experienced an overspeed trip during a TSSR test resulting in the NRC dispatching a Special Inspection Team (SIT) based on criteria in

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Manual Chapter 0309, "Reactive Inspection Decision Basis for Reactors." A subsequent overspeed trip of the TDAFW during another TSSR test occurred on July 2, 2009, and was included in the SIT review. The three TDAFW pump failures were the major contributor of the Mitigating Systems Performance Index (MSPI), Heat Removal Systems PI (MS08) associated with the TDAFW pump to exceed the Green to White threshold ($1.00E-6$) in the third quarter 2009. Ginna entered the Degraded Cornerstone column of the NRC's Action Matrix in the third quarter 2009 based on two inputs having low to moderate safety significance (White) in the Mitigating Systems Cornerstone.

On November 12, 2009, the SIT documented three findings. One finding was characterized as having White safety significance based on the results of a Phase 3 risk analysis performed by a region-based SRA, as discussed in NRC SIT IR 05000244/2009008. The White finding was associated with the failure to preclude recurrence of a significant condition adverse to quality related to the TDAFW pump failures (overspeed trips) on May 26 and July 2, 2009. The failures were mainly attributed to governor control valve stem binding caused by corrosion. The stem components were cleaned and replaced, and increased monitoring was implemented. A surveillance test was performed satisfactorily and the TDAFW pump was restored to an operable condition. Because this finding was documented in the fourth quarter of 2009, affected the mitigating systems cornerstone, and shared the same underlying causal factors as the White PI, these two issues have not been double-counted during plant performance assessments in accordance with the guidance in Manual Chapter 0305.

Prior to this supplemental inspection, the NRC had previously conducted inspections (ML093160122, ML093160200 and ML091250233)¹ to ensure that deficiencies associated with the TDAFW pump had been corrected.

Constellation informed the NRC staff on May 3, 2010, of their readiness for the supplemental inspection. In preparation for the inspection Constellation conducted a comprehensive common evaluation of the three White issues to identify weaknesses that existed in various organizations that allowed for the degraded reactor oversight cornerstone and to document a combined causal evaluation. Constellation identified additional causal factors, which were appropriately documented and addressed in an additional root cause analysis report (RCAR, CR 2010-000724). In addition, Constellation commissioned an independent third-party team to review Constellation's root cause evaluations (RCEs), extent of condition and extent of cause review, corrective actions, and safety culture considerations.

The inspectors reviewed Constellation's RCE for each issue, in addition to other evaluations conducted in support and as a result of the RCE. The inspectors reviewed the corrective actions taken or planned to address the identified causes. The inspectors also held discussions with Constellation personnel to ensure that the root and contributing causes and the contribution of safety culture components were understood and corrective actions taken or planned were appropriate to address the causes and prevent recurrence. The inspectors also independently assessed the extent of condition and extent of cause of the identified issues. In addition, the inspectors performed an assessment of whether any safety culture components caused or significantly contributed to the issues.

¹ Designation refers to an ADAMS accession number. Documents referenced are publicly available using the accession number in ADAMS

.02 Evaluation of the Inspection Requirements

02.01 Problem Identification

- a. IP 95002 requires that the inspection staff determine that Constellation's evaluation of the issues document who identified the issues (i.e. licensee-identified, self-revealing, or NRC-identified) and the conditions under which the issues were identified.

.1 Turbine Driven Auxiliary Feedwater (TDAFW) Pump Failed to Develop Adequate Head and Flow During Testing (Condition Report CR- 2008-009911)

On December 2, 2008, the inoperability of the TDAFW pump was self-revealing during the performance of PT-16Q-T (Auxiliary Feedwater Turbine Pump Quarterly Test) conducted on December 2, 2008. The TDAFW pump failed to reach the required recirculation flow rate and discharge head. The test was stopped based on the abnormal indications and the TDAFW pump was declared inoperable. The inspectors determined that Constellation's root cause analysis (RCA), documented in root cause analysis report (RCAR, CR-2008-009911), appropriately documented the identification of the issues and the conditions under which the issues were identified.

.2 May and July 2009 TDAFW Pump Failures; Overspeed Trip During Testing (Condition Reports CR-2009-003680 & CR 2009-004577)

On May 26, 2009, and again on July 2, 2009, the inoperability of the TDAFW pump was self-revealing during normal and enhanced surveillance testing (PT-16Q-T & STP-Comp respectively). Both tests resulted in an overspeed trip of the TDAFW pump. Constellation performed a single RCA (RCAR CR-2009-003680 & CR-2009-004577) to address both events due to the close proximity of the two events. The inspectors determined that Constellation's RCA appropriately documented the identification of the issues and the conditions under which the issues were identified.

.3 Repeated Failures of TDAFW Pump Resulting in Degraded Mitigating Systems Cornerstone (Condition Report CR-2010-000724)

Ginna has experienced three failures of the TDAFW pump. Constellation identified the need to perform a third RCA (RCAR CR-2010-000724) to collectively assess the events and address shortcoming in the previous two root cause reports that failed to prevent repeat failures of the TDAFW pump. The inspectors determined that Constellation's RCA appropriately documented the identification of the issues and the conditions under which the issues were identified.

Also, on July 6, 2009, Constellation identified that the failure of the TDAFW pump on July 2, 2009, caused the Heat Removal System, Auxiliary Feedwater MSPI PI to cross the threshold from Green to White for the third quarter of 2009. Constellation identified that the largest contributor to the PI increase was the three failures of the TDAFW pump along with accumulated unavailability hours. The TDAFW system is the third most risk-significant system at Ginna. The inspectors determined that Constellation's apparent cause evaluation (CR-2009-004604) appropriately documented the identification of the issues and the conditions under which the issues were identified.

- b. IP 95002 requires that the inspection staff determine that Constellation's evaluation of the issues document how long the issues existed and prior opportunities for identification.

