



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET, SW, SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

January 29, 2009

Mr. Dale E. Young, Vice President  
Crystal River Nuclear Plant (NA1B)  
Supervisor, Licensing &  
Regulatory Programs  
15760 West Power Line Street  
Crystal River, FL 34428-6708

SUBJECT: CRYSTAL RIVER UNIT 3 – NRC INTEGRATED INSPECTION REPORT  
05000302/2008005

Dear Mr. Young:

On December 31, 2008, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Crystal River Unit 3. The enclosed integrated inspection report documents the inspection findings which were discussed on January 12, 2009, with you and other members of your staff.

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

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

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

Sincerely,  
*/RA/*

Marvin D. Sykes, Chief  
Reactor Projects Branch 3  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000302/2008005  
w/Attachment: Supplemental Information

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Letter to Dale E. Young from Marvin D. Sykes dated January 21, 2009

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SUBJECT: CRYSTAL RIVER UNIT 3 – NRC INTEGRATED INSPECTION REPORT  
05000302/2008005

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos: 50-302

License Nos: DPR-72

Report No: 05000302/2008005

Licensee: Progress Energy (Florida Power Corporation)

Facility: Crystal River Unit 3

Location: Crystal River, FL

Dates: October 1, 2008 – December 31, 2008

Inspectors: T. Morrissey, Senior Resident Inspector  
R. Reyes, Resident Inspector  
C. Fletcher, Reactor Inspector (Section 4OA5)  
G. Kuzo, Senior Health Physicist (Section 2OS1, 4OA1)  
R. Hamilton, Senior Health Physicist (Section 2PS1, 4OA1)  
H. Gepford, Senior Health Physicist (Section 2OS3)  
A. Nielson, Health Physicist (Section 2PS3)

Approved by: M. Sykes, Chief,  
Reactor Projects Branch 3  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000302/2008005; 10/01/2008-12/31/2008; Crystal River Unit 3; Routine Integrated Report.

The report covered a three month period of inspection by resident inspectors, a region based reactor inspector and region based health physicists. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process", Revision 4, dated December 2006.

A. NRC Identified & Self-Revealing Findings

No findings of significance were identified.

B. Licensee Identified Violations

None

## REPORT DETAILS

### Summary of Plant Status:

Crystal River 3 began the inspection period at 100 percent rated thermal power (RTP). On December 5, the unit was manually reduced to 48 percent RTP for a planned replacement of a main feedwater pump controller. The unit was restored to 100 percent RTP on December 7th. The unit remained at essentially 100 percent for the remainder of the inspection period

### REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

The inspectors evaluated the licensee's readiness for mitigating cold weather to assure that vital systems and components were protected from freezing in accordance with the licensee's Administrative Instruction AI-513, Seasonal Weather Preparations, Section 4.1, Cold Weather Preparations. The inspectors walked down portions of the systems/areas listed below to check for any unidentified susceptibilities. Operability of heat trace circuits was verified. Nuclear condition reports (NCRs) were reviewed to check that the licensee was identifying and correcting cold weather protection issues.

- Borated water storage tank
- Emergency feed tank EFT-2 building
- Emergency diesel generator (EGDG) rooms
- Emergency feed water pump EFP-3 building

There were no sustained periods of freezing weather during the inspection period.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment

##### Partial Equipment Walkdowns

##### a. Inspection Scope

The inspectors performed walkdowns of the critical portions of the selected trains to verify correct system alignment. The inspectors reviewed plant documents to determine the correct system and power alignments, and the required positions of select valves and breakers. The inspectors verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating

events or impact mitigating system availability. The inspectors verified the following three partial system alignments in system walkdowns using the listed documents:

- Auxiliary feedwater pump FWP-7 and turbine-driven emergency feedwater pump EFP-2, using operating procedure OP-605, Feedwater System, and OP-450, Emergency Feedwater System, while the diesel-driven emergency feedwater pump EFP-3 was out of service for planned maintenance.
- EGDG-1A, using OP-707, Operation of the ES Emergency Diesel Generators, while EGDG-1B was out of service for testing.
- Control complex chilled water system (CHHE-1B), using OP-409, Plant Ventilation System, while chiller CHHE-1A was out of service for planned maintenance.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

Fire Area Walkdowns

a. Inspection Scope

The inspectors walked down accessible portions of the plant to assess the licensee's implementation of the fire protection program. The inspectors checked that the areas were free of transient combustible material and other ignition sources. Also, fire detection and suppression capabilities, fire barriers, and compensatory measures for fire protection problems were verified. The inspectors checked fire suppression and detection equipment to determine whether conditions or deficiencies existed which could impair the function of the equipment. The inspectors selected the areas based on a review of the licensee's probabilistic risk assessment. The inspectors also reviewed the licensee's fire protection program to verify the requirements of Final Safety Analysis Report (FSAR) Section 9.8, Plant Fire Protection Program, were met. Documents reviewed are listed in the attachment. The inspectors toured the following four areas important to reactor safety:

- Intermediate building 119' elevation
- Control Complex Chiller and Ventilation Room
- A train decay heat removal (DHR) and building spray (BS) vault
- Auxiliary building 95' elevation high pressure injection penetration area

b. Findings

No findings of significance were identified.

## 1R06 Flood Protection Measures

### Internal Flood Protection

#### a. Inspection Scope

The Inspectors reviewed the Crystal River Unit 3, FSAR, Chapter 2.4.2.4, Facilities Required for Flood Protection, and the Crystal River Unit 3 Design Basis Documents that depicted protection for areas containing safety-related equipment to identify areas that may be affected by internal flooding. A walkdown of emergency diesel generator EGDG-1A and 1B areas were conducted to ensure that flood protection measures were in accordance with design specifications. Specific plant attributes that were checked included structural integrity, sealing of penetrations, and operability of sump systems.

#### b. Findings

No findings of significance were identified.

## 1R11 Licensed Operator Regualification Program

### Resident Inspector Quarterly Review

#### a. Inspection Scope

On October 21, the inspectors observed and assessed licensed operator crew response and actions for the Crystal River Unit 3 licensed operator simulator evaluated session SES-07. Session SES-07 involved failures of reactor coolant pump seals, a steam generator tube, and a steam generator atmospheric dump valve. The inspectors observed the operator's use of abnormal procedures; AP-510, Rapid Power Reduction and AP-545, Plant Runback; and emergency operating procedures; EOP-02, Vital System Status Verification; EOP-05, Excessive Heat Transfer; and EOP-06, Steam Generator Tube Rupture. The operator's actions were verified to be in accordance with the above procedures. Event classification and notifications were verified to be in accordance with emergency management procedure EM-202, Duties of the Emergency Coordinator. The simulator instrumentation and controls were verified to closely parallel those in the actual control room. The inspectors evaluated the following attributes related to crew performance:

- Clarity and formality of communication
- Ability to take timely action to safely control the unit
- Prioritization, interpretation, and verification of alarms
- Correct use and implementation of abnormal and emergency operation procedures; and emergency plan implementing procedures
- Control board operation and manipulation, including high-risk operator actions
- Oversight and direction provided by supervision, including ability to identify and implement appropriate
- Technical Specification (TS) actions, regulatory reporting requirements, and emergency plan classification and notification

- Crew overall performance and interactions

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the licensee's effectiveness in performing routine maintenance activities. The review included the identification, scope, and handling of degraded equipment conditions, as well as common cause failure evaluations, and the resolution, of historical equipment problems. For those systems, structures, and components within the scope of the Maintenance Rule (MR) per 10 CFR 50.65 (a)(1) and (a)(2) classifications were justified in light of the reviewed degraded equipment condition. The documents reviewed are listed in the attachment. The inspectors conducted this inspection for the following two issues:

- NCR 302511, MR unavailability criterion exceeded for the B train decay heat closed cycle cooling (DC) system.
- NCR 287257, Degraded raw water pump flush water flow rate (A train)

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the risk impact associated with those activities listed below and verified the licensee's associated risk management actions. This review primarily focused on equipment determined to be risk significant within the maintenance rule. The inspectors also assessed the adequacy of the licensee's identification and resolution of problems associated with risk management including emergent work activities. The licensee's implementation of compliance procedure CP-253, Power Operation Risk Assessment, was verified in each of the following six work week assessments.

