



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-302/94-20

Licensee: Florida Power Corporation
3201 34th Street, South
St. Petersburg, FL 33733

Docket No.: 50-302

License No.: DPR-72

Facility Name: Crystal River 3

Inspection Conducted: August 13 through September 9, 1994

Inspector: A.R. Long for 9/18/94
R. Butcher, Senior Resident Inspector Date Signed

Inspector: A.R. Long for 9/19/94
T. Cooper, Resident Inspector Date Signed

Inspector: A.R. Long 9/19/94
A. Long, Project Engineer Date Signed

Approved by: K. Landis 9/16/94
K. Landis, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope:

This routine inspection was conducted by the resident inspectors in the areas of plant operations, radiological controls, security, surveillance observations, maintenance observations, fire protection, self assessment, and licensee action on previous inspection items. Numerous facility tours were conducted and facility operations observed. Backshift inspections were conducted on August 29, 30, 31, September 1, 3, and 4.

Results:

During this inspection period, the inspectors had comments in the following Systematic Assessment of Licensee Performance functional areas:

Operations:

Within the scope of this inspection, the inspectors determined that the licensee continued to demonstrate satisfactory performance to ensure safe plant operations. One unresolved item was identified.

** Unresolved Item 50-302/94-20-01, Respiratory and Self Contained Breathing Apparatus Equipment Qualification Requirements for Control Room Personnel. (paragraph 3.b)

Maintenance:

For those maintenance activities observed, the inspectors determined that the activities were conducted in a satisfactory manner and that the work was properly performed in accordance with approved maintenance work orders. The inspectors determined that the testing activities were performed in a satisfactory manner and met the requirements of the TSs.

Plant Support:

The implementation of the health physics program observed during this inspection period were proper and conservative.

Overall, the inspector concluded that fire detection and suppression systems were well maintained, and control of transient combustibles continued to be very good. The licensee continued effectively and proactively identifying potential hazards or deficiencies, and achieving prompt resolution. Management provided good support to the Fire Protection program. Plant workers demonstrated safety focus and cooperation with respect to fire prevention.

**Unresolved items are a matter about which more information is required to determine whether they are acceptable or may involve violations or deviations.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

W. Bandhauer, Nuclear Shift Manager
G. Boldt, Vice President Nuclear Production
J. Campbell, Manager, Nuclear Plant Technical Support
R. Davis, Manager, Nuclear Plant Maintenance
*E. Froats, Senior Nuclear Licensing Engineer
*G. Halnon, Manager, Nuclear Plant Operations
B. Hickie, Director, Nuclear Plant Operations
*S. Koleff, Supervisor, Nuclear Plant Technical Support
*G. Longhouser, Superintendent, Nuclear Plant Security
W. Marshall, Nuclear Shift Manager
P. McKee, Director, Quality Programs
R. McLaughlin, Nuclear Regulatory Specialist
B. Moore, Production Manager
W. Neuman, Supervisor, Inservice Inspection
*A. Petrowsky, Supervisor, Site Nuclear Engineering Services
*S. Robinson, Manager, Nuclear Quality Assurance
*W. Rossfeld, Manager, Site Nuclear Services
W. Stephenson, Nuclear Shift Manager
F. Sullivan, Nuclear Shift Manager
*R. Widell, Director, Nuclear Operations Site Support
G. Wilson, Nuclear Shift Manager
*K. Wilson, Manager, Nuclear Licensing

Other licensee employees contacted included office, operations, engineering, maintenance, chemistry/radiation, and corporate personnel.

NRC Resident Inspectors

*R. Butcher, Senior Resident Inspector
*T. Cooper, Resident Inspector

*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Plant Status and Activities

a. Plant Status

At the beginning of this reporting period, Unit 3 was operating at 100% power and had been on line since June 19, 1994. No plant evolutions occurred this report period.

b. NRC Activity

On August 16, 1994, M. Miller, resident inspector, St. Lucie, was on site to get badged and conduct familiarization tours with the resident inspectors. M. Miller is the backup inspector for the CR site in the event of an emergency. No report will be issued.

On August 22 through August 26, 1994, A. Long, Project Engineer, NRC Region II, was on site to provide inspection coverage during the Region II resident inspectors meeting. Inspection results are documented in this report.

