



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

June 14, 2012

Mr. Jon A. Franke
Vice President, Crystal River Nuclear Plant
Crystal River Nuclear Plant (NA2C)
15760 W. Power Line Street
Crystal River, FL 34428-6708

**SUBJECT: CRYSTAL RIVER UNIT 3 NUCLEAR GENERATING PLANT – NRC
SUPPLEMENTAL INSPECTION REPORT 05000302/2012503**

Dear Mr. Franke:

On May 3, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff completed a supplemental inspection pursuant to Inspection Procedure 95001, "Inspection for one or two White inputs in a Strategic Performance Area," at your Crystal River Nuclear Generating Plant. The enclosed inspection report documents the inspection results that were discussed at the exit meeting on May 3, 2012, with you and other members of your staff.

As required by the NRC Reactor Oversight Process Action Matrix, this supplemental inspection was performed because a finding of low to moderate safety significance (White) was identified in the third quarter of 2011. This issue was documented previously in NRC Inspection Reports (IR) 05000302/2011501 and 05000302/2011504. The NRC was informed on February 7, 2012, of your staff's readiness for this inspection after April 29, 2012.

The objectives of this supplemental inspection were to provide assurance that: (1) the root causes and contributing causes of risk significant performance issues were understood; (2) the extent of condition and extent of cause of risk significant performance issues were identified; and (3) corrective actions for risk significant performance issues were sufficient to address and preclude repetition of the root and contributing causes. The inspection consisted of 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.

The NRC has determined that the inspection objectives have been met. The inspectors determined that your staff performed a comprehensive evaluation of the (White) finding. Your staff's evaluation identified the root cause to be insufficient procedural guidance to direct the Emergency Action Level (EAL) change process. All immediate and long term corrective actions have been completed or are scheduled to be completed.

Based on the results of this inspection, no findings were identified.

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 document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Brian R. Bonser, Chief
Plant Support Branch 1
Division of Reactor Safety

Docket No. 50-302
License No. DPR-72

Enclosure:
Inspection Report 05000302/2012503
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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 w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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| DATE | 06/14/2012 | 06/14/2012 | 06/14/2012 | 06/13/2012 | |
| E-MAIL COPY? | YES NO | YES NO | YES NO | YES NO | YES NO |

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-302

License Nos.: DPR-72

Report No.: 05000302/2012503

Licensee: Progress Energy

Facility: Crystal River Nuclear Plant

Location: Crystal River, FL

Dates: April 30, 2012, through May 3, 2012

Inspectors: M. Speck, Senior Emergency Preparedness Inspector
N. Childs, Resident Inspector

Approved by: Brian Bonser, Chief
Plant Support Branch 1
Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 050000302/2012503; 04/30/2012 – 05/03/2012; Crystal River Nuclear Plant, Unit 3; Supplemental Inspection for a White finding in the Emergency Preparedness Cornerstone. A senior emergency preparedness inspector and a resident inspector performed this inspection. No findings were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

Cornerstone: Emergency Preparedness

The NRC staff conducted this supplemental inspection in accordance with Inspection Procedure 95001, "Inspection for one or two White inputs in a Strategic Performance Area," to assess the licensee's evaluation associated with the failure to follow and maintain a standardized Emergency Action Level (EAL) scheme. The NRC staff previously characterized this issue as having low to moderate risk significance (White) in NRC Inspection Report (IR) 05000302/2011504.

During this supplemental inspection, the inspectors determined that the licensee had performed a comprehensive evaluation of the licensee-identified failure to follow and maintain a standardized EAL scheme for several years prior to June 2011.

The licensee identified the root cause of the issue to be insufficient procedural guidance to direct the EAL change process. All immediate and long term corrective actions have been completed except for: (1) Evaluate/change EAL threshold values based on updated assumptions coincident with replacing the RM-A1 and RM-A2 instruments (expected completion date (ECD) of October 15, 2012); (2) Complete corrective action effectiveness reviews (ECD September 1, 2012); and (3) Assess Emergency Preparedness (EP) staff including workload leveling and degree of interaction with other site groups (ECD December 29, 2012).