- Work Week 08W40, Operations with the emergency feed pump EFP-3 out of service for maintenance, and emergent work during the week
- Work Week 08W41, Operations with the emergency feed valves EFV-55 and EFV-56 out of service for planned maintenance and EGDG -1B for testing
- Work Week 08W42, Operations with the reactor coolant system (RCS) power operated relieve valve (PORV) out of service due to emergent work

- Work Week 08W43, Operations in yellow risk condition while the A train high head safety injection was out of service for maintenance and emergent work on make-up pump MUP-1B
- Work Week 08W47, Operations with EGDG-1B out of service due to emergent lube oil temperature switch repair
- Work Week 08W50, Operations with individually out of service for planned maintenance, auxiliary feedwater pump FWP-7 and safety-related flush water systems for both trains of the raw water system

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

The inspectors reviewed the following five NCRs to verify operability of systems important to safety was properly established, that the affected components or systems remained capable of performing their intended safety function, and that no unrecognized increase in plant or public risk occurred. The inspectors determined if operability of systems or components important to safety was consistent with TS, the FSAR, 10 CFR Part 50 requirements, and when applicable, NRC Inspection Manual, part 9900, Technical Guidance, "Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety." The inspectors reviewed licensee NCRs, work schedules, and engineering documents to check if operability issues were being identified at an appropriate threshold and documented in the corrective action program, consistent with 10 CFR 50, Appendix B requirements; and licensee procedure NGGC-CAP-200, Corrective Action Program.

- NCR 300576, EFIC transmitter, MS-109-PT, exceeded environmentally qualified life
- NCR 305965, Control complex chiller, CHHE-1A does not meet surveillance procedure SP-385A acceptance criteria
- NCR 295539, Orifice installed in RCS PORV smaller than specified in design basis document
- NCR 306122, Breaker 3360 found with open coil and broken charging handle
- NCR 312009, Ultrasonic Test (UT) on A DHR discharge piping showed indication of air

1R18 Plant Modifications

Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed one temporary modification listed below and the associated 10 CFR 50.59 screening against the system design basis documentation and FSAR

to verify the modification did not adversely affect the safety functions of important safety systems. Additionally, the inspectors reviewed licensee procedure EGR-NGGC-00005, Engineering Change, to assess if the modification was properly developed and implemented.

- Engineering Change (EC) 69854, Disable Decay Heat to Pressurizer Spray Valve (RCV-53) Annunciator due to Ground (repair refueling outage R16)

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors witnessed and/or reviewed post-maintenance test procedures an/or test activities, as appropriate, for selected risk significant systems to verify whether: (1) testing was adequate for the maintenance performed; (2) acceptance criteria were clear, and adequately demonstrated operational readiness consistent with design and licensing basis documents; (3) test instrumentation had current calibrations, range, and accuracy consistent with the application; (4) tests were performed as written with applicable prerequisites satisfied, and (5) equipment was returned to the status required to perform its safety function. The five post-maintenance tests reviewed are listed below:

- SP-349C, EFP-3 and Valve Surveillance, after performing maintenance on the emergency feed pump EFP-3 per work order (WO) 1371251
- SP-340C, MUP-1A, MUP-1B, and Valve Surveillance (MUP-1B only), after performing a weld repair per WO 1440787
- Compliance procedure CP-140, Operations Evolution Orders, Troubleshoot/repair RCS valve RCV-10 DC-ground, after performing maintenance per WO 01435324
- SP-340C, MUP-1A, MUP-1B, and Valve Surveillance (MUP-1A and MUV-73 only), after performing maintenance on make-up valve MUV-73, and make-up pump MUP-1A, per WOs 1069854 and 1384253 respectively
- SP179C, Containment Leak Test –Type “C” (penetration 441 only), after performing maintenance on chemical addition valve CAV-753 per WO 1356536

b. Findings

No findings of significance were identified.

1R22 Surveillance Testinga. Inspection Scope

The inspectors observed and/or reviewed six surveillance tests listed below to verify that TS surveillance requirements were followed and that test acceptance criteria were properly specified. The inspectors verified that proper test conditions were established as specified in the procedures, that no equipment preconditioning activities occurred, and that acceptance criteria had been met. Additionally, the inspectors also verified that equipment was properly returned to service and that proper testing was specified and conducted to ensure that the equipment could perform its intended safety function following maintenance or as part of surveillance testing.

In-Service Test:

- SP-340A, RWP-3A, DCP-1A & Valve Surveillance
- SP-344B, RWP-2B, SWP-1B and Valve Surveillance

Surveillance Test:

- SP- 344A, RWP-2A, SWP-1A and Valve Surveillance (RWP-2A only)
- SP-146A, EFIC Monthly Functional Test (Modes 1, 2 and 3)
- SP-108, Reactor Trip Module and Control Rod Drive Trip Functional Test
- SP-348A, Auxiliary Feedwater Pump (FWP-7) Testing

b. Findings

No findings of significance were identified.

## 2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety and Public Radiation Safety

2OS1 Access Control To Radiologically Significant Areasa. Inspection Scope

Access Controls Licensee activities for controlling and monitoring worker access to radiologically significant areas and tasks were evaluated. The inspectors evaluated changes to and adequacy of procedural guidance; directly observed implementation of established administrative and physical radiological controls; appraised radiation worker and health physics technician (HPT) knowledge of and proficiency in implementing radiation protection activities; and assessed occupational exposures to radiation and radioactive material.

The inspectors directly observed or discussed controls established for workers and HPT staff in airborne radioactivity area, radiation area, high radiation area (HRA), locked-high radiation area (LHRA), and very high radiation area (VHRA) locations within select reactor auxiliary building (RAB) locations. Controls and their

implementation for HRA/LHRA keys and for storage of irradiated material within the spent fuel pool (SFP) area were reviewed and discussed in detail. The inspectors reviewed and evaluated select medium and high radiological risk tasks performed between October 1, 2007, and December 4, 2008, including reactor building (RB) 'at power' entries, RB in-core closure/torque activities, RB and RAB valve maintenance, radioactive waste (radwaste) handling and storage; and transportation activities. Radiological controls and resultant doses for 'at power' entry were evaluated. The inspectors observed radiation work permit briefings and reviewed radiation work permit details to assess communication of radiological control requirements to workers. Occupational workers adherence to selected radiation work permits and HPT proficiency in providing job coverage were evaluated through direct observations and interviews with licensee staff. Direct Reading Dosimeter (DRD) alarm set points and worker stay times were evaluated against area radiation survey results and actual dose rates encountered and doses received. Worker exposure as measured by DRD, by licensee evaluations of potential skin doses resulting from discrete radioactive particle (DRP) or dispersed skin contamination events during calendar year (CY) 2008 were reviewed and assessed independently. For HRA tasks involving potentially significant dose rate gradients, the inspectors evaluated the potential use of dosimeter multi-badging to monitor worker exposure.

Postings for access to radiologically controlled areas (RCAs) and physical controls for the RAB locations designated as LHRAs were evaluated during facility tours. The inspectors independently measured radiation dose rates or directly observed conduct of licensee radiation surveys and results for RAB equipment and work locations, and radioactive waste/material storage areas. All results were compared to current licensee surveys and assessed against established postings and radiological controls.

Internal exposures of greater than 30 millirem (mrem) Committed Effective Dose Equivalent were evaluated from review of whole body counting analyses conducted between October 1, 2007, through December 4, 2008. The inspectors evaluated the implementation and effectiveness of administrative and physical controls for including air sampling, alpha-monitoring, barrier integrity, engineering controls, and postings. Licensee identification and assessment of potential radionuclide intakes by workers from October 1, 2007, through September 4, 2008, were reviewed and evaluated.