On August 22 through August 24, 1994, J. Arildsen, Senior Operations Engineer, NRR, accompanied by Brian Haagensen and Debra Schurberg of Brookhaven National Laboratory, were on site to perform a voluntary survey of the licensee's personnel workloads and the workload management strategies utilized when responding to plant operational events. This was a survey and no report will be issued.

On August 29 through September 2, 1994, R. Shortridge, Senior Radiation Specialist, and R. Carrion, Radiation Specialist, were on site to inspect the licensee's programs in the areas of radiological effluents, chemistry, and radwaste management and shipment. T. Decker, Section Chief, attended the exit meeting. Results will be documented in IR 50-302/94-21.

3. Plant Operations (71707 & 93702)

Throughout the inspection period, facility tours were conducted to observe operations and maintenance activities in progress. The tours included entries into the protected areas and the radiologically controlled areas of the plant. During these inspections, discussions were held with operators, health physics and instrument and controls technicians, mechanics, security personnel, engineers, supervisors, and plant management. Some operations and maintenance activity observations were conducted during backshifts. Licensee meetings were attended by the inspector to observe planning and management activities. The inspections confirmed FPC's compliance with 10 CFR, Technical Specifications, License Conditions, and Administrative Procedures.

- a. On August 17, 1994, EFP-2 was taken out of service for a planned system outage. The main reason for this system outage was due to minor turbine surging during the last performance test. The work scope was expanded to include a Limitorque inspection and lubrication inspection/change on valves EFV-11 and EFV-32. The inspectors witnessed the replacement of the governor and the inspection of EFV-32. TS 3.7.5, Emergency Feedwater (EFW) System, Condition B, states that with one EFW train inoperable for reasons other than Condition A, restore EFW train to operable status within 72 hours. The licensee entered TS 3.7.5 at 6:00 a.m. on August 17, 1994, and exited TS 3.7.5 at 12:15 a.m. on August 18,

1994, after surveillance procedure SP-349B, EFP-2 and Valve Surveillance, was successfully completed on EFP-2, EFV-11, and EFV-32.

The inspectors reviewed the safety benefit evaluation for the EFP-2 system outage. Procedure AI-255, System/Component Outage Preparation and Implementation, requires a written justification before performing a system outage when failure of the operable redundant system/component during the system outage may place the plant in one of the following situations:

- Trip
- Power decrease
- Reportable event
- Unexpected or undesired release to the environment

The inspectors had no questions on the safety benefit evaluation.

- b. Respirators are maintained in the control room for radiological emergencies. Self-contained breathing apparatus are maintained in the control room for toxic gas emergencies. Short-term instruction 94-0016, requires that upon receipt of a verified toxic gas alarm, personnel in the control room are to don SCBAs concurrent with performing the immediate actions of the licensee procedure, AP-513, Toxic Gas. This is to be accomplished within two minutes.

The inspectors performed an inspection of the qualifications of various control room personnel for the wearing of respirators and SCBAs. It was found that all reactor operators and ANSSs were qualified for respirators and SCBAs. Only two of the NSSs were qualified. For the periods of time when the ANSS was absent from the control room, there might not have been an SRO in the control room who was qualified to deal with a radiological or toxic gas emergency which required the wearing of respiratory or SCBA equipment. Each NSS is now completing their qualification on both the respirator and SCBA.

The inspectors will continue their investigation into the requirements for the qualifications of the NSS for use of respirators and/or SCBAs in the control room. URI 50-302/94-20-01: Requirements for Respiratory and SCBA Equipment for Control Room Personnel, is being opened while the investigation is being conducted.

- c. On September 7, 1994, at 1:20 a.m. the licensee removed the B ECCS from service to perform an on line system outage. The following equipment and their related TS were affected. The TS action statements were for 72 hours.