Given the licensee's acceptable performance in addressing the failure to follow and maintain a standardized EAL scheme, the White finding associated with this issue will only be considered in assessing plant performance until the end of the second quarter 2012, in accordance with the guidance in Inspection Manual Chapter (IMC) 0305, "Operating Reactor Assessment Program." Implementation of the licensee's corrective actions will be reviewed during a future inspection.

Findings

No findings were identified.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA4 SUPPLEMENTAL INSPECTION (95001)

.01 Inspection Scope

The NRC staff performed this supplemental inspection in accordance with Inspection Procedure 95001 to assess the licensee's evaluation of a White finding that affected the emergency preparedness cornerstone in the reactor safety strategic performance area. The inspection objectives were to provide assurance that the:

- root causes and contributing causes of risk significant performance issues were understood.
- extent of condition and extent of cause of risk significant performance issues were identified.
- corrective actions for risk significant performance issues were sufficient to address the root and contributing causes and prevent recurrence.

The licensee entered the Regulatory Response Column of the NRC's Action Matrix in the third quarter of 2011, as a result of one inspection finding of low to moderate safety significance (White). The finding was associated with the failure to follow and maintain a standardized EAL scheme for several years prior to June 2011. The finding was characterized as having (White) safety significance as discussed in NRC IR 05000302/2011504.

The licensee informed the NRC staff on February 7, 2012, that they were ready for the supplemental inspection to commence after April 29, 2012. In preparation for the inspection, the licensee performed a root cause investigation, documented in Condition Report (CR) 474477, to identify weaknesses that existed in various organizations and processes that resulted in the risk-significant (White) finding.

The inspectors reviewed the licensee's root cause evaluation (RCE) and other assessments conducted in support of and as a result of the root cause investigation. The inspectors reviewed corrective actions taken to address the identified root and contributing causes. The inspectors interviewed licensee personnel to ensure that the root and contributing causes and the contribution of safety culture components were understood and corrective actions were appropriate to address the causes and preclude repetition.

.02 Evaluation of Inspection Requirements

02.01 Problem Identification

- a. Determine that the evaluation identifies who (i.e., licensee-identified, self-revealing, or NRC-identified) and under what conditions the issue was identified.

The licensee accurately characterized the inappropriate General Emergency gaseous effluent EAL (1.4) threshold found on June 27, 2011, as licensee-identified.

The inspectors verified that this information was documented in the licensee's evaluation.

- b. Determine that the evaluation documents how long the issue existed and prior opportunities for identification.

The licensee identified that the inappropriate threshold setpoint was implemented into the emergency action levels in June of 2000, when it upgraded its EAL values to conform to NUMARC/NESP 007 criteria. They also determined there were several opportunities to identify the EAL threshold error prior to the identification in June of 2011. Two of the opportunities involved inadequate reviews of industry operating experience (May 2008, and September 2010,) and the third was when the EAL threshold values were revised in July 2010.

The inspectors determined that the licensee's evaluation and assessments were adequate with respect to identifying how long the issue existed and the prior opportunities for identification and did not identify any additional opportunities.

- c. Determine that the evaluation documents the plant-specific risk consequences, as applicable, and compliance concerns associated with the issue.

The NRC determined this issue was a White finding, as documented in NRC IR 05000302/2011504 dated December 20, 2011, and the licensee also documented the associated finding in their Reply to Notice of Violation: EA-11-208 dated January 19, 2012. In addition, the RCE documented the consequences of the issue, including potential adverse impacts on the ability of the site to mitigate the effects of events during an emergency and the licensee's responsibility to protect the health and safety of the public. At the time the condition was identified, the plant was defueled.

The inspectors concluded that the licensee appropriately documented the risk consequences and compliance concerns associated with the finding.

- d. Findings

No findings were identified.