Radiation protection activities were evaluated against FSAR, TS, and 10 Code of Federal Regulations (CFR) Parts 19 and 20 requirements. Specific assessment criteria included FSAR Section 11, Radioactive Waste Management, and Section 12, Radiation Protection; 10 CFR 19.12; 10 CFR 20, Subpart B, Subpart C, Subpart F, Subpart G, Subpart H, and Subpart J; TS Sections 5.6.1, Procedures, and 5.8, High Radiation Area; and approved procedures. Documents reviewed are listed in the attachment.

Problem Identification and Resolution Licensee Corrective Action Program (CAP) documents associated with access control to radiologically significant areas were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with CAP-NGGC-0200, Corrective Action Program. Licensee NCR documents and audits associated with access controls, personnel monitoring instrumentation, and personnel

contamination events were reviewed. Documents reviewed are listed in the attachment.

The inspectors completed 21 of the specified line-item samples detailed in Inspection Procedure (IP) 71121.01.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment

a. Inspection Scope

Radiation Monitoring Instrumentation During tours of the auxiliary building and turbine building, the inspectors observed installed radiation detection equipment including area radiation monitors (ARMs), process radiation monitors, continuous air monitors, personnel contamination monitors (PCMs), and portal monitors. The inspectors observed the physical location of the components, noted the material condition, and compared sensitivity ranges with FSAR specifications. The inspectors also compared readouts on the local displays with those in the control room. In addition, the inspectors discussed maintenance and performance history of the radiation monitoring system with the system engineer.

In addition to equipment walkdowns, the inspectors observed functional checks and alarm setpoint testing of various fixed and portable detection instruments. These observations included source checks of PCMs and portal monitors at the radiologically controlled area exits, protected area exit, and other locations throughout the site. The inspectors observed the calibration of an Eberline RO-20 survey instrument and discussed calibration of other portable instruments using the Shepard calibrator. The inspectors observed the calibration facilities and reviewed calibration source validation records for the Shepard calibration source.

The most recent 10 CFR Part 61 analysis for dry active waste (DAW) was reviewed to determine if calibration and check sources used were representative of the plant source term.

The inspectors reviewed calibration records for selected PCMs, portal monitors, ARMs, CAMs, and portable survey instruments. Calibration stickers on portable survey instruments were noted during inspection of storage areas for "ready-to-use" equipment and currency of daily/weekly source checks of instruments staged for use were confirmed. Daily source checks for PCMs and portal monitors were observed. Records of quality assurance checks, cross-check analysis results, and calibration for the whole body counter were also reviewed.

Operability and reliability of selected radiation detection instruments were reviewed against details documented in the following: 10 CFR Part 20; NUREG-0737, Clarification of TMI Action Plan Requirements; TS Sections 3 and 5; FSAR Chapter 11; and applicable licensee procedures. Documents reviewed are listed in the attachment.

Self-Contained Breathing Apparatus (SCBA) and Protective Equipment Selected SCBA units staged for emergency use in the control room, technical support center, and other locations were inspected for material condition, breathing air cylinder pressure, and number of units, bottles, and spare masks available. The inspectors observed performance of the monthly inspection for selected SCBA units, verified hydrostatic testing dates for tanks, and reviewed certification records associated with supplied air quality. The ability to fill and transport bottles during emergency conditions was also evaluated.

Qualifications for individuals responsible for inspecting SCBA and filling air tanks were evaluated. Training curricula, including hands-on training, for the new SCBA equipment being used was reviewed. In addition, control room operators and chemistry technicians were interviewed to determine their knowledge of available SCBA equipment locations, including corrective lens inserts if needed, their training on bottle change-out during a period of extended SCBA use, and comfort/familiarity with the new SCBA equipment. Respirator qualification records were reviewed for selected users with emergency response duties.

Licensee activities associated with maintenance and use of respiratory protection equipment were reviewed against 10 CFR Part 20; Regulatory Guide (RG) 8.15, Acceptable Programs for Respiratory Protection; and applicable licensee procedures. Documents reviewed are listed in the attachment.

Problem Identification and Resolution Select corrective action program documents associated with instrumentation and protective equipment were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with procedure CAP-NGGC-0200, Corrective Action Program. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results. Documents reviewed are listed in the attachment.

The inspectors completed the nine required line-item samples detailed in IP 71121.03.

b. Findings

No findings of significance were identified.

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

a. Inspection Scope

Effluent Monitoring and Radwaste Equipment During inspector walkdowns, accessible sections of the liquid and gaseous radwaste processing and effluent systems were evaluated for material condition and conformance with system design diagrams. The evaluated systems included selected liquid waste system processing tanks, pumps, valves, and piping; liquid and gaseous waste processing and effluent radiation monitor (RM) equipment and sample lines for the RAB liquid radwaste effluent monitor RM-L2, nuclear services closed cycle cooling system RM-L3 secondary drain tank liquid monitor RM-L7, RB purge exhaust monitor RM-A1, and

the RAB and fuel handling building area exhaust duct monitor RM-A2; and the RAB ventilation exhaust system and air cleaning units (AHFL-2A/2B/2C/2D). The inspectors interviewed chemistry supervision and engineering personnel regarding radioactive waste (radwaste) equipment configuration and effluent monitor operation. In addition, the inspectors walked down and observed the material condition of the following radiation monitors: RM-L5, RM-L6, RM-L7 and RM-A4 and RM-A8. RM-L4 is no longer used.

The inspectors reviewed performance records and calibration results for selected radiation monitors, flowmeters, and RAB normal ventilation exhaust systems. For the reviewed monitoring systems, the inspectors reviewed the most recent calibration records, including the functional/flow checks, as appropriate. The inspectors reviewed the out-of-service monitors from January 2007 to December 2008, and verified that required compensatory sampling was performed for selected systems. The most recent surveillances on the RAB exhaust ventilation systems (AHFL-2A/2B/2C/2D) were reviewed. Performance and operations of the systems were reviewed and discussed with cognizant licensee personnel.

Installed configuration, material condition, operability, and reliability of selected effluent sampling and monitoring equipment were reviewed against details documented in the following: 10 CFR Part 20; American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME) N509-1976, Nuclear Power Plant Air Cleaning Units and Components, and ANSI N510-1975, Testing of Nuclear Air-Cleaning Systems; RG 1.21, Measuring, Evaluating and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water Cooled Nuclear Power Plants and RG 1.143 Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light Water Cooled Reactors; TS Section 5.6.2.3, Offsite Dose Calculation Manual (ODCM); and FSAR Chapters 9 and 11. Documents reviewed are listed in the attachment.

Effluent Release Processing and Quality Control (QC) Activities In lieu of observing the chemist collecting and processing samples the inspectors opted to review several release permits. The inspectors discussed the processing of release permits with appropriate chemistry personnel with particular emphasis on releases that had to go to the percolation ponds adjacent to the discharge canals for National Pollutant Discharge Elimination System considerations. The inspectors discussed the processing of releases with non-licensed operators that were scheduled to support a release of station drain tank SDT-1 in addition to the chemistry technician that was to perform the sampling. The inspectors reviewed laboratory crosscheck results by a vendor laboratory for the period from the last quarter of 2006 through the second quarter of 2008.

Selected portions of procedures for effluent sampling, processing, and release were observed and evaluated for consistency with chemistry technician activities. Both gaseous and liquid release permits were reviewed against ODCM specifications for pre-release sampling and effluent monitor set-points. The inspectors discussed performance of pre-release sampling and analysis and release permit generation with chemistry technicians. The inspectors reviewed the 2006 and 2007 Annual Radiological Effluent Release Reports to evaluate reported doses to the public and

ODCM changes. The inspectors reviewed a variety of CY 2008 release permits for consistency of dose projection calculation results, sample results and closure results.