.1 TDAFW Pump Failed to Develop Adequate Head and Flow During Testing

Constellation's RCA concluded that for the December 2, 2008, event the TDAFW pump was likely inoperable at some point between the timeframe of September 2008 and December 2008. Ginna's root cause team evaluated the TDAFW pump failure and determined that during the last scheduled maintenance period for the TDAFW pump in March 2008, the governor linkages were not lubricated because steps in procedure M-11.5C that lubricate the linkages were deleted during the maintenance planning process. The TDAFW pump successfully passed the quarterly surveillance test (PT-16Q-T) in September 2008. The lack of proper lubrication in the governor linkage assembly caused the linkage to bind during the December 2008 surveillance testing. The RCA (RCAR CR-2008-009911) reviewed processes, procedures, and OE that may have provided an opportunity to identify the issue. The first RCA concluded the review did not identify any missed opportunities. However, Constellation's collective RCA (RCAR CR-2010-000724) identified weaknesses in the OE review along with the adequacy of the identification of a contributing cause failure mechanism. Overall, the inspectors determined that Constellation's RCAs were adequate with respect to identifying how long the issue existed and prior opportunities for identification.

.2 May and July 2009 TDAFW Pump Failures; Overspeed Trip During Testing

For the May and July events, Constellation's RCAR documented that the most probable cause was binding of the governor control valve (9519E) within the bushing. The binding was a result of corrosion of the stem. The stem binding appears to have been an intermittent problem and thus it is unknown when the binding began to impact system operation. The TDAFW pump successfully passed the quarterly surveillance test (PT-16Q-T) on March 16, 2009. The RCA concluded that there were prior opportunities to identify the corrosion that led to valve stem binding. The RCA documented that both during the December and May events that there were missed opportunities to identify the degradation of the stem to prevent repeat failures. Work performed in 2005 indicated that the governor control valve was pitted and a replacement stem was installed. However, there was no CR to document the issue or take any other action to identify the cause of the corrosion. This was identified in NRC SIT report 05000244/2009008. In addition, the RCA identified that for the May event, stem binding was determined to be the most probable root cause, however sluggish relay valve operation as a result of wear material accumulation in the relay valve, was not completely ruled out. Overall, the inspectors determined that Constellation's RCA was adequate with respect to identifying how long the issue existed and prior opportunities for identification.

.3 Repeated Failures of TDAFW Pump Resulting in Degraded Mitigating Systems Cornerstone

Constellation's collective RCA (RCAR CR-2010-000724) identified an inadequate OE program was a significant cause of the TDAFW pump failures. Constellation determined that the OE reviews in the original two RCAs for the TDAFW failures and others reviewed were narrowly focused. The RCA concluded that the OE evaluation process

focused more on differences than on similarities of OE, which resulted in missed opportunities regarding the TDAFW Pump governor stem binding. Additionally, the corrosion of the governor control valve stem and subsequent binding was identified as a root cause for the July 2009 failure. It is likely the valve stem corrosion was present 36 days earlier and contributed to the May 2009 failure and seven months earlier in the December 2008 failure. Overall, the inspectors determined that collectively Constellation's RCAs were adequate with respect to identifying how long the issues existed and prior opportunities for identification.

- c. IP 95002 requires that the inspection staff determine that Constellation's evaluation documents the plant-specific risk consequences, as applicable, and compliance concerns associated with the issues both individually and collectively.

.1 TDAFW Pump Failed to Develop Adequate Head and Flow During Testing

The NRC determined this issue was a White finding, as documented in IR 05000244/2009002. Constellation's RCA documented the consequences of the issue, which included the following:

- Failure of the TDAFW pump contributes approximately 3% to the overall core damage frequency (CDF)
- TDAFW pump contribution to large early release frequency (LERF) is approximately 2%
- Failures of the TDAFW pump represents a Maintenance Rule Functional Failure (MRFF) and an MSPI failure

Constellation also documented that the event could have caused the TDAFW pump not to provide flow to the steam generators during a loss of all AC power event and fire scenarios. In addition, Constellation's evaluation considered the associated TDAFW pump inoperable and the applicable technical specification action statements were entered. If the TDAFW pump did not provide flow to the steam generators, this would result in the loss of secondary heat sink. The TDAFW pump is one of five pumps which can supply feedwater to the steam generators. The inspectors concluded that Constellation appropriately documented the risk consequences and compliance concerns associated with the issue.

.2 May and July 2009 TDAFW Pump Failures; Overspeed Trip During Testing

The NRC determined this issue was a White finding, as documented in IR 05000244/2009008. Constellation's RCAR documented the consequences of the issue, which included the following:

- Failure of the TDAFW pump contributes approximately 3% to the overall CDF
- TDAFW pump contribution to LERF is approximately 2%
- Failures of the TDAFW pump represents MRFFs and an MSPI failure

Constellation also documented that the events could have caused the TDAFW pump not to provide flow to the steam generators during a loss of all AC power event and fire scenarios. In addition, Constellation's evaluation considered the associated TDAFW pump inoperable and the applicable technical specification action statements were

entered. If the TDAFW pump did not provide flow to the steam generators, this would result in the loss of secondary heat sink. The TDAFW pump is one of five pumps which can supply feedwater to the steam generators. The inspectors concluded that Constellation appropriately documented the risk consequences and compliance concerns associated with the issue.

.3 Repeated Failures of TDAFW Pump Resulting in Degraded Mitigating Systems Cornerstone

In addition to the information documented in the first and second RCAs, the third RCA independently and collectively examined plant-specific risk of the three events. For each event, Constellation calculated the change in CDF along with the incremental conditional core damage probability (ICCDP). In addition, Constellation examined the combination of the second and third events due to their time proximity. Constellation results were consistent with NRC risk assessments. The inspectors concluded that Constellation appropriately documented the risk consequences and compliance concerns associated with the issue.

d. Findings

No findings of significance were identified.

02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation

- a. IP 95002 requires that the inspection staff determine that Constellation evaluated the issue using a systematic methodology to identify the root and contributing causes.

.1 TDAFW Pump Failed to Develop Adequate Flow During Testing

This event occurred during routine surveillance testing on December 2, 2008. Constellation performed a RCA in accordance with Constellation procedure CNG-CA-1.01-1004, Root Cause Analysis and documented the result as RCAR CR-2008-009911.

Constellation utilized the following methods to determine the Root Cause of the event:

- Failure Modes and Effects Analysis (FMEA)
- Why Staircase
- Comparative Timeline
- Interviews with IRT personnel
- Review of IRT documentation

The Why Staircase and the Comparative Timeline were methodologies identified as acceptable for use in performing a root cause analysis by Constellation procedure CNG-CA-1.01-1004, Root Cause Analysis. However, Constellation did not utilize these techniques in accordance with guidance contained in Constellation procedure CNG-CA-1.01-GL002, Causal Analysis Handbook. Specifically, the RCA Team used the conclusions of the IRT without verifying all potential failure modes were fully explored and properly ruled out.