02.02 Root Cause and Extent of Condition Evaluation

- a. Determine that the problem was evaluated using a systematic methodology to identify the root and contributing causes.

The licensee's investigation was performed by a diverse, qualified team of nine members using licensee procedure CAP-NGGC-0205, Condition Evaluation and Corrective Action Process, Revision 15. The following systematic methods and tools were used to perform the causal evaluation:

- Event Time Line/Chronology

- Event and Causal Factor Chart
- Barrier Analysis
- Extent of Condition Tool
- Human Performance Evaluation
- Extent of Cause Evaluation
- Organization and Programmatic Evaluation Worksheet

The licensee performed a self-assessment (CR 518332-17) of the completed RCE to ensure all issues were addressed and documented.

The inspectors determined that the licensee evaluated the issue using a systematic methodology to identify root and contributing causes.

- b. Determine that the root cause evaluation was conducted to a level of detail commensurate with the significance of the problem.

The RCE incorporated the following activities to support the evaluation:

- Conducted interviews with key personnel involved with the issue
- Performed searches and reviews of the corrective action database for Emergency Preparedness identified items, Training department lesson plans and supporting documents to include Emergency Preparedness and Operations procedures
- Solicited an independent subject matter expert review of the effluent radiation monitor operation
- Performed reviews of industry operating experience, internal operating experience, and emergency preparedness internal change documentation.

Barrier analysis identified failed barriers in the following areas:

- EP/Ops training programs
- Human Performance areas
- Procedure and document management
- Operating experience reviews and self-assessment quality
- Lack of use of plant policies and procedures

A cause and effect analysis was used to analyze two events: EAL 1.4 threshold revision beyond the equipment's capability in July 2010, and the June 2011, EAL 1.4 threshold revision to a previously used value which was still incorrect. Analysis of the two events identified three main contributors and eight additional contributing causes. The following represents a synopsis of the significant contributors and/or causes: Barrier analysis identified failed barriers in the following areas:

- System engineering was not involved in the procedure review process.
- Incorrect assumptions that the mid-range monitor instrument was capable of reading a higher value
- Reviewers unfamiliar with the mid-range monitor purge operations
- Insufficient review tools provided with minimum management oversight
- Insufficient program guidance for changing EAL thresholds

Based on a review of the root cause evaluation and supporting documentation, the inspectors concluded that the evaluation was conducted to a level of detail commensurate with the significance of the problem.

- c. Determine that the root cause evaluation included a consideration of prior occurrences of the problem and knowledge of prior operating experience.

The inappropriate threshold setpoints were implemented into the emergency action levels in June of 2000, when the licensee upgraded its EAL values to conform to NUMARC/NESP 007 criteria. The licensee's evaluation determined there had been several opportunities to identify the EAL threshold error prior to the identification in June of 2011.

Based on the licensee's detailed evaluation and conclusions, the inspectors determined that the licensee's root cause investigation included a consideration of prior occurrences of the problem and knowledge of prior operational experience.

- d. Determine that the root cause evaluation addressed the extent of condition and the extent of cause of the problem.

The licensee's evaluation limited the extent of condition review to EAL threshold values that may be challenged by the end device equipment functionality or operation of the equipment. All of the Crystal River Unit 3 radiation monitor EAL threshold values were reviewed under CR 511445. The extent of condition evaluation revealed concerns for EAL's 1.1, 1.6, 2.2, 2.23, and 7.2. The licensee entered these deficiencies into their corrective action program as CRs 519392, 482014, 522623, 525486, and 525483.

The inspectors performed an independent review of the programmatic change process for the Security and Chemistry Departments to determine if similar issues might exist within these departments that had not been previously identified by the licensee. The inspectors also performed an independent review of EAL 1.10 (Fuel Handling/Fuel Handling Pool Water Level), EAL 2.1 (Earthquake Experienced), and EAL 2.2 (Earthquake Experienced) to determine if similar issues might exist with the monitors used for these EALs that had not been previously identified by the licensee. The inspectors identified no issues and concluded that the licensee's root cause investigation adequately addressed the extent of condition and the extent of cause of the issue.