<u>ITEM</u>	<u>TS</u>	<u>Date OOS</u>	<u>Date Returned</u>
DHP-1B	3.5.2A	9-7-94 at 1:20 a.m.	9-8-94 at 6:00 p.m.
DCP-1B	3.7.8A	9-7-94 at 1:20 a.m.	9-8-94 at 6:24 a.m.
RWP-3B	3.7.10A	9-7-94 at 1:20 a.m.	9-8-94 at 6:18 a.m.
RWP-2B	3.7.9A	9-7-94 at 1:20 a.m.	9-8-94 at 6:18 a.m.
BSP-1B	3.6.6A	9-7-94 at 1:20 a.m.	9-8-94 at 6:00 p.m.

The purpose of the system outage was to repair system leaks, perform minor modifications to DCP-1B, RWP-2B, and RWP-3B, to shoot and clean DCHE-1B, and check Rosemont transmitters that were wetted during a NaOH spill (see NRC IR 50-302/94-16, paragraph 6.d). The inspectors reviewed the safety benefit evaluation per AI-255 for the system outage and identified no problems.

Violations or deviations were not identified. One URI was identified.

4. Surveillance Observations (61726)

The inspectors observed TS required surveillance testing and verified that the test procedures conformed to the requirements of the TSs; testing was performed in accordance with adequate procedures; test instrumentation was calibrated; limiting conditions for operation were met; test results met acceptance criteria requirements and were reviewed by personnel other than the individual directing the test; deficiencies were identified, as appropriate, and were properly reviewed and resolved by management personnel; and system restoration was adequate. For completed tests, the inspectors verified testing frequencies were met and tests were performed by qualified individuals.

The inspectors witnessed/reviewed portions of the following test activities:

- SP-150, Operability and Functional Check of the Loose Parts Monitoring Subsystem;
- SP-310, LPMS Channels Assessment;
- SP-312A, Daily Heat Balance Power Comparison; and
- PT-175, Standby SW Heat Exchanger Valve Lineup for Single Tube Testing.

The inspectors determined that the above testing activities were performed in a satisfactory manner and met the requirements of the TSs.

Violations or deviations were not identified.

J. Maintenance Observations (62703)

Station maintenance activities of safety-related systems and components were observed and reviewed to ascertain they were conducted in accordance with approved procedures, regulatory guides, industry codes and standards, and in conformance with the TSs.

The following items were considered during this review, as appropriate: LCOs were met while components or systems were removed from service; approvals were obtained prior to initiating work; activities were accomplished using approved procedures and were inspected as applicable; procedures used were adequate to control the activity; troubleshooting activities were controlled and repair records accurately reflected the maintenance performed; functional testing and/or calibrations were performed prior to returning components or systems to service; QC records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were properly implemented; QC hold points were established and observed where required; fire prevention controls were implemented; outside contractor force activities were controlled in accordance with the approved QA program; and housekeeping was actively pursued.

The inspectors witnessed/reviewed portions of the following maintenance activities in progress:

- WR NU 0311691, Perform PM-178A, Preventive Maintenance of Limitorque Actuators, 2 Year Inspection, EFV-32;
- WR NU 0319804, Replace governor on EFP-2;
- WR NU 0321117, Repair concrete surface and re-coat the A and B decay heat pits; and
- WR NU 0321449, Support EPRI and FPC on conducting SWHE-1A heat exchanger tube testing.

The following item was considered noteworthy.

- The A and B decay heat pits have had a water intrusion problem for many years. Previous attempts by the licensee to prevent water intrusion, and the resultant problems with failed coatings, contamination control, and general housekeeping, has been unsuccessful. The licensee located a contractor that will remove the existing wall and floor coatings, prepare the concrete surfaces, and apply a water tight coating (Xepex) to seal the concrete from further water intrusion. This process has been successfully used on tunnels, dams, and other concrete structures that are subject to water intrusion problems. The existing coatings on the walls and floors are being removed with a high pressure water hydrolyzing process and then a protective coating of Xepex is being applied. Only one decay heat pit is being

worked at a time and safety related equipment is protected from the water and Xepex coating material. A work request (WR NU 0321117) and special work instructions are used to control the work process and to ensure operability of the equipment while work is ongoing. The inspectors reviewed the 10 CFR 50.59 evaluation, attended the PRC meeting, discussed the job controls with the responsible Nuclear Production Coordinator, and toured the B decay heat pit to observe equipment protection installation prior to the start of work. The work started in the B decay heat pit on August 18, 1994. This work is on going and will continue for several more weeks.