The focus on the IRT conclusions prevented Constellation from assessing evidence of other failure mechanisms identified during the Comparative Timeline evaluation. For example, the discovery of corrosion on the stem of the governor control valve in 2005 was not evaluated as a potential failure mode because the IRT had previously ruled it out. Additionally, the focus of the Why Staircase was inappropriately limited. The analysis performed by Constellation used the conclusions of the IRT to answer the first two questions of the Why Staircase and started with the question, "Why did the linkage bind."

The inspectors determined that the deficiencies in the use of the Comparative Timeline and Why Staircase methods contributed to the incomplete identification of the root and contributing causes of the December 2, 2008, event.

See Section 02.02(a) (.3) of this report for the inspectors assessment of Constellation's use of a systematic methodology to identify the root and contributing causes for the RCA relating to repeated TDAFW pump failures.

.2 May and July 2009 TDAFW Pump Failures; Overspeed Trip During Testing

The May 26 and July 2, 2009, events occurred during normal and enhanced frequency surveillance testing, respectively. Constellation performed a RCA in accordance with Constellation procedure CNG-CA-1.01-1004, Root Cause Analysis and documented the result as RCARs CR-2009-003680 and CR-2009-004577.

Constellation utilized the following methods to determine the Root Cause of the events:

- FMEA
- Kepner – Tregoe Analytical Troubleshooting
- Comparative Timeline
- Why Factor Tree
- Vender analysis of particulate material
- Videos of the TDAFW pump governor during testing
- Personnel interviews and document reviews

The Constellation used multiple systematic analysis methods identified in Constellation procedure CNG-CA-1.01-1004 as acceptable for use in performing a root cause analysis. The inspectors determined that Constellation evaluated the issue using systematic methods to identify root and contributing causes.

See Section 02.02(a) (.3) of this report for the inspectors assessment of Constellation's use of a systematic methodology to identify the root and contributing causes for the RCA relating to repeated TDAFW pump failures.

.3 Repeated Failures of TDAFW Pump Resulting in Degraded Mitigating Systems Cornerstone

This RCA (RCAR, CR-2010-000724) was performed to assess any additional organizational programmatic deficiencies that led to the previous three failures of the TDAFW pump that were not identified in the first two RCARs. Constellation performed an RCA in accordance with Constellation procedure CNG-CA-1.01-1004, Root Cause Analysis.

Constellation utilized the following methods to determine the root cause of the events:

- Management Oversight and Risk Tree (MORT)
- Events and Causal Factors Chart
- Fault Tree Analysis
- Personnel interviews and document reviews

Constellation used multiple systematic analysis methods identified in Constellation procedure CNG-CA-1.01-1004 as acceptable for use in performing a root cause evaluation.

The inspectors determined that the deficiencies in methodology identified by the inspectors in Constellation's performance of the RCA for the December 2, 2008, TDAFW pump failure, "Turbine Driven Auxiliary Feedwater Pump Failed to Develop Adequate Flow During Testing," were identified by Constellation in the subsequent RCAs. Specifically, the final RCA, performed to assess the organizational programmatic deficiencies, identified that the RCA for the December 2, 2008, TDAFW pump failure lacked a conclusive evaluation of the IRT processes and failed to identify that the FMEA relied on by the Why Staircase was inadequate. Additionally, Constellation identified that the RCA for the December 2, 2008, event failed to adequately evaluate the corrosion discovered on the governor control valve stem in 2005 as a possible failure mechanism.

The inspectors determined that Constellation evaluated the issues using systematic methods to identify root and contributing causes.

- b. IP 95002 requires that the inspection staff determine that Constellation's root cause evaluation (RCE) was conducted to a level of detail commensurate with the significance of the issue.

.1 TDAFW Pump Failed to Develop Adequate Flow During Testing

The inspectors determined that Constellation's RCA was not conducted to a sufficient level of detail commensurate with the significance of the event. Although Constellation's RCA report was performed by a multi-disciplined team consisting of personnel from Constellation's Engineering, Maintenance, Operations, Work Management, and Training departments and utilized multiple analysis methods, the deficiencies identified in section 02.02.a.1 resulted in Constellation focusing their efforts on one contributing cause of the TDAFW pump failure. Constellation failed to challenge the conclusions of the IRT to ensure that other probable failure mechanisms were properly evaluated; therefore, Constellation missed the opportunity to identify corrosion on the governor control valve stem as a potential cause of the December 2, 2008 TDAFW pump failure. Constellation identified and satisfactorily addressed this in their subsequent RCAs.

.2 May and July 2009 TDAFW Pump Failures; Overspeed Trip During Testing

Constellation's RCA was performed by a multi-disciplined team consisting of personnel from Constellation's Engineering, Maintenance, Operations, Work Management, and Training departments and utilized multiple analysis methods. Constellation's RCAR documented both equipment and organizational root causes including: 1) failure of the

governor control valve due to binding caused by corrosion between the valve stem and valve bushings; 2) sluggish response of the relay valve due to grit in the valve and incomplete flushing following modifications; 3) station management failed to reinforce high performance standards resulting in a lack of rigor and depth; and 4) critical decision-making team members and leads did not challenge the use of inadequate evidence to completely confirm a conclusion. Additionally, twelve contributing causes of the TDAFW pump failures were identified by Constellation. Based on the extensive evaluation and review performed by Constellation documented in this RCAR, the inspectors concluded that the RCA was conducted to a level of detail commensurate with the significance of the problem.

.3 Repeated Failures of TDAFW Pump Resulting in Degraded Mitigating Systems Cornerstone

Constellation's RCA was performed by a multi-disciplined team consisting of personnel from Constellation's Nuclear Safety and Security, Information Technology, Operations, Performance Improvement, and Training departments as well as two contractors from an outside RCA specialist consultant, utilizing multiple analysis methods. Constellation's RCA focused on identifying any additional organizational or programmatic deficiencies that were not identified in the previous two RCARs. The RCA documented four root causes including: 1) the IRT process and implementation lacked sufficient rigor resulting in less than adequate information being provided to the root cause team and insufficient corrective actions; 2) non-conservative decision-making by the management team allowed for repeat failures of the TDAFW pump; 3) the corrective action program and implementation was less than adequate resulting in the failure to identify root causes and implement corrective actions; and 4) the process for fully evaluating and incorporating OE was less than adequate. Based on the extensive work performed by Constellation for this RCAR, the inspectors concluded that the RCA was conducted to a level of detail commensurate with the significance of the problem.