- e. Determine that the root cause, extent of condition, and extent of cause evaluations appropriately considered the safety culture components as described in IMC 0305.

The licensee found weaknesses in the following cross-cutting aspects:

- Human Performance (HU) component of Decision Making: The EP group was unaware that the prior EAL threshold value exceeded the radiation monitor's range and was therefore not considered when recalculating the EAL.
- HU component of Resources: In both 2010, and 2011, the EAL 1.4 threshold value was revised to a reading which was not in the monitor's range.

- HU component of Work Practices: Personnel failed to question instructions and results when told to change EAL 1.4 General Emergency threshold.
- HU component of Work Practices: There was inadequate monitoring of activities and work distribution by management.
- Problem Identification and Resolution (PI&R) component of Corrective Action Program: Personnel failed to question instructions and results when told to change EAL 1.4 General Emergency threshold.
- PI&R component of Operating Experience (OE): There were missed opportunities to learn from industry OE.

With respect to the root cause and contributing causes, various aspects of safety culture were identified, but no singular component was identified as a root cause or significant contributing cause.

The inspectors determined that the licensee's root cause investigation included a proper consideration of whether a weakness in any safety culture component was a root cause or significant contributing cause of the issue.

f. Findings

No findings were identified.

02.03 Corrective Actions

- a. Determine that appropriate corrective actions are specified for each root and contributing cause or that the licensee has an adequate evaluation for why no corrective actions are necessary.

As an immediate corrective action, the licensee revised the EAL threshold to a value that could be read on the high-range radiation monitor scale. This corrective action resolved the site's inability to declare a General Emergency based on RM-A1 and RM-A2 mid-range detector readings.

The licensee identified the following root cause and implemented the corresponding corrective action:

- Insufficient procedure detail/guidance for EAL changes. As a corrective action, the licensee revised a fleet procedure to provide specific guidance on the verification, validation, and approval of EAL changes to include reviews by technical and managerial personnel, field walk downs for process monitor EAL changes, validation reviews by an individual trained as an Emergency Coordinator, and review and approval by the plant nuclear safety review committee.

The licensee developed corrective actions to address contributing causes not covered by the immediate corrective actions. Those causes and actions are summarized below:

- Assumptions made but not validated; coached individual and emphasized importance of performing accurate and detailed analyses. (complete)
- Reviews inadequate or not conducted; provided training to EP staff members on the new procedure for changing EALs. (complete)
- Duties not well distributed; assess EP staff including workload leveling and degree of interaction with other site groups. (current due date 12/29/2012)
- Inadequate management monitoring; reinforce with EP Supervisor the need to more closely monitor work activities and engage with workers, and reinforce with EP staff to question instructions when unsure. Provide human performance training to EP staff. (complete)
- Causes of previous error not fully understood; provide independent consultant to review EALs addressing radiological conditions. (complete)
- Inadequate review of previous OE; coach individual and review OE assignment with EP staff for lessons learned. (complete)
- Lesson plan material lacked sufficient detail; enhance the EAL Bases Manual and related training plans/lesson plans to clearly define the RM-A1 and RM-A2 mid-range and high range monitor response. (complete)
- EP personnel were not trained in a comprehensive process to make EAL changes; provide training to EP staff members on the new procedure for changing EALs. (complete)
- EP personnel prioritized schedule over quality during 2011 EAL 1.4 change process; reinforce with EP Supervisor the need to more closely monitor work activities and engage with workers, and reinforce with EP staff to question instructions when unsure. Provide human performance training to EP staff. (complete)
- Gaseous effluent EAL threshold values were determined using legacy assumptions; review and modify applicable EAL threshold values using an isotopic mixture consistent with gap release under Loss of Coolant Accident conditions. (ECD 10/15/2012)

The inspectors determined that the corrective actions were appropriate and addressed each root and contributing cause.

b. Determine that corrective actions have been prioritized with consideration of risk significance and regulatory compliance.