For those maintenance activities observed, the inspectors determined that the activities were conducted in a satisfactory manner and that the work was properly performed in accordance with approved maintenance work orders.

Violations or deviations were not identified.

6. Plant Support (71750)

a. Health Physics Program

Radiation protection control activities were observed to verify that these activities were in conformance with the facility policies and procedures, and in compliance with regulatory requirements. These observations included:

- Entry to and exit from contaminated areas, including step-off pad conditions and disposal of contaminated clothing;
- Area postings and controls;
- Work activity within radiation, high radiation, and contaminated areas;
- RCA exiting practices;
- Proper wearing of personnel monitoring equipment, protective clothing, and respiratory equipment; and
- NRC form 3 and NOVs involving radiological working conditions were posted in accordance with 10 CFR 19.11.

Effluent and environmental monitoring was observed to determine that radiation and meteorological recorders and indicators were operable with no unexplained abnormal traces evident. Other observations verified that control room toxic monitors were operable and that plant chemistry was within TS and procedural limits.

The implementation of the health physics program observed during this inspection period were proper and conservative.

b. Security Control

In the course of the monthly activities, the inspector included a review of the licensee's physical security program. The performance of various shifts of the security force was observed in the conduct of daily activities to include: protected and vital areas access controls; searching of personnel, packages, and vehicles; badge issuance and retrieval; escorting of visitors; patrols; and compensatory posts. In addition, the inspector observed the operational status of protected area lighting, protected and vital areas barrier integrity, and the security organization interface with operations and maintenance. No performance discrepancies were identified by the inspectors.

c. Fire Protection

Fire protection activities, staffing, and equipment were observed to verify that fire brigade staffing was appropriate and that fire alarms, extinguishing equipment, actuating controls, fire fighting equipment, emergency equipment, and fire barriers were operable. See paragraph 8 of this report also.

Violations or deviations were not identified.

7. Self Assessment (40500)

The licensee routinely performs Quality Program audits of plant activities as required under its QA program or as requested by management. To assess the effectiveness of these licensee audits, the inspectors examined the status, scope, findings and recommendations of the following audit report:

<u>REPORT NO.</u>	<u>TITLE</u>	<u>NO. OF FINDINGS</u>	<u>NO. OF RECOMMENDATIONS</u>
94-07-TRNG	Nuclear Operations Training	2	5

No additional NRC follow-up will be taken on the findings referenced above because they were identified by the licensee's audit program and corrective actions have either been completed or are currently underway. PRs were initiated on the findings and plant management is aware of the findings.

Violations or deviations were not identified.

8. Fire Protection (64704)

The inspector continued an inspection of fire protection begun in February 1994, (documented in NRC IRs 50-302/94-05 and 94-14). The objective of the inspection was to evaluate the overall adequacy and implementation of the licensee's NRC-approved Fire Protection Program. The program was inspected against the requirements of the Crystal Unit 3 Fire Protection Plan, Revision 10, December 1993.

a. Plant Tours

The inspector toured portions of the turbine, intermediate, auxiliary, control, and reactor buildings, as well as warehouse buildings and the intake and discharge structures. During these tours, the inspector verified the following: operability requirements as defined in the FPP, acceptable general condition of fire suppression devices and equipment, presence of adequate portable fire extinguishers which had been inspected within the required time frame, and unrestricted access to fire suppression devices.

The inspector found fire detection and suppression systems to be well maintained. Fire Protection service water at CR-3 is obtained from a system of wells and is filtered prior to use. As a result, flow systems have remained relatively free of clams, rocks, and other such foreign material which typically plague raw water systems.

b. Surveillance and Maintenance

The inspector reviewed selected surveillance and maintenance procedures, and records of previous procedure performances, to verify the following: fire protection procedures were technically adequate to implement the requirements of the FPP; procedures contained appropriate acceptance criteria and requirements for documentation of results of tests or evaluations; and that system operability had been satisfactorily demonstrated at the required frequencies. An adequate surveillance/maintenance tracking system was found to be in place.