The inspectors determined that the deficiencies in level of detail identified by the inspectors in Constellation's performance of the RCA for the December 2, 2008, TDAFW pump failure, "Turbine Driven Auxiliary Feedwater Pump Failed to Develop Adequate Flow During Testing," were identified by Constellation in the subsequent RCAs. Specifically, the final RCA, performed to assess for the organizational programmatic deficiencies, identified that the RCA for the December 2, 2008, TDAFW pump failure stopped at what appeared to be the most probable cause and did not fully identify corrective actions to prevent recurrence.

- c. IP 95002 requires that the inspection staff determine that Constellation's RCA included a consideration of prior occurrences of the issue and knowledge of prior OE.

.1 TDAFW Pump Failed to Develop Adequate Flow During Testing

Constellation's RCA included an evaluation of internal and external OE. However, Constellation's OE review did not document an OE review of the identified root cause of the event but rather the equipment deficiency that was the result of the root cause. This resulted in an incomplete review of OE applicable to the event. Constellation identified the root cause of this event as inadequate managerial controls to identify the level of detail appropriate for the PM work scope. However, Constellation's OE review focused on the governor control valve linkage binding that was the result of the inadequate PM.

Based on Constellation's OE review of previous governor control valve linkage issues, Constellation concluded that previous industry OE would not have prompted the site to implement additional barriers that could have prevented the event. The deficiencies identified in the industry OE were evaluated as not applicable to Ginna due to differences in equipment configuration or already existing procedural guidance at the time of the OE evaluation.

The inspectors determined that this resulted in Constellation failing to document the review of appropriate industry OE and how prior reviews failed to prevent this event in accordance with Constellation procedures. However, the inspectors determined through interviews with Constellation personnel and a review of the corrective actions identified in the RCAR that there are extensive actions in place to improve the PM process through the use of OE and industry best practices.

.2 May and July 2009 TDAFW Pump Failures; Overspeed Trip During Testing

Constellation's RCA included an evaluation of internal and external OE. However, Constellation's OE review focused on only one of Constellation's identified four root causes for the event. This resulted in an incomplete review of OE applicable to the event. Constellation reviewed industry OE regarding governor control valve binding as a result of corrosion in the stem packing area. The inspectors determined that this resulted in Constellation failing to identify appropriate industry OE and how prior reviews failed to prevent this event in accordance with Constellation procedures.

Constellation identified multiple NRC and industry OE reports concerning corrosion of a governor control valve stem causing binding. Constellation review determined that the OE was not applicable due to a different equipment configuration between the Ginna TDAFW pump and the pumps referenced in the OE. However, Constellation failed to identify the 2005 internal event, during the OE review, where corrosion was discovered on the governor control valve stem during routine maintenance. As a result, Constellation failed to assess if the assumptions of the external OE evaluations were still valid given the 2005 event.

.3 Repeated Failures of TDAFW Pump Resulting in Degraded Mitigating Systems Cornerstone

Constellation's RCA included an evaluation of internal and external OE as well as a review of the OE process effectiveness. As a result of this review, Constellation determined the process for fully evaluating and incorporating OE was less than adequate. The process used to disposition the OE lacked rigor and narrowly focused on differences rather than similarities of OE. This resulted in missed opportunities regarding the TDAFW pump. Additionally, Constellation identified that OE had not been adequately integrated into site technical procedures, work instructions, and program documents. Constellation determined that this resulted in several missed opportunities to learn from internal and external OE.

Constellation determined that the deficiencies in the OE process resulted in a failure to adequately assess OE in the two previous RCARs. Constellation subsequently performed a thorough OE review related to both the equipment deficiencies, and the organizational and programmatic deficiencies associated with the TDAFW pump failures.

Constellation identified several corrective actions to address the identified deficiencies, including:

- Additional training of Constellation personnel on OE screening
- Reassess prior OE relevant to the TDAFW pump
- Require Management Review Committee (MRC) review of barrier analyses for industry OE
- Revise the process for incoming OE to require a multidisciplinary team review at the initial screening phase of the process
- Perform a statistically significant sample of historical OE to identify any missed opportunities to perform a barrier analysis for critical and significant components

The inspectors determined that the deficiencies in the identification and evaluation of previous internal and external OE in Constellation's performance of the "Turbine Driven Auxiliary Feedwater Pump Failed to Develop Adequate Flow During Testing," RCA and the "May and July 2009 Turbine Driven Auxiliary Feedwater (TDAFW) Pump Failures; Overspeed Trip During Testing," RCA were identified by Constellation in the subsequent Root Cause Analyses. Specifically, the final RCA, performed to assess the organizational and programmatic deficiencies, identified multiple internal and external OE applicable to the organizational and equipment deficiencies identified in the first two RCARs that were missed. Additionally, the final RCAR identified that the inadequate OE program was a significant cause of the TDAFW pump failures and identified corrective actions to strengthen the OE process.

d. IP 95002 requires that the inspection staff determine that Constellation's RCA addresses the extent of condition and extent of cause of the issues.

.1 TDAFW Pump Failed to Develop Adequate Flow During Testing

Constellation's RCA considered the extent of condition associated with the binding of the governor control valve linkage causing a failure of the TDAFW pump. Constellation determined that the failure of the linkage due to binding did not directly affect other plant systems. Constellation verified that maintenance procedures for other systems that utilize governor control linkages, including the Emergency Diesel Generators, contained steps to periodically lubricate those linkages.

Additionally, Constellation's RCA considered the extent of cause associated with the inadequate PM work scope. Constellation performed a search of condition reports pertaining to Maintenance Functional Failures caused by incomplete performance of scope and was unable to identify any instances. Constellation developed corrective actions to initiate an engineering review of job plans to ensure they contain sufficient detail to ensure that all necessary steps of a PM activity are included in the scope of the work order.

.2 May and July 2009 TDAFW Pump Failures; Overspeed Trip During Testing

Constellation's RCA considered the extent of condition associated with the governor control valve stem binding due to corrosion. Constellation determined that the corrosion mechanism combined with the limited leakoff seal design was unique to the TDAFW

pump. Constellation determined that other critical systems were not susceptible to this failure.