The licensee took immediate interim corrective actions to ensure that appropriate EAL threshold values were in place to ensure the ability to make an emergency declaration was maintained at all times based on existing plant conditions. These interim actions were completed on July 15, 2011, and resulted in full compliance.

The licensee completed a root cause evaluation and a subsequent assessment to determine contributing causes and developed appropriate corrective actions. These corrective actions were appropriately prioritized with consideration of risk significance and full regulatory compliance was achieved on July 15, 2011, with the RM-A2 EAL threshold value and EAL procedure revisions.

The inspectors determined that the corrective actions were adequately prioritized with consideration of the risk significance and regulatory compliance.

- c. Determine that a schedule has been established for implementing and completing the corrective actions.

The licensee established due dates for the corrective actions in accordance with their corrective action program. The inspectors reviewed the status of each corrective action assignment and determined that an appropriate schedule had been established for implementing the corrective actions with the only remaining action actions being: (1) Review/modification of EAL threshold values based on using a revised isotopic mix coincident with a Loss of Coolant Accident (ECD October 15, 2012); (2) Completion of the final effectiveness review (ECD September 1, 2012); and (3) Assess EP staff including workload leveling and degree of interaction with other site groups (ECD December 29, 2012).

- d. Determine that quantitative or qualitative measures of success have been developed for determining the effectiveness of the corrective actions to prevent recurrence.

As documented in CR 474477, the licensee had established an effectiveness review plan. The effectiveness review plan included a series of questions to ensure the following: (1) all elements of the corrective actions to prevent recurrence were incorporated into the EAL procedure; (2) EP staff were adequately trained and understood the revised procedural requirements; and (3) EP staff did not anticipate time pressure when updating EAL's. The licensee planned to conduct an initial interim effectiveness review six months following the approval of the RCE and a final effectiveness review six months after that in order to ensure that all corrective actions were appropriately completed.

The licensee completed the interim effectiveness review, but it was indeterminate due to insufficient time between completion of the final EAL change process procedure revision (February 2012), and performance of the interim effectiveness review. Therefore, an adequate review of the effectiveness of the corrective actions could not be determined at that time. An effectiveness review is scheduled to be completed by September 1, 2012.

The inspectors observed that the effectiveness review plan as written would verify and validate that the corrective actions were completed; however, there were opportunities to improve the evaluation and documentation of the effectiveness review. The inspectors also noted that the individual assigned to perform the effectiveness review was the EP Supervisor and that an independent review may be more appropriate. These observations were discussed with the licensee and were placed in the corrective action program.

- e. Determine that the corrective actions planned or taken adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection, if applicable.

The licensee's response described: (1) corrective actions taken and the results achieved; (2) actions which will be taken; (3) the date when full compliance was achieved; and (4) the reasons for the violation. During this inspection, the inspectors confirmed that the licensee's root cause investigation and actions completed or planned adequately addressed the NOV. The licensee restored full compliance on July 15, 2011.

- f. Findings

No findings were identified.

4OA6 Exit Meeting

On May 3, 2012, the inspectors presented the inspection results to Mr. J. Franke and other members of the staff who acknowledged the results. The inspectors asked the licensee if any of the material examined during the inspection should be considered proprietary. The licensee did not identify any proprietary information. At the conclusion of the exit meeting, Mr. B. Bonser, Chief, Plant Support Branch 1, Division of Reactor Safety conducted a regulatory performance meeting with licensee management to discuss the issue and actions taken and proposed.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