Current licensee programs for monitoring, tracking, and documenting the results of both routine and abnormal liquid releases to the onsite and offsite surface and ground water environs were reviewed and discussed in detail. The inspectors reviewed selected 10 CFR 50.75(g) reports associated with abnormal liquid releases and corrective actions initiated. The inspectors discussed the radiologically contaminated status of the nuclear services closed cycle cooling system and the secondary system leakage that necessitated frequent SDT-1 releases with a chemistry specialist. Licensee actions to evaluate ground water hydrology and to detect any potential onsite/offsite environmental impact of significant leakage/spills from onsite systems, structures, and components were reviewed and discussed. Groundwater monitoring initiatives and radionuclide concentration results for several onsite groundwater monitoring wells surrounding the power block and a percolation pond receiving contaminated liquid effluents were reviewed. Initial results of samples collected from the wells associated with the power block did not identify tritium concentrations above environmental detection limits. One well farther away did have a tritium result that was slightly higher than background but only a small fraction of the drinking water limit and the anomalous result is traceable to a minor leak that was discovered and repaired many years ago.

Observed task evolutions, count room activities, and offsite dose results were evaluated against details and guidance documented in the following: 10 CFR Part 20 and Appendix I to 10 CFR Part 50; ODCM; RG 1.21; RG 1.109, Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50 Appendix I; RG 1.33, Quality Assurance Program Requirements; and TS Section 5.6. Documents reviewed are listed in the attachment.

Problem Identification and Resolution A selection of NCRs and three audits associated with effluent release activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve selected issues in accordance with licensee procedure CAP-NGGC-0200, Corrective Action Program. Documents reviewed are listed in the attachment.

The inspectors completed the three specified line-item samples detailed in IP 71122.01.

b. Findings

No findings of significance were identified.

2PS3 Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program

a. Inspection Scope

REMP Implementation The inspectors observed routine sample collection and surveillance activities as required by the licensee's environmental monitoring program. The inspectors noted the material condition and operability of airborne

Enclosure

particulate filter and iodine cartridge sample stations and observed collection of weekly air samples at selected monitoring locations. Environmental thermoluminescent dosimeters at selected sites were checked for material condition. In addition, the inspectors observed collection of surface water, groundwater, and broadleaf vegetation samples. The inspectors determined the current location of selected sample points using NRC global positioning system instrumentation. Land use census results, changes to the ODCM, and sample collection/processing activities were discussed with environmental technicians and licensee staff.

The inspectors reviewed the last two calibration records for selected environmental air samplers. The inspectors also reviewed the 2006 and 2007 Radiological Environmental Operating Reports, results of the 2006 and 2007 inter-laboratory cross-check program, and procedural guidance for environmental sample collection and processing. Selected environmental measurements were reviewed for consistency with licensee effluent data, evaluated for radionuclide concentration trends, and compared with detection level sensitivity requirements.

Procedural guidance, program implementation, and environmental monitoring results were reviewed against: 10 CFR Part 20; Appendix I to 10 CFR Part 50; TS Section 5.0; ODCM; RG 4.15, Quality Assurance for Radiological Monitoring Programs (Normal Operation) - Effluent Streams and the Environment; and the Branch Technical Position, An Acceptable Radiological Environmental Monitoring Program - 1979. Documents reviewed are listed in the attachment.

Meteorological Monitoring Program During tours of the meteorological tower and local data collection equipment, the inspectors observed the physical condition of the tower and its instruments and discussed equipment operability and maintenance history with the system engineer. The inspectors evaluated transmission of locally generated meteorological data to other licensee groups such as main control room operators.

For the meteorological measurements of wind speed, wind direction, and temperature, the inspectors reviewed calibration records for applicable tower instrumentation and evaluated measurement data recovery for 2008.

Licensee procedures and activities related to meteorological monitoring were evaluated against: ODCM; FSAR Chapter 2; ANSI/ANS-2.5-1984, Standard for Determining Meteorological Information at Nuclear Power Sites; and Safety Guide 23, Onsite Meteorological Programs. Documents reviewed are listed in the attachment.

Unrestricted Release of Materials from the RCA The inspectors observed surveys of material and personnel being released from the RCA using small article monitor, personnel contamination monitor, and portal monitor instruments. The inspectors also observed source check testing of these instruments and discussed equipment sensitivity, alarm set-points, and release program guidance with licensee staff. The inspectors compared recent 10 CFR Part 61 results for the DAW waste stream with radionuclides used in calibration and check sources to evaluate the appropriateness and accuracy of release survey instrumentation. The inspectors also reviewed the last two calibration records for selected release point survey instruments.

Licensee programs for monitoring materials and personnel released from the RCA were evaluated against 10 CFR Part 20 and IE Circular 81-07, Control of Radioactively Contaminated Material. Documents reviewed are listed in the attachment.

Problem Identification and Resolution The inspectors reviewed selected NCRs in the areas of environmental monitoring, meteorological monitoring, and release of materials. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with CAP-NGGC-0200, Corrective Action Program. The inspectors also evaluated the scope of the licensee's internal audit program and reviewed recent assessment results. Documents reviewed are listed in the attachment.

The inspectors completed the 10 specified line-item samples detailed in IP 71122.03.

b. Findings

No findings of significance were identified.

1EP7 Force-on-Force Drill Evaluation

a. Inspection Scope

On October 1, the inspectors in the technical support center observed the emergency preparedness component of a Force-on-Force security exercise to verify licensee self-assessment of classification, notification, and protective action recommendation development in accordance with 10 CFR 50, Appendix E during a simulated terrorist event. This inspection constitutes one sample as defined by Inspection Procedure 71114.07.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

.1 Initiating Events and Mitigating Systems Cornerstones

a. Inspection Scope

The inspectors checked the mitigating system performance indicators listed below to verify the accuracy of the PI data reported. Performance indicator data submitted from October 2007 through September 2008 was compared for consistency to data obtained through review of monthly operating reports, nuclear condition reports, the licensee maintenance rule database and control room logs. Performance indicator definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Guideline, Rev.5 were used to check the reporting for each data element. The inspectors checked that any deficiencies affecting the licensee's

performance indicator program were entered into the CAP and appropriately resolved.

- Emergency AC power
- Residual heat removal system
- Auxiliary feedwater system
- High pressure injection system
- Support cooling water system

b. Findings

No findings of significance were identified.

.2 Occupational Radiation Safety Cornerstone

a. Inspection Scope

The inspectors reviewed PI data collected from January 1, 2007, through September 30, 2008, for the Occupational Exposure Control Effectiveness PI. For the reviewed period, the inspectors assessed CAP records to determine whether HRA, VHRA, or unplanned exposures, resulting in TS or 10 CFR 20 non-conformances, had occurred during the review period. In addition, the inspectors reviewed selected personnel contamination event data, internal dose assessment results, and DRD alarms for cumulative doses and/or dose rates exceeding established set-points. Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

.3 Public Radiation Safety Cornerstone

a. Inspection Scope

The inspectors reviewed the Radiological Control Effluent Release Occurrences PI results for the period of January 1, 2007, through September 30, 2008. For the assessment period, the inspectors reviewed dose totals to the public, out-of-service (OOS) effluent radiation monitors and selected compensatory sampling data, and selected NCRs related to Radiological Effluent Technical Specific/ Offsite Dose Calculation Manual issues. The inspectors also reviewed licensee procedural guidance for collecting and documenting PI data. Documents reviewed are listed in the attachment.

b. Findings

No findings of significance were identified.

## 4OA2 Problem Identification and Resolution

### .1 Daily Review

#### a. Inspection Scope

As required by Inspection Procedure 71152, Identification and Resolution of Problems, and in order to help identify equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by attending daily plant status meetings, interviewing plant operators and applicable system engineers, and accessing the licensee's computerized database.

#### b. Findings

No findings of significance were identified.

### .2 Annual Sample Review

#### a. Inspection Scope

The inspectors selected two priority five NCRs for a detailed review. NCR 302511 described that the Maintenance Rule (MR) unavailability performance criterion for the B decay heat closed cycle cooling (DC) system had been exceeded during the recent emergency core cooling system (ECCS) outage. NCR 290023 investigated the valve stroke time for emergency feed valve EFV-57, which had recently been surveillance tested and found to be very close to the action level in the IST monitoring program. The inspectors discussed the corrective action aspects of the two NCRs with the licensee. This inspection completes one sample under the annual sample review.