Constellation's RCA also considered the extent of condition associated with the foreign material in the TDAFW control oil system. Constellation determined that there was a potential for other oil systems to contain foreign material if maintenance was not properly controlled or the systems were not properly flushed following maintenance. Constellation implemented corrective actions to review all oil systems for similar foreign material deficiencies.

Constellation's RCA also considered the extent of cause associated with the organizational and programmatic causes. Constellation performed a review of CRs and self-assessments to identify other programs and processes used to ensure risk-significant systems and components were properly implemented. Additionally, corrective actions were implemented to improve the formality and rigor when assumptions are used and while performing troubleshooting.

.3 Repeated Failures of TDAFW Pump Resulting in Degraded Mitigating Systems Cornerstone

Constellation's RCA considered the extent of cause associated with the inadequate IRT process that resulted in inadequate information transfer to root cause teams resulting in insufficient corrective actions for the first two TDAFW pump failures and with the inadequate implementation of the corrective action program. Constellation identified that other departments contained similar processes with multiple procedure hand offs. Constellation evaluated these departments and clarified procedural inconsistencies in methodologies, terminology, and turnover from one process to another.

Constellation's RCA also considered the extent of cause associated with non-conservative decision-making by management failing to place appropriate emphasis on safe and reliable operation. Constellation identified that this cause extended beyond the decisions surrounding the TDAFW pump failure events and implemented training on safety culture aspects to ensure that the proper emphasis is placed on safe and reliable operation.

Constellation's RCA also considered the extent of cause associated with the inadequate process for fully evaluating and incorporating OE. Constellation performed an assessment of recent OE to verify that other significant OE was evaluated properly and deficiencies identified were appropriately dispositioned by the corrective action program. Constellation also initiated actions to identify additional industry user groups for participation that could be used as a source of additional OE and technical expertise.

e. Findings

No findings of significance were identified.

02.03 Corrective Actions

Due to the related nature of the assessed issues and the second White finding is based on ineffective corrective actions, the following inspection areas are documented collectively to accurately characterize Constellation's corrective actions associated with the multiple TDAFW pump failures.

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- a. IP 95002 requires that the inspection staff determines that (1) Constellation specified appropriate corrective actions for each root and contributing cause, or (2) an evaluation that states no actions are necessary is adequate.

Constellation took immediate corrective actions to restore the TDAFW pump operability based on the conclusions from each of the RCARs that were performed for each TDAFW pump failure. Ultimately, the operability of the TDAFW pump was restored due to extensive rework including replacement and adjustment of the governor control valve linkage, rebuilding of the relay valve, inspection and cleaning of the control valve, replacement of the control valve stem and adjustments to the stem and bushing clearances.

The initial failure of the TDAFW pump in December 2008, prompted Constellation to perform the initial RCAR (CR-2008-009911) originally completed on January 9, 2009. This initial RCAR was revised in March 2009 due to weaknesses identified by Constellation in the corrective actions developed to prevent reoccurrence. In June 2010, the initial RCAR was revised to address identified concerns in the effectiveness of the corrective actions due to the repetitive failures experienced in May and July 2009, and to align with the corrective actions developed in the subsequent RCARs (CR-2009-003690/CR-2009-004577 and CR-2010-000724).

During the review of these RCARs, the inspectors noted minor issues associated with documentation and implementation of the corrective actions. Specifically, the corrective actions associated with procedural enhancements have been slowed by the Constellation fleet review, acceptance, and implementation process. The fleet implementation timeline has affected the progress of Constellation's process training and procedural implementation. The inspectors also noted that the documentation of corrective actions associated with issues regarding "less than adequate operating experience" (Root Cause #2 and #4 from RCAR CR-2010-000724) was lacking. During the review of these two root causes, it was not apparent to the inspectors how the corrective actions, consisting of changes to the OE training, process, and procedures, had been implemented. The site informally implemented the corrective actions associated with the OE screening committee, procedural training, and the MRC screening of OE. The site also conducted informal tabletop training for Engineering on the revised FMEA and Operational Decision-Making (ODM) processes without supporting documentation. Based on follow-up information provided by Constellation and interviews, the inspectors determined that the corrective actions were implemented but not clearly documented in accordance with Constellation's corrective action program (CAP). Constellation has documented this issue in the CAP.

Overall, the corrective actions identified for the three RCARs' root and contributing causes were assessed by the inspectors to be appropriate and prioritized according to their significance. To address the issues associated with the CAP program lacking sufficient rigor and the inadequate PI&R process, Constellation restructured the PI&R process flow path and is in the process of revising and implementing procedures related to both the CAP and PI&R processes. Constellation conducted process training and table-top exercises on problem solving, complex troubleshooting and failure mode analysis. To address the independence of the PI&R teams and the need for ODM to drive the process effectively, process and procedural improvements were made to challenge boards, nuclear safety advocates, MRC, and a fleet inter-departmental high impact team (HIT) was established. A review of the changes to the PI&R process and

procedural changes are appropriate to affect improvements in Constellation's processes and clarify specific IRTs roles and responsibilities. To address all of the contributing causes, Constellation is upgrading the PM program processes and procedures, identifying training and resource needs in the Quality and Performance Assessment (Q&PA) department, and performing assessments of all the proposed corrective actions. The inspectors determined that these proposed corrective actions are appropriate and adequately address each root and contributing cause.

- b. IP 95002 requires that the inspection staff determine that Constellation prioritized corrective actions with consideration of risk significance and regulatory compliance.

The inspectors determined that Constellation established appropriate priorities for corrective actions based on sound criteria, including risk significance. Constellation has completed most corrective actions associated with the three TDAFW pump RCARs. Others are scheduled during the next refueling outage. Additionally, Constellation made enhancements to improve the integrated risk management procedure to reflect consistency between the ODM teams as part of the new site PI&R process. Based upon Constellation's prioritization of corrective actions using the recommendations of the RCARs, the fleet interdepartmental HIT and the corporate challenge boards, the inspectors determined that Constellation appropriately prioritized all of the corrective actions with due consideration of risk significance and regulatory compliance.

- c. IP 95002 requires that the inspection staff determine that Constellation established a schedule for implementing and completing the corrective actions.