The following surveillance procedures and records were reviewed:

- SP-190B, Functional and Operability Test of the Reactor Building Fire Detection Instrumentation;
- SP-190D, Functional Check of Fire Detection Systems - Control Complex;
- SP-300, Operating Daily Surveillance Log;
- SP-301, Shutdown Daily Surveillance Log;

- SP-363, Fire Protection System Tests;
- SP-366, Fire System Annual Valve Surveillance;
- SP-367, Fire Service Valve Alignment and Operability Check;
- SP-404, Fire Deluge and Sprinkler System Surveillance;
- SP-408, Fire System Flow Test;
- SP-503, Fire Pump Diesel Batteries Quarterly Check; and
- SP-606, Diesel Fire Pump Engine Inspection and Maintenance (18 month, 1987 to present).

NOTES: For 18-month frequency surveillances, the inspector reviewed records from 1987 to present.

For yearly surveillances, the inspector reviewed records from 1991 to present.

For monthly surveillances, the inspector reviewed records from 1993 to date.

The inspector reviewed the following recently completed PM on the diesel-driven fire pump, FSP-2B.

- PM-185, Diesel Fire Pump Engine Inspection and Maintenance, Revision 0.

This procedure was implemented effective July 27, 1994, to cover the annual pump inspections and maintenance formerly performed per SP-606. The procedure incorporated applicable vendor recommendations, and its development involved significant interaction with the vendor representative. The pump was found to be in good condition.

The inspector reviewed open maintenance requests applicable to the fire protection system, and found that maintenance was generally scheduled and completed in a timely manner so as not to result in excessive equipment unavailability.

Section 1.5.5.2 of the FPP requires that nonconformances with the Operability Requirements tables of the FPP shall be reported to the NRC in a Special Report. Licensee records back to 1981 indicated that no nonconformances had occurred for equipment remaining out of service longer than allowable, and therefore no Special Reports had been issued.

Surveillance test data did not indicate decreasing system flow rates or other noticeable equipment degradation. Based on surveillance records and discussions with plant personnel, CR-3

has not had a fire protection valve fail to function properly when called upon since at least 1982.

c. Training and Qualifications

Training consists of classroom instruction, fire fighting practice, and drills. The inspector reviewed training records, maintained at the Training Center, and found them complete and up-to-date. In addition to the tracking of qualification completion performed by the Training Center, the licensee has implemented a computer process which flags if the training a fire brigade member coming onshift has somehow lapsed. This provides added assurance that training and qualification is kept current.

The inspector reviewed portions of the course materials used for fire brigade training, which were found to be comprehensive and thorough. During the course of the inspection, the inspector interviewed a number of licensee personnel to evaluate their understanding and knowledge of fire protection requirements. Personnel were found to be knowledgeable in the area of fire protection, and also shows a good understanding of plant safety systems and the interrelation of such equipment to fire fighting.

The inspector noted that the licensee notified the NRC in letters dated February 15, 1994, and June 24, 1994, that they intended to replace the present fire brigade requalification training program with a performance-based program. This request was approved by NRR in a letter dated July 22, 1994.

The inspector reviewed the fire protection portions of the licensee's GET employee indoctrination training, as outlined in GT-001, Green Badge/Fitness for Duty/Yellow Badge. This training material was comprehensive and thorough, and included background technical information on fires and fire fighting, requirements for fire hazard control, and specifics on plant fire protection systems and expected personnel responses to various events.

The licensee has placed a priority on devoting resources to the fire protection area. At the time of the inspection, the licensee was close to completing a special building so that hands-on fire training could be conducted on site.

d. Fire Brigade Readiness

During plant tours, the inspector observed the condition of fire brigade equipment and turnout clothing, and found the gear to be complete, orderly, and in good condition. The licensee provided individual lockers for fire brigade members, which contributed to the good maintenance of personal equipment. Further, the licensee had emphasized the purchase of good quality equipment in order to maximize future reliability.

The FPP requires that fire drills be held at the plant site to provide the opportunity for Fire Brigade members to demonstrate their proficiency and improve their response. Each shift participates in one drill per quarter, and each individual one drill per year. The inspector reviewed plant records for 1993 and 1994 and determined that they met the requirements of the FPP. Drills were conducted at the required frequency, instructions were provided by suitably experienced and qualified personnel, and scenarios were realistic and suitably challenging. Fire drill scenarios included electrical-type fires.