#### b. Findings and Observations

No findings of significance were identified.

Both NCRs were initiated as priority 2 and were later downgraded to priority 5 when the investigations determined that no adverse conditions existed. The inspectors determined that both should not have been downgraded since adverse conditions did exist. For NCR 302511, the inspectors noted that the NCR investigation did not address why the DC system MR monitoring had failed to recognize beforehand that the performance criteria would be exceeded during the planned ECCS outage. The fact that the performance criteria had been exceeded was not an adverse condition due to recent changes in the maintenance strategy that allowed longer outage durations. For NCR 290023, the inspectors noted that although there was no recent adverse trend of the stroke time for EFV-57, a review of the 3-year history of IST data showed an increasing trend toward the action level. After discussions with the licensee, NCR 302511 was re-opened as a priority 2 NCR to address exceeding the MR unavailability criteria. NCR 310438 was initiated to address the proximity of EFV-57 stroke time to the action level. In addition, NCR 308433 was initiated to investigate whether NCRs that are downgraded receive the appropriate management review.

### .3 Semi-Annual Trend Review

#### a. Inspection Scope

As required by Inspection Procedure 71152, Identification and Resolution of Problems, the inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in section 4OA2.1 above, plant status reviews, plant tours, and licensee trending efforts. The inspectors' review nominally considered the six month period of July 2008 through December 2008. The review also included issues documented in the licensee's Equipment Performance Priority List dated December 22, 2008; various nuclear assessment section reports and maintenance rule reports. Corrective actions associated with a sample of the issues identified in the licensee's corrective action program were reviewed for adequacy.

#### b. Assessment and Observations

No findings of significance were identified. The inspectors evaluated the licensee's trend methodology and observed that the licensee had performed a detailed review. The inspectors compared the licensee reviews with the results of the inspector's daily screening and did not identify any discrepancies or potential trends in the data which the licensee had failed to identify.

### 4OA3 Event Follow-up

#### .1 Operator Performance During Non-Routine Event

##### a. Inspection Scope

For the two non-routine plant evolutions described below, the inspectors reviewed the operating crew's performance, operator logs, control board indications, and the plant computer data to verify that operator response was in accordance with plant procedures.

- December 5, planned reactor power reduction from 100 percent RTP to 48 percent RTP in accordance with OP-204, Power Operations, to support replacement of a main feedwater pump control system
- December 7, planned reactor power increase from 48 percent RTP to 100 percent RTP in accordance with OP-204, Power Operations

##### b. Finding

No findings of significance were identified.

4OA5 Other Activities.1 Quarterly Resident Inspector Observations of Security Personnel Activitiesa. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status reviews and inspection activities.

b. Finding

No findings of significance were identified.

.2 (Discussed) NRC Temporary Instruction (TI) 2515/172, Reactor Coolant System Dissimilar Metal Butt Welds (DMBW)a. Inspection Scope

From December 8 to 10, 2008, the inspector reviewed the licensee's activities related to the inspection and mitigation of DMBWs in the Reactor Coolant System (RCS) to ensure that the licensee activities were consistent with the industry requirements established in the Materials Reliability Program (MRP) document MRP-139, Primary System Piping Butt Weld Inspection and Evaluation Guideline, July 2005. This inspection was limited to the review of licensee activities with regard to the scoping, classification, inspection, and mitigation of dissimilar metal butt welds in accordance with the industry requirements of MRP-139.

A portion of this TI 2515/172 was completed prior to this inspection. The direct observation and documentation review of baseline volumetric Ultrasonic examination (UT) and the application of Full Structural Weld Overlays (FSWOLs) was completed and documented in Integrated Inspection Report 5000302/2008002, Section 4OA5.

b. Findings and Observations

No findings of significance were identified.

**MRP-139 Baseline Inspections**

- 1) Have the baseline inspections been performed or are they scheduled to be performed in accordance with MRP-139 guidance

Yes. The licensee performed all required baseline inspections at the time of this review and the licensee has scheduled the remaining baseline inspections in accordance with MRP-139 guidance.

- Pressurizer – The licensee installed weld overlays on all PRZ DMBWs within the scope of the MRP-139 program during the fall 2007 refueling outage. There were no ultrasonic (UT) examinations performed prior to the installation of weld overlays.
- PRZ surge line-to-hot leg DMBW – The licensee installed a weld overlay during the fall 2007 refueling outage and subsequently removed it due to indication of lack of fusion identified during ultrasonic examinations. After the weld overlay removal, the licensee performed a UT examination in accordance with MRP-139 requirements. This UT examination served as a baseline examination until the installation of a weld overlay, which is planned during the next refueling outage in the Fall of 2009.
- Decay heat removal system suction line-to-hot leg DMBW – The licensee performed a UT examination on the suction line-to-hot leg DMBW during the fall 2007 refueling outage. However, the examination coverage did not meet the coverage requirements of MRP-139. After additional surface preparation, the licensee performed a qualified phased array UT during a forced outage in February-March 2008. The phased array examination identified an unacceptable circumferential indication 15 inches long and 65 percent through wall. For information purposes, the licensee confirmed this indication by conventional qualified UT techniques which also identified the indication and, as added assurance, the results of the phased array examinations were also reviewed by the Electric Power Research Institute (EPRI). The licensee repaired the weld by installing a FSWOL.
- Cold leg DMBWs – The licensee has scheduled to perform the remaining baseline volumetric examination in Fall 2009 and will meet the MRP-139 implementation deadline of December 31, 2010. The licensee has not decided how they will mitigate all of these DMBWs.

2) Is the licensee planning to take any deviations from MRP-139 requirements?

No, the licensee has not submitted any requests for deviation from MRP-139 requirements.

### **Volumetric Examinations**

1) For each examination inspected, was the activity performed in accordance with the examination guidelines in MRP-139, Section 5.1, for unmitigated welds or mechanical stress improved welds and consistent with NRC staff relief request authorization for overlaid welds?

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Pressurizer Surge Line-To-Hot Leg DMBW (Baseline Inspection)

Yes. For details, see Integrated Inspection Report 50-302/2008-002, Section 4OA5.

Decay heat Removal Suction Line-to-Hot Leg DMBW After Mitigation by FSWOL

Yes. For details, see Integrated Inspection Report 50-302/2008-002, Section 4OA5.

- 2) For each examination inspected, was the activity performed by qualified personnel?

Yes. For details, see Integrated Inspection Report 5000302/2008002, Section 4OA5.

- 3) For each examination inspected, was the activity performed such that deficiencies were identified, dispositioned, and resolved?

Pressurizer Surge Line-to-Hot Leg DMBW (Baseline Inspection)

Yes. For details, see Integrated Inspection Report 5000302/2008002, Section 4OA5.

Decay heat Removal Suction Line-to-Hot Leg DMBW After Mitigation by FSWOL

Yes. For details, see Integrated Inspection Report 5000302/2008002, Section 4OA5.

**Weld Overlays**

- 1) For each weld overlay inspected, was the activity performed in accordance with ASME Code welding requirements and consistent with NRC staff relief requests authorizations? Has the licensee submitted a relief request and obtained NRR staff authorization to install weld overlays?

Yes. For details, see Integrated Inspection Report 5000302/2008002, Section 4OA5.

- 2) For each weld overlay inspected, was the activity performed by qualified personnel?

Yes. For details, see Integrated Inspection Report 5000302/2008002, Section 4OA5.

- 3) For each weld overlay inspected, was the activity performed such that deficiencies were identified, dispositioned, and resolved?

Yes. For details, see Integrated Inspection Report 5000302/2008002, Section 4OA5.

**Mechanical Stress Improvement (Not Applicable)**

The licensee has not implemented mechanical stress improvement as a mitigation method for DMBWs.

**In-service Inspection Program**

1) Has the licensee prepared an MRP-139 in-service inspection program?