At the time of the supplemental inspection, all of Constellation's corrective actions had either been implemented or scheduled. Procedural changes and program management changes were either completed or in the process of going through fleet adaptation and were scheduled to be implemented in the near future. The inspectors noted some minor issues associated with the schedule for implementing and completing some of the RCAR assigned corrective actions. The inspectors determined that multiple effectiveness reviews that were previously scheduled for completion were identified by Constellation's collective RCAR as not being scheduled in a timely manner. This was due to extensions of completion dates for associated corrective actions. Constellation is continuing to address both process-wise and procedurally how long-term corrective actions (LTCAs) are assigned. The inspectors noted that the assignment and justification for completion date extensions were not always clear. The inspectors considered the schedule for completion of the remainder of the corrective actions to be appropriate.

- d. IP 95002 requires that the inspection staff determine that Constellation developed quantitative and/or qualitative measures of success for determining the effectiveness of the corrective actions to preclude repetition. Constellation has planned several effectiveness reviews and self-assessments for each root and contributing cause corrective actions to ensure that these corrective actions prevent recurrence and are complete and appropriate. These effectiveness reviews are intended to verify that the corrective actions have adequately revised the station's CAP procedures and PI&R processes. The effectiveness reviews are scheduled at 3-month intervals following the estimated completion of the majority of the corrective actions. The inspectors noted a minor issue associated with the ability of the Q&PA department to accurately complete the multiple self-assessments and effectiveness reviews required by the RCAR corrective actions in a timely manner.

During the review of corrective actions associated with contributing cause #2 of RCAR CR-2010-000724, the inspectors identified a possible vulnerability with the station's ability to complete these corrective actions because of the lack of qualified Q&PA inspectors and insufficient training on the changes to the CAP procedures and PI&R processes. At the time of the inspection, the inspectors identified only one Q&PA individual qualified as a Level 3 inspector. The inspectors also identified one Q&PA inspector in the department who had been trained on the new CAP and PI&R processes. Constellation entered this issue into their CAP as CR-2010-004438. Constellation plans to perform a Q&PA needs-analysis for providing training on the new CAP processes to the Q&PA inspectors. Inspectors determined that Constellation developed an adequate plan to address this issue by training and adding qualified inspectors before the end of 2010.

Constellation has planned self-assessments intended to review historical events of critical components, identify potential latent equipment issues, reveal non-conservative decision-making in the PI&R process, inconsistencies in site integrated work management turnovers, and other missed opportunities. Constellation has also taken steps to benchmark other industry plants that have established effective metrics associated with nuclear safety culture health. Based on the information provided by Constellation and a thorough review of all the corrective actions, the inspectors determined that Constellation's plans contained sufficient methods and measures of success for determining the effectiveness of the corrective actions to prevent recurrence.

- e. IP 95002 requires that the inspection staff determine that Constellation's planned or taken corrective actions adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection, if applicable.

The NRC issued the first of two NOV's concerning the TDAFW pump failures to Constellation on June 8, 2009, and the second on November 12, 2009. Constellation provided the NRC written responses on July 7, 2009, and December 9, 2009, respectively. Both of the Constellation's responses described: (1) corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken; (3) the date when full compliance will be achieved; and (4) the reasons for the violation.

During the conduct of this inspection, the inspectors confirmed that Constellation's RCARs and the corrective actions planned and taken fully address both of the NOV's. Due to the subsequent failure of the TDAFW pump during and following the issuance of the first NOV, Constellation identified that the compliance date of December 15, 2009, listed in the response to the first NOV needed to be revised. Constellation conducted multiple RCARs to address both the first NOV and the second NOV. Constellation now plans to restore full compliance by June 1, 2011, by completing all the corrective actions associated with CR-2008-009911, CR-2009-003690, CR-2009-004577 and CR-2010-000724.

f. Findings and Assessment

No findings of significance were identified.

Constellation performed appropriate operability and reportability determinations; evaluated and properly prioritized the safety significance of corrective actions, performed a historical review for repetitive occurrence, and scheduled timely effectiveness reviews

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to assess the progress of the corrective actions. Constellation assessed the generic applicability of the identified problems and adequately addressed these issues with compensatory actions until all corrective actions are completed. The inspectors determined that there are no significant issues regarding Constellation's corrective actions that have not already been identified and addressed in the CAP program.

02.04 Independent Assessment of Extent of Condition and Extent of Cause

a. Inspection Scope

IP 95002 requires that the inspection team perform a focused inspection to independently assess the validity of Constellation's conclusions regarding the extent of condition and extent of cause of the issues. The objective of this requirement is to independently sample performance, as necessary, within the key attributes of the mitigating systems cornerstone to provide assurance that Constellation's evaluation regarding the extent of condition and extent of cause is sufficiently comprehensive.

The inspectors conducted independent extent of condition and extent of cause reviews of the performance issues associated with the White issues. Constellation's RCAs of the White issues ultimately revealed significant and broad organizational issues associated with the process of problem investigation and resolution, decision-making, CAP, and OE. Specifically, the significant and broad organizational issues were the ODM process tree, supporting teams, inter-departmental coordination, and how an issue is addressed, processed, and resolved. The inspection team's independent review focused on the primary root causes associated with the White findings in addition to Constellation's identified contributing causes that involved more specific attributes of the broader root causes.

The inspection team assessed whether Constellation's extent of condition and extent of cause evaluations sufficiently identified and bounded the performance issues. The staff also assessed whether Constellation's extent of condition and extent of cause evaluations sufficiently determined the actual extent of similar organizational issues that potentially existed in other station departments, programs, and processes.

In conducting this independent review, the inspection team interviewed station management and staff, reviewed program and process documentation, and reviewed existing station program monitoring and improvement efforts, including review of corrective action documents. The inspectors conducted walkdowns of the plant and observed operators perform plant procedures. Based on the root and contributing causes identified by Constellation, the inspection team focused the review on the following attributes of the programs and processes:

- Program and process expectations that clearly delineated station management and staff roles and responsibilities;
- Program and process performance monitoring efforts that included performance gap analyses;
- Program and process improvement efforts that included effective use of the OE and existing station improvement plans, and;
- Change management implementation for past programs and processes, including organizational and staffing restructuring completed at the station.

b. Assessment

The inspection staff determined that Constellation conducted a comprehensive extent of condition and extent of cause review that sufficiently identified most relevant areas. Issues continue to be evident in the effective review and use of OE; corrective actions are still in progress. The staff did not identify any substantive extent of condition and extent of cause issues that Constellation was not aware of and had not already identified with corrective action plans in place.