T. Burnett, Performance Improvement Supervisor
C. Burtoff, Root Cause Evaluation team member
J. Franke, Site Vice President
R. Gapp, Root Cause Evaluation Team Leader
S. Gangi, Sr. Emergency Preparedness Specialist
D. Herrin, Licensing Engineer
T. Hobbs, Plant General Manager
J. Huecker, Superintendent of Nuclear Operations Performance
M. Kelly, Manager – Shift Operations
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M. Rigsby, Manager - Site Support
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J. Stephenson, Corporate Emergency Preparedness Functional Area Manager
D. Westcott, Licensing Supervisor
M. Wolf, Operations Shift Manager
B. Wooten, Control Room Supervisor
B. Wunderly, Manager – Engineering

ITEMS OPENED AND CLOSED

Opened

None

Closed

VIO 05000302/2011501-01, Failure to Maintain a Standard EAL Scheme

DOCUMENTS REVIEWED

Plans and Procedures

CAP-NGGC-1000, Conduct of Performance Improvement, Rev. 6
 CAP-NGGC-0205, Condition Evaluation and Corrective Action Process, Rev. 15
 CAP-NGGC-0200, Condition Identification and Screening Process, Rev. 34
 REG-NGGC-0010, 10 CFR 50.59 and Selected Regulatory Reviews, Rev. 17
 PRO-NGGC-0204, Procedure Review and Approval, Rev. 22
 EMG-NGGC-0010, "Emergency Plan Change Screening and Evaluation 10CFR50.54(q)(3),
 Rev. 2
 EMG-NGGC-1000, Fleet Conduct of Emergency Preparedness, Rev. 4
 EM-202, Duties of the Emergency Coordinator, Rev. 96
 EALBM, Emergency Action Level Basis Manual, Rev. 13
 ODCM, Off Site Dose Calculation Manual, Rev. 32
 AI-1500, Administration of Environmental and Chemistry Department, Rev. 44
 CP-160, Closed Cooling Water Systems Chemistry Program Guidelines, Rev. 12
 CP-142, Primary Water Chemistry Program Guidelines, Rev. 25
 CP-138, Secondary Water Chemistry Program Guidelines, Rev. 30
 CP-161, Radiological Environmental Monitoring Program, Rev. 6
 CHE-NGGC-1000, Conduct of Environmental and Chemistry, Rev. 1
 AP-961, Earthquake, Rev. 23
 SP-736B, WDT-10B Release to the Discharge Canal, Revision 12
 SP-736L, Liquid Releases to the Discharge Canal via RM-L2, Revision 0

Corrective Action Documents

CR 519392, Potential Challenge to RM-A1 and RM-A2 Low Range Usable Range
 CR 511445, Independent Review of EAL Bases Manual Documentation
 CR 522129, Inadequate Extent of Condition Review
 CR 525483, Potential Loss of Containment Criteria Inconsistent with NEI 97-03
 CR 525486, Evaluate EAL 2.23 Internal Flooding EAL Threshold
 CR 511445, Independent Review of EAL Bases Manual Documentation
 CR 522623, EAL 2.2 Clarification Regarding Acceleration Threshold

Miscellaneous Documents

Root Cause Evaluation Report, 474477
 OPS-4-58, Operator Continuing Training, Primary Chemical Addition, Sampling, PASS, and
 Heat Tracing
 Quick Hit Self-Assessment 518332-17 - March 5, 2012, Inspection/Evaluation of NCR 474477
 Fleet Formal Self-Assessment: OE Program dated 12/22/2010
 Nuclear Oversight C-SE-10-01, Assessment of Self-Evaluation and Human Performance of
 December 2, 2010
 Emergency Plan Related Equipment listing, Rev. 3

ACRONYMS

| | |
|------|---------------------------------------|
| CR | Condition Report |
| EAL | Emergency Action Level |
| ECD | Estimated Completion Date |
| EP | Emergency Preparedness |
| HU | Human Performance |
| IMC | Inspection Manual Chapter |
| IR | Inspection Report |
| NRC | Nuclear Regulatory Commission |
| NOV | Notice of Violation |
| OE | Operating Experience |
| PARS | Publicly Available Records |
| PI&R | Problem Identification and Resolution |
| RCE | Root Cause Evaluation |