No, the licensee does not have a MRP-139 in-service inspection program document. The licensee's MRP-139 inspection program consists of the documents listed below, which were previously prepared documents, and the inclusion of MRP-139 requirements as augmented inspections in the ASME Section XI In-service Inspection Program (ISI Program). Therefore, the licensee is managing the MRP-139 commitments. The inspectors reviewed the following documents and held discussions with licensee representatives.

- Progress Energy Nuclear Generation Group "Alloy 600 Strategic Plan," Revision 0
- Nuclear Generation Group Standard Procedure ADM-NGGC-0112, "Reactor Coolant System Material Integrity management Program," Revision 0
- Progress Energy Letter dated January 29, 2007, "Inspection and Mitigation of Alloy 600/82/182 Pressurizer Butt Welds"
- NRC Letter dated March 27, 2007, "Confirmatory Action Letter Crystal River Unit 3"
- Crystal River Action Request 00223348, "CR3 PZR Weld and RCS Leakage Monitoring"
- Progress Energy letter dated January 23, 2008, "CR Summary of Ultrasonic Examination results of Structural Weld Overlays"
- Action Request 00170903, Action Plan to Implement MRP-139
- ISI drawings and list of welds in the Scope of MRP-139

2) Are welds appropriately categorized?

Yes. All welds were appropriately categorized. The inspectors reviewed all welds categorized at the time of the inspection for appropriate categorization in accordance with MRP-139, Section 6.

3) Are inspection frequencies consistent with the requirements of MRP-139?

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Yes, planned inspection frequencies for welds in the MRP-139 program are consistent with the requirements of MRP-139.

- 4) What is the licensee's basis for categorizing welds as H or I and plans for addressing potential PWSCC?

No welds were categorized as Categories H or I after application of a FSWOL. Therefore, all welds were able to be volumetrically inspected to greater than 90 percent.

- 5) What deviations has the licensee incorporated and what approval process was used?

No deviations to MRP-139 have been incorporated by the licensee, therefore no approval was needed.

.3 World Association of Nuclear Operators (WANO) Assessment Report Review

The inspectors reviewed the final report of the WANO assessment of site activities conducted in May 2008. The report did not identify any significant licensee performance issues that had not been previously addressed and/or reviewed by the NRC.

40A6 Exit

Exit Meeting Summary

On January 12, 2009, the resident inspectors presented the inspection results to Mr. D. Young, Site Vice President and other members of licensee management. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee personnel:**

J. Holt, Plant General Manager  
W. Brewer, Manager, Maintenance  
S. Cahill, Manager, Engineering  
P. Dixon, Manager, Nuclear Assessment  
J. Franke, Director of Site Operations  
R. Hons, Manager Training  
C. Morris, Manager, Operations  
D. Westcott, Supervisor, Licensing  
B. Akins, Superintendent, Radiation Protection  
J. Stephenson, Supervisor, Emergency Preparedness  
I. Wilson, Manager Outage and Scheduling  
D. Young, Vice President, Crystal River Nuclear Plant

#### **NRC personnel:**

M. Sykes, Chief, Branch 3, Division of Reactor Projects

### **LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**

#### **Discussed**

050000302/2515/172	TI	Reactor Coolant System Dissimilar Metal Butt Welds (Section 40A5)
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### **LIST OF DOCUMENTS REVIEWED**

#### **Section 1R05: Fire Protection**

##### **Procedures**

AI-2205A, Pre Fire Plan – Control Complex  
AI-2205B, Pre Fire Plan – Turbine Building  
AI-2205C, Pre Fire Plan – Auxiliary Building  
AI -2205F, Pre Fire Plan – Miscellaneous buildings and Components  
SP-804, Surveillance of Plant Fire Brigade Equipment

**Section 1R12: Maintenance Effectiveness****Nuclear Condition Reports**

NCR 302693, NCR not written in timely manner for B DC system exceeding the MR unavailability criterion.

NCR 302628, Degraded raw water pump flush water flow rate (B train)

NCR 308929, Degraded raw water pump flush water flow rate (B train)

**Maintenance Work Orders**

1463910, Remove shell from A train raw water piping and component internals

1463462, Remove shell from B train raw water piping and component internals

**Section 2OS1: Access Controls to Radiologically Significant Areas****Procedures, Manuals, and Guidance Documents**

DOS-NGGC-0001, Dosimetry Records Management, Rev. 11

DOS-NGGC-0005, Skin Dose from Contamination, Rev. 9

DOS-NGGC-0006, Personnel Exposure Investigations, Rev. 11

DOS-NGGC-0007, Internal Dose Calculations, Rev. 9

HPS-NGGC-0003, Radiological Posting, Labeling and Surveys, Revision (Rev.) 12

HPS-NGGC-0013, Personnel Contamination Monitoring, Decontamination, and Reporting, Rev. 8

HPS-NGGC-0014, Radiation Work Permits, Rev.4

Operations Procedure (OP) 417, Containment Operating Procedure, Section 4.2

Containment Access, Rev. 105

Health Physics Procedure (HPP)-221, High Radiation Area, Locked High Radiation Area, and Very High Radiation Area Controls, Rev 9, and Rev.10

HPP-219, RP Failed Fuel Action Plan, Rev. 6

CP-123, Restrained Components and Key Control, Rev. 54, Rev. 54A, Rev 55, Rev. 56, and Rev. 57

Radiation Work Permit (RWP) Number (No.) 00004310 00, Operations Activities (Moderate Risk, Rev. 00

RWP No. 00004312 02, Low Risk Inspection Activities – No

RWP No. 00004314 01, Moderate Risk Activities, Rev. 01

RWP No. 00004315 01, Moderate Risk Activities, Rev. 01

RWP No. 00004316 00, Moderate Risk Activities, Rev. 01

RWP No. 00004320 00, Spent Fuel Pool Activities, Rev. 0

RWP No. 00004325 00, Reactor Building Entries – Moderate Risk, Rev. 0

RWP No. 00004326 01, Reactor Building Entries, Rev. 01

RWP No. 00004490 03, Maintenance Reactor Building Activities – Planned Outage (Moderate Risk, Rev. 03

Corrective Action Program Procedure – NGGC-022, Corrective Action Program, Rev. 26

**Records and Data Reviewed**

Workers Exceeding RWP Dose and/or Rate Alarm Set-Points, January 1, 2008 through December 4, 2008

Whole Body Counter Analysis Results, October 1, 2007, through December 4, 2008

Direct Reading Dosimeter Alarm Evaluations, January 1, 2008, through December 4, 2008

Attachment

Health Physics Survey Record No. 08-11-0083, Spent Fuel floor, Remove FHCR-3 Mast Cable, 11/12/08  
 HPSR 07-11-0096, "B" Upper Manway and Diaphragm Removal, 11/05/07  
 HPSR 07-11-0099, Smear from "A" OTSG upper diaphragm, preparation for shipment, 11/05/07  
 HPSR 07-11-0433, Refueling floor, re-pack Box 378 for shipping purposes, 11/14/07  
 HPSR 07-11-0675, Berm, Hatch to Yellow Room, and Reactor Coolant Bleed Tank Room, 119' Elevation, 11/20/07  
 HPSR 07-11-0836, Hatch to Reactor Coolant Bleed Tank Room/Make-up Tank Room, 119' Elevation, 11/26/07  
 HPSR 07-11-0901, Yellow Room 119' Elevation, 11/28/07  
 HPSR 07-12-0058, 95' Elevation, Reactor Coolant Bleed Tank Room, 12/04/07 Elevation, 11/20/07  
 HPSR 07-12-0024, Reactor Coolant Bleed Tank Room, 12/01/07  
 HPSR 07-12-0025, Auxiliary Building 119' Auxiliary Building 12/01/07  
 HPSR 07-12-0046, Yellow and Green Room, 12/03/07  
 HPSR 08-08-0249, RB verify RCV-164 leakage, 08/29/08