The inspectors noted evidence of change in enforcing existing procedures and processes, including exercising the improved process of problem investigation and resolution through review of a selected number of plant issues:

- Station Trip Event root cause investigation that occurred on December 30, 2009, and documented in RCAR CR-2010-000084;
- Station Battery 'B' cell voltage apparent cause investigation documented in CR-2010-001205;
- Station Post-Contingency Low Voltage ODM documented in CR-2010-004217

Based on the results of the independent assessment, the inspectors concluded that Constellation's extent of condition and extent of cause evaluations were sufficiently comprehensive.

c. Findings

No findings of significance were identified.

02.05 Safety Culture Consideration

a. Inspection Scope

IP 95002 requires that the inspection staff perform a focused inspection to independently determine that Constellation's RCA appropriately considered whether any safety culture component caused or significantly contributed to any risk-significant issue.

The inspectors reviewed the RCARs, CRs, and common cause evaluation. The inspectors also conducted numerous interviews with station personnel assessing Constellation's safety conscious work environment.

b. Assessment

As part of the RCAs for the performance issues, Constellation evaluated the identified root and contributing causes against the safety culture components that could have contributed to the issues. Constellation's root cause evaluation included a discussion of the thirteen safety culture components described in Regulatory Issue Summary 2006-013, "Information on the Changes Made to the Reactor Oversight Process to More Fully Address Safety Culture," (ADAMS Accession No. ML061880341) as they applied to the two White findings affecting the mitigating cornerstone. Constellation determined that significant contributors to the identified root and contributing causes most prevalently included human performance (decision-making and work practices), problem

identification and resolution (corrective action program and operating experience) components, and continuous learning environment. Constellation also identified weaknesses in organizational change management, resources, work control, self and independent assessments, accountability, and safety policies. Constellation also considered the results of a safety culture assessment and safety conscious work environment (SCWE) survey in the consideration of safety culture components.

For each of the identified contributing components, Constellation confirmed that corrective actions were established to address the issues. The inspectors determined that Constellation appropriately considered whether weaknesses in safety culture components were root or contributing causes for the performance issues. The identified root and contributing causes were broad and, therefore, encompassed the applicable safety culture attributes. The inspectors did not identify any safety culture component that could reasonably have been a root cause or significant contributing cause that had not been addressed in the root cause evaluation.

c. Findings

No findings of significance were identified.

02.06 Evaluation of IMC 0305 Criteria for Treatment of Old Design Issues

Constellation did not request credit for self-identification of an old design issue; therefore, the risk-significant issues were not evaluated against the IMC 0305 criteria for treatment of an old design issue.

4OA6 Meetings

Exit Meeting Summary

On August 4, 2010, the inspectors presented the inspection results at a public meeting (ML102010415)² to Ms. Maria Korsnick, Chief Nuclear Officer, and other members of her staff, who acknowledged the issues presented. The inspectors understood and acknowledged that proprietary information reviewed would not be retained following the report issuance.

On August 4, 2010, the NRC also conducted a regulatory performance meeting after the conclusion of the exit meeting discussing the inspection results. The regulatory performance meeting was held between Constellation and the NRC to discuss the corrective actions associated with Constellation's safety-significant inspection findings. The purpose of the meeting was to provide a forum in which to develop a shared understanding of the performance issues, underlying causes, and Constellation's planned actions for each safety significant assessment input.

ATTACHMENT: SUPPLEMENTAL INFORMATION

² Designation refers to an ADAMS accession number. Documents referenced are publicly available using the accession number in ADAMS

SUPPLEMENTAL INFORMATION**KEY POINTS OF CONTACT**Licensee Personnel

M. Kosznick	Chief Nuclear Officer, CENG
J. Carlin	Site Vice President, Ginna
E. Larson	Plant General Manager, Ginna
M. Annett	Performance Improvement Director
D. Bierbrauer	Nuclear Safety and Security Manager
J. Brown	Operations Support General Supervisor
M. Casale	Planning Supervisor
E. Deogracias	Quality Assurance Supervisor
E. Durkish	TDAFW System Engineer
R. Everett	Design Engineering General Supervisor
S. Fregeau	General Supervisor System Engineer
M. Giacini	Maintenance Manager
T. Harding	Director, Licensing
C. Holden	Engineer, Design
G. Howie	Technician, Mechanical
T. Kirkpatrick	Senior Analyst Performance Improvement
S. Lash	Technician, I&C
S. Mason	Outage Management General Supervisor
T. Paglia	Integrated Work Management Manager
J. Sullivan	Manager, Operations
P. Swift	Engineering Services Manager
L. Taylor	Director Human Resources
J. Torbitt	Supervisor Quality Assurance
S. Turner	95002 Support
D. Wilson	Manager, Mechanical Maintenance
G. Wrobel	Senior Project Manager

NRC Personnel

C. Cahill	Senior Reactor Analyst
L. Casey	Resident Inspector
G. Hunegs	Senior Resident Inspector
K. Kolaczyk	Senior Resident Inspector
N. Perry	Senior Project Engineer

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSEDClosed

05000244/2009002-01	VIO	Failure to Properly Lubricate Governor Linkage
05000244/2009008-01	VIO	Failure to Preclude Recurrence of a Significant Condition Adverse to Quality Associated with the Turbine Driven Auxiliary Feedwater Pump Governor Control Valve

LIST OF DOCUMENTS REVIEWED

Root/Apparent Cause Analyses

CR-2008-009911, RCA Turbine Driven Auxiliary Feedwater Pump Failed to Develop Adequate Flow During Testing, date 06/24/2010
 CR-2009-003680 and CR-2009-004577, RCA May and July 2009 Turbine Driven Auxiliary Feedwater Pump (TDAFWP) Failures; Overspeed Trip During Testing, dated 06/24/2010
 CR-2010-000724, RCA Ginna Station has Experienced Repeat Failures of the Turbine Driven Auxiliary Feedwater (TDAFW) Pump Which has Resulted in a Degraded Cornerstone in Mitigating System, dated 05/19/2010
 CR-2009-004604, ACE AFW MSPI White Indicator, dated 08/27/2009
 CR-2009-008886, ACE TDAFW Pump Maintenance Field Activities, dated 12/28/2009
 CR-2009-009518, ACE TDAFW Pump Outboard Bearing, dated 01/28/2010
 CR-2010-002498, ACE Improper Use of N/A, dated 05/07/10

Engineering Change Packages

ECP-10-000069, Replace TDAFW Pump Steam Admission Check Valves, Rev. 0
 ECP-2009-0208, V-9519E Replacement with Enhanced Materials, Rev. 0
 ECP-10-000072, Replace TDAFW Pump Steam Admission Valves 3504A and 3505A, Rev. 0

Calculations & Analysis

CALC-2010-0014, Pipe Stress and Pipe Support Analysis for Pipe Segment MS-120 Due to Replacement of Valves 3505A, 3504A, 3505B and 3504B, Rev. 0
 330-54871, Weak Link Report 6-inch Class 600 Parallel Disc Gate Valve, Rev. 0

Condition Reports (* denotes NRC identified during this inspection)

CR-2010-003514	CR-2010-003935	CR-2010-003467
CR-2010-003467	CR-2010-003917	CR-2010-002498
CR-2010-002487	CR-2010-003854	CR-2010-001450
CR-2009-006765	CR-2010-003736	CR-2010-000724
CR-2008-009911	CR-2010-003534	CR-2010-004431*
CR-2009-009310	CR-2010-003470	CR-2010-004438*

Corrective Actions

CA-2009-000747	CA-2010-001272
CA-2009-000101	CA-2010-001629
CA-2009-000102	CA-2010-001712
CA-2009-002311	CA-2010-001713
CA-2009-002316	
CA-2009-002324	
CA-2009-002327	
CA-2009-002331	
CA-2009-002333	
CA-2010-001091	
CA-2010-001093	
CA-2010-001094	
CA-2010-001095	
CA-2010-001133	
CA-2010-001135	
CA-2010-001136	
CA-2010-001137	

Assessments and Audits

SA-2010-000102
SA-2010-000134
SA-2010-000129

Drawings

33013-1237, P&ID Auxiliary Feedwater, Rev. 56
33013-1231, P&ID Main Steam, Rev. 37

Procedures and Completed Surveillance Tests

STP-O-16-COMP-T, Auxiliary Feedwater Turbine Pump-Comprehensive Test, performed 06/03/210, 05/03/2010, and 04/05/2010
STP-O-16-COMP-T, Auxiliary Feedwater Turbine Pump-Comprehensive Test, Rev. 1100
STP-O-16QT, Auxiliary Feedwater Turbine Pump-Quarterly, Rev. 200
P-15.6, Operation of the Turbine Driven Auxiliary Feed Pump Trip Throttle Valve, Rev. 200
PRAER-G1-2009-010, PRA Evaluation Request, Rev. 0
CMM-37-12-3652, Perform Major Inspection on V-3652, performed 03/25/2006
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CNG-AM-1.01-1004 Rev. 00500 Equipment Reliability Reporting
CNG-AM-1.01-1018 Rev. 00000 Preventative Maintenance Program
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CNG-CM-1.01-1003 Rev. 00202 Design Engineering and Configuration Control
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 CNG-MN-1.01-1002 Rev. 00100 Troubleshooting
 CNG-OM-1.01-3000 Rev. 00100 Issue Response Team
 CNG-OP-1.01-1001 Rev. 00300 Operational Decision-making
 CNG-OP-1.01-1002 Rev. 00000 Conduct of Operability Determinations/Functionality Assessments
 CNG-OP-1.01-1009 Rev. 00000 Monitoring and Contingency Planning for Abnormal Conditions
 CNG-OP-4.01-1000 Rev. 00600 Integrated Risk Management
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 CNG-PR-1.01-GL007 Rev. 00100 Fleet Procedure Reviews
 CNG-QL-1.01-1005 Rev. 00200 Quality Inspection Process
 CNG-QL-1.01-1006 Rev. 0000 QPA Issue Escalation
 EG-032 Rev. 00102 PM Job Plan Review Process
 IP-CAP-1 Condition Reporting
 IP-REL-10 Preventative Maintenance and Surveillance Change Process
 M-11.5C AFW Pump Minor Mechanical Inspection and Maintenance Rev. 29 (18 Month)
 MG-30 Rev. 00000 Work Order Close Out Checklist
 MMP-GM011-00021 [TDAFWP Major Mechanical Inspection and Mechanical Overspeed Trip Testing]
 PG-1 Ginna Specific Planning Information Rev. 01900
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M-1016, Ginna Station Lubricant List, Rev. 00900
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Safety Culture Assessment Report, 2010
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ECP-2009-0208
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QPA Qualification Training Document 7/15/10
QPA Policy for Rotational Assignments
Reptask P300158
2010 Ginna Program Health Reports (Multiple)
2010 Ginna Tier 1 – 4 Performance Indicators (Multiple)
2010 Operations Instructor Schedule
Change Management Oversight Committee Team Charter
Ginna Organizational Charts – 2008, 2009, and 2010
Nuclear Training Department Qualification Matrix – 2010

LIST OF ACRONYMS

ADAMS	Agency-Wide Documents Access and Management System
CAP	Corrective Action Program
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
CR	Condition Report
DRP	Division of Reactor Projects
FMEA	Failure Modes and Effects Analysis
GINNA	R.E. Ginna Nuclear Power Plant
HIT	High Impact Team
ICCDP	Incremental Conditional Core Damage Probability
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IRT	Issue Response Team
LCO	Limiting Condition for Operation
LERF	Large Early Release Factor
LTCA	Long-Term Corrective Action
MORT	Management Oversight and Risk Tree
MRC	Management Review Committee
MRFF	Maintenance Rule Functional Failure
MSPI	Mitigating Systems Performance Index
NEI	Nuclear Energy Institute
NCV	Non-Cited Violation
NOV	Notice of Violation
NRC	U.S. Nuclear Regulatory Commission
ODM	Operational Decision-Making
OE	Operating Experience
PARS	Publicly Available Records
PI	Performance Indicator
PI&R	Problem Identification and Resolution
PM	Preventive Maintenance
Q&PA	Quality and Performance Assessment
RCA	Root Cause Analysis
RCAR	Root Cause Analysis Report
RCE	Root Cause Evaluation
SCWE	Safety Conscious Work Environment
SIT	Special Inspection Team
SRA	Senior Reactor Analyst
TDAFW	Turbine-driven Auxiliary Feedwater
TS	Technical Specifications
TSSR	Technical Specification Surveillance Requirement
UFSAR	Updated Final Safety Analysis Report