#### Corrective Action Program (CAP) Documents

NCR 256721, Personnel Contamination Event  
 NCR 257334, Hot spot found in nuclear sample room  
 NCR 262664, Increase in radiation protection dose  
 NCR 266611, Emergent dose for January 2008  
 NCR 276937, Un-posted radiation area  
 NCR 281380, Needed Improvement for reactor building entry scheduling  
 NCR 286949, FME removed from refueling team underwater vacuum  
 NCR 291271, Site on-line dose KPI for July is red  
 NCR 292928, RVCH Storage Building Sump Water Level Inspection  
 NCR 293445, Incorrect container and potential lifting and rigging concern  
 NCR 294996, Lack of effective long-handled tools available  
 NCR 296056, Opportunity to clean Spent Fuel Pool not realized  
 NCR 296433, Site on-line dose KPI for August is red

### **Section 2OS3: Radiation Monitoring Instrumentation and Protective Equipment**

#### Procedures and Guidance Documents

CH-401D, RM-A4 Calibration, Rev. 3  
 CH-601, Breathing Air Sampling, Rev. 9  
 HPP-320, Whole Body Counting System Operation, Rev. 19  
 HPP-404, Area Radiation Monitoring System Calibration, Rev. 16  
 HPP-411, Calibration Check of Main Steam Line Monitors RM-G25 and G28, Rev. 8  
 HPP-414, Calibration and Operation of Eberline Personnel Contamination Monitors, Rev. 23  
 HPP-442, Operation and Calibration of the GEM-5 Gamma Exit Monitor, Rev. 3  
 HPP-448, Operation and Calibration of the ARGOS-5AB Exit Monitor, Rev. 2  
 HPP-500, Respiratory Protection Program, Rev. 0  
 HPP-502, Respiratory Equipment Inspection and Maintenance, Rev. 20  
 HPS-NGGC-0005, Calibration of Portable Radiation/Contamination Survey Instruments, Rev. 9  
 SP-166, Calibration of RM-G29 and RM-G30, Rev. 17

#### Records and Data Reviewed

Shepard Model 89 Recertification Spreadsheet, 9/5/08  
 WO 516945-01, Calibration of RM-G29 and RM-G30, 11/15/05  
 WO 516945-02, Calibration of RM-G29 and RM-G30, 8/9/05  
 WO 812346-02, Calibration of RM-G29 and RM-G30, 8/13/07  
 WO 812346-01, Calibration of RM-G29 and RM-G30, 11/23/07  
 WO 853024-01, Main Steam Line Rad Monitor Calibration, RMG-25 & RMG-28, 5/4/07  
 WO 1058944-01, Main Steam Line Rad Monitor Calibration, RMG-25 & RMG-28, 5/8/08  
 Calibration Check, Main Steam Line Radiation Monitor RM-G28 (4/4/07, 5/8/08)  
 Calibration Certificate, RMG-14 (4/19/07, 4/16/08)  
 Calibration Data, RM-A4 (5/17/06, 9/7/07)  
 Calibration Certificates: SAM s/n 265 (1/24/08); SAM s/n 279 (1/24/08); SAM s/n 428 (1/23/08);  
 SAM s/n 449 (1/23/08); ARGOS s/n 0710-037 (3/3/08); ARGOS s/n 0804-055 (6/4/08);  
 Gamma 60 s/n 1026, 2/12/08; Gamma 60 s/n 980081 (2/12/08); Gamma 60 s/n 1024 (6/16/08);  
 GEM-5 s/n 601-035 (2/14/08); GEM-5 s/n 601-036 (2/14/08);  
 GEM-5 s/n 601-037(2/14/08); GEM-5 s/n 601-038 (2/14/08); GEM-5 s/n 805-124 (9/9/08);  
 GEM-5 s/n 805-125 (9/8/08); PCM-1B s/n 1142 (2/26/08); PCM-1B s/n 1142 (2/26/08); PCM-1B s/n 7640-01(2/26/08);  
 PCM-1B s/n 7640-05 (2/25/08); PCM-1C s/n 124 (2/29/08); PCM-1C s/n 120 (2/29/08); PCM-1C s/n 119 (2/29/08)  
 Calibration Record: Eberline RO-20, s/n 2330, 5/9/08; Eberline RO-20, s/n 2468, 5/5/08;  
 Eberline RO-20, s/n 2503, 4/29/08; Eberline RM-14, s/n 4929, 5/6/08; Eberline RM-14, s/n 6061, 5/6/08  
 System Health Reports, Radiation Monitoring, January 2006 through June 2008 (semi-annual)  
 IAP-2 Compressor Log Sheet  
 Grade D Air Certification: Mako Compressor IAP-2 (3/14/07, 6/8/07, 9/26/07, 12/20/07, 2/21/08, 5/15/08)  
 Lesson Plan GNP0012C, MSA FireHawk SCBA Users Practical Training  
 Lesson Plan GNI0012C, MSA FireHawk SCBA User Initial Training  
 Certification of CR3 as MSA C.A.R.E. Authorized Repair Center, 5/7/08  
 PT-160, Post Accident Sampling System Standby Operation Testing (7/10/08, 8/27/08)  
 Whole Body Counter Calibration, 5/8/08  
 Whole Body Counter Libraries – Daily QCC, Ingestion, Inhalation, Master, Mixed-Gamma, Organ  
 Whole Body Counter Cross-Check Analysis Results, 3<sup>rd</sup> Quarter 2008

#### CAP Documents

Quick-Hit Self-Assessment 269776, 10 CFR 20.170X Respiratory Program  
 Audit C-RP-07-01, Radiation Protection Assessment, 5/30/07  
 Audit C-RP-08-01, Radiation Protection Assessment, 5/12/08  
 NCR 295249, Radiation monitoring system health report degraded  
 NCR 201299, RM STGP – Obsolescence of rad monitors  
 NCR 201298, RM STGP – Obsolescence of RMA-6 and RMA-12  
 NCR 232002, Some SCBA cylinders have reached the end of service life  
 NCR 278908, MSA SCBA discrepancies  
 NCR 285195, New MSA prescription spectacle kit added response time

**Section: 2PS1 Radioactive Gases and Liquid Effluent Treatment and Monitoring Systems**

Procedures, Guidance Documents, and Manuals

CH-615, RM-A1 Sampling, Rev. 6  
 CH-616, RM-A2 Sampling, Rev. 6  
 CH-617, RM-A6 Sampling, Rev. 12  
 CH-655, Radwaste Demineralizer System Sampling, Rev. 2  
 SP-731A, Auxiliary Building Ventilation Continuous Release, Rev.8  
 SP-731B, Reactor Building Purge Batch Release and Batch to Continuous Release, Rev. 19  
 SP-731C, Reactor Building Ventilation Continuous Release, Rev. 10  
 SP-731D, Reactor Building Purge System Test Release, Rev. 8  
 SP-731F, WDT-1A Release, Rev. 7  
 SP-736A, WDT-10A Release to the Discharge Canal, Rev. 9  
 SP-736B, WDT-10B Release to the Discharge Canal, Rev. 10  
 SP-736E, WDT-11A and WDT-11B Combined Release to the Discharge Canal, Rev. 8  
 SP-736F, SDT-1/Turbine Building Sump Release to the Settling Ponds, Rev. 10  
 Crystal River 3 FSAR Chapter 11.4, Radiation Monitoring System, Rev. 31.1  
 Crystal River 3 FSAR Chapter 11.2, Radioactive Waste Disposal Systems Summary, Rev. 31.1  
 Crystal River Unit 3, Off-Site Dose Calculation Manual, Rev.31

Records and Data Reviewed

AHFL-1A/1B (Reactor Building) In-Place Filter Testing, 2/14/2008  
 AHFL-2A/2B/2C/2D Auxiliary Building In-Place Filter Testing, 11/15/2006  
 CH-220R, RM-L2 Calibration, Rev. 9, performed 3/30/2006 and 5/25/2007  
 CH-220S, RM-L3 Calibration and Setpoint Determination, Rev. 5, performed 12/15/2006 and 8/15/2007  
 CH-220V, RM-L7 Calibration, Rev. 9, performed 3/15/2006 and 9/19/2007  
 SP-701A, RM-A1 Gas Calibration low range, Rev. 7, performed 2/17/2007  
 SP-701A, RM-A1 Gas Calibration low range, Rev. 8, performed 7/22/2008  
 SP-701D, RM-A1 Iodine Channel Calibration, Rev.6, performed 7/16/2006 and 1/22/2008  
 SP-701E, RM-A2 Gas Calibration Low Range, Rev. 6 performed 4/6/06  
 SP-701E, RM-A2 Gas Calibration Low Range, Rev. 7, performed 8/7/2007  
 SP-701H, RM-A2 Iodine Channel Calibration, Rev.7, performed 1/30/2008  
 SP-701H, RM-A2 Iodine Channel Calibration, Rev.8, performed 6/25/2008  
 SP-701U, RM-A2 Particulate Channel Calibration, Rev.3, performed 6/28/2006 and 5/1/2008  
 SP-701V, RM-A1 Particulate Channel Calibration, Rev. 3 performed 1/11/2006 and 6/7/2007  
 Low-Level Radioactive Waste Analysis Data Sheet (DAW Part 61 Analysis), 8/6/2008  
 Crystal River Unit 3 2006 Annual Radioactive Effluent Release Report, 4/25/2007  
 Crystal River Unit 3 2007 Annual Radioactive Effluent Release Report, 4/23/2008  
 Station Drain Tank 1 Release Permit 80192.006.686.L, 11/1/2008  
 Station Drain Tank 1 Release Permit 80195.006.688.L, 11/8/2008  
 Station Drain Tank 1 Release Permit 80198.006.691.L, 11/12/2008  
 Station Drain Tank 1 Release Permit 80200.006.690.L, 11/15/2008  
 Station Drain Tank 1 Release Permit 80201.006.691.L, 11/20/2008  
 Station Drain Tank 1 Release Permit 80204.006.692.L, 11/22/2008  
 Station Drain Tank 1 Release Permit 80205.006.693.L, 11/26/2008  
 Condensate Release Permit, 80049.007.027.L, 3/8/2008  
 Waste Drain Tank 1B Release Permit 80054.022.064.G, 9/4/2008

Auxiliary Building Vent Release Permit, 80059.020.468.G, 9/25/2008  
 Waste Decay Tank 10B Release Permit, 80175.002.561.L, 10/1/2008  
 Radiochemistry Crosscheck Program Results for 4<sup>th</sup> quarter 2006, 1<sup>st</sup> through 4<sup>th</sup> quarter 2007 and 2<sup>nd</sup> quarter 2008

#### CAP Documents

CNAS-2007-53, Environmental and Chemistry Assessment, 8/9/2007  
 CNAS-2006-21, Radiation Protection Assessment, 5/16/2006  
 CNAS-2007-39, Radiation Protection Assessment, 5/30/2007  
 NCR 00215863, Dose calculations are needed to make SDT-1 releases to percolation ponds.  
 NCR 00220681, Perform Self-Assessment for Tritium in Groundwater Initiative.  
 NCR 00255033, Noted that tritium samples taken during outage from RM-A2 were a factor of 10 higher than those taken when the plant was on-line.  
 NCR 00277583, RM-L2 indication found 10 times higher than normal. Switch was in wrong position. NCR 00276201 and NCR 00277539 also address this observation.  
 NCR 00277940, RM-A2 (Iodine) high alarm set-point was found to be non-conservative.  
 NCR 00278204, Recommending process improvements for documentation of radiation monitor setpoints.  
 NCR 00279567, A transcription error was identified on a release permit where a digit was wrong.  
 NCR 00286400, RM-L2 lost power due to a fuse blown from fatigue  
 NCR 00288371, ODCM required samples for RM-A2 missed  
 NCR 00289959, Discrepancy between local instrument indicated value and the value indicated in the control room on RM-L2.

### **Section 2PS3: Radiological Environmental Monitoring Program (REMP) and Radioactive Material Control Program**

#### Procedures and Guidance Documents

HPP-202A, Supplemental Instructions to HPS-NGGC-0003: Radiological Surveys and Inspections, Rev. 29  
 EMG-NGGC-0002, Off-Site Dose Assessment, Rev. 0  
 FP 1, Field Deployment of Gas Meters, Rev. 0  
 CAP-NGGC-0200, Corrective Action Program, Rev. 25

#### Records and Data Reviewed

2006 and 2007 Annual Radiological Environmental Operating Reports  
 Environmental Gas Meter Calibration Record Log Sheet, 12/4/06 – 7/30/08  
 Meteorological Data Recovery Evaluations, Wind speed, Wind direction, Delta temperature, 2008  
 Primary System Meteorological Monitoring Instrumentation Calibrations, 12/8/06, 5/23/07, 10/25/07, and 5/1/08  
 10 CFR Part 61 Analysis, Dry Active Waste Stream, 8/6/08

#### CAP Documents

CNAS-2007-53, Environmental and Chemistry Assessment, 8/9/07  
 NCR 00237736, Environmental air sampler at location C40 found without power  
 NCR 00275233, Interlab cross-check program for REMF samples not fully completed in 2007  
 NCR 00276959, Meteorological tower has aging and obsolescence issues

NCR 00295211, Radioactive material control procedures could be enhanced to check for container degradation

### **Section: 4OA1 Performance Indicator Verification**

#### Procedures

REG-NGGC-0009, NRC Performance Indicators and Monthly Operating Report Data, Rev. 8  
CP-217, NRC Performance Indicator (PI) Program, Rev. 9

#### Records and Data Reviewed

Direct Reading Dosimeter (DRD) Alarm List and Selected DRD Evaluation Records,  
October 1, 2007, through December 4, 2008

#### CAP Documents

NCR 253848, Dose rate alarm during ISI Inspection  
NCR 255213, Unanticipated dose rate alarm for worker  
NCR 255321, Dose rate alarm occurred that was not pre-briefed  
NCR 257320, ED dose rate alarm while installing insulation  
NCR 260124, DRD Alarm Evaluation  
NCR 262242, Review HNP LHRA/VHRA key NCR  
NCR 268399, Dosimeter failure  
NCR 275691, DRD Alarm Evaluation  
NCR 277635, DRD Alarm Evaluation  
NCR 278060, Fire team leader maintaining a master LHRA key on his key ring  
NCR 281343, Worker received dose rate alarm message on log-out  
NCR 296909, TLD worn after medical treatment  
NCR 297448, TLD sent through x-ray machine at airport  
NCR 297476, TLD sent through x-ray machine at airport

### **Section: 4OA5 Other Activities**

#### Procedures and Specifications

EPRI Materials Reliability Program (MRP) 139, Primary System Piping Butt Weld Inspection and Evaluation Guideline, July 14, 2005  
EPRI MRP-126, Generic Guidance for Alloy 600 Management  
EPRI MRP-121, Mechanical Stress Improvement Process (MSIP) Implementation and Progress Energy, Nuclear Generation Group Alloy 600 Strategic Plan, Revision 0  
Progress Energy, Nuclear Generation Group Alloy 600 Strategic Plan, Revision 1a

#### Corrective Action Documents

Condition Report (CR) CR-2007-5956, UT indication in the Hot Leg Surge Nozzle Weld Overlay

\*Nonconformance Report (NCR) NCR 310471, Inadequate MRP-139 Weld Categorization

\*NCRs generated as a direct result of this inspection

Other Records

Crystal River Unit 3, TI 2515/172 DMBW Inspection Tracking Matrix  
Areva, Document 51-9018595-000, CR3 Alloy 600 Program Review, April 2006  
Crystal River Unit 3, RFO 16, Period 1, 4<sup>th</sup> Interval, Component Scheduling, 12/9/2008  
NRC Approved Letter and Safety Evaluation Report (SER) and Response For Additional  
Information for Crystal River Unit 3 Relief Request 07-003-RR, Rev 1  
NRC Approved Letter and SER for Crystal River Unit 3 Relief Request 07-011-II, Rev 0  
Crystal River Unit 3 Letter 3f0103-03, to NRC-Response to Request for Additional  
Information, Bulletin 2002-01, Jan 28, 2003  
NRC Integrated Inspection Report number 50-302/2008-002, section 4OA5