Fire drills were critiqued by Fire Protection management and also by a qualified instructor from the Training Center. As required by the FPP, the drill critiques addressed fire alarm effectiveness as well as personnel performance. In general, the drills were rated by the licensee reviewers as having been performed in a very good manner. The team leaders adequately directed fire fighting efforts, and team members were knowledgeable of fire fighting strategies and their roles in the fire brigade. The site security force also demonstrated good response.

Some areas for improvement were identified in the critiques. On several occasions, problems were encountered with communications in high noise areas, although in most instances this area was rated as very good. Fire Brigade response to a drill on July 7, 1994, was delayed because the alarm and annunciator were not heard in the RB maintenance support building. The critique of the drill on July 1 indicated a need for additional training in the use of door wedges and in protective clothing interfaces.

The inspector discussed these areas with Fire Protection Personnel to determine how they were being addressed and what corrective action was taken. Communications problems in high noise areas were being addressed by the implementation of bone-conducting microphones, and the licensee was scheduled to complete training on these devices by the end of the third quarter. This was expected to result in uniform high performance in this area. Weaknesses in the use of door wedges and protective clothing interfaces had been incorporated into the training program.

A review of licensee records, including NRC inspection reports and other correspondence, indicated that recurring problems with loudspeakers at CR-3 have occurred in the past. One reason was that plant personnel would turn speaker volumes down in their work areas. FSAR Section 9.8.6, concerning fire protection, states that notices and instructions are provided to personnel over the plant PA system. The inspector determined that the licensee had taken action to address these speaker problems. PM-140 was in progress at the time of the inspection, WR NU 0321578 was issued to install plant communications in the maintenance support building for MAR 91-01-13-10, and WR NU 0321577, and WR NU 0320703

had been issued to repair various speakers which were known not to be working.

Overall, the licensee's fire drill critiques were effective in reemphasizing fire fighting techniques and identifying areas for improvement, and appropriate followup of identified problems was achieved.

e. Site Support Audit

The inspector reviewed fire protection portions of the Nuclear Operations Site Support audit conducted from March 7 through March 18, 1994. The audit assessed fire protection-related maintenance and concluded that it was being planned and performed in accordance with procedural requirement, and was generally timely. A recommendation was made to routinely use Precursor Cards to identify variations to the Transient Combustibles Program, which would provide additional useful input for trending areas potentially needing improvement.

Overall, the inspector concluded that fire detection and suppression systems were well maintained, and control of transient combustibles continued to be very good. The licensee continued effectively and proactively identifying potential hazards or deficiencies, and achieving prompt resolution. Management provided good support to the Fire Protection program. Plant workers demonstrated safety focus and cooperation with respect to fire prevention.

Violations or deviations were not identified.

9. Plant Support Follow-up (92904)

(Closed) IFI 50-302/94-10-01, Monitor Licensee Determination of Personnel Contaminations Event and Early Boration Root Cause.

In response to the unanticipated I-132 personnel contamination event which began on April 15, 1994, the licensee initiated two PRs as follows:

PR 94-0095 - Inadvertent pressurizer heater activation while control switches were off.

PR 94-0098 - Unanticipated I-132 personnel contaminations.

The licensee's investigation in response to PR 94-0095 identified that the inadvertent pressurizer heater activation was due to faulty equipment in the pressurizer heater controls. This finding was previously addressed in NRC IR 50-302/94-14, paragraph 11. Subsequently, the inspectors verified that procedure OP-209, Plant Cooldown, was revised to have operations red tag open all feeder breakers to the pressurizer heaters when establishing a nitrogen blanket

on the pressurizer. This action will prevent a future recurrence of this problem.

Another equipment problem during this event, the loss of the reactor building purge air supply, was found to be due to the failure of smoke detector AH-23-CE, resulting in the loss of reactor building purge air. Work request WR NU 0318611 was issued to trouble shoot and repair the purge air system in order to recover the reactor building purge. The existing smoke detector was obsolete and no spare smoke detector was available in stores, so the faulty switch was bypassed and the purge supply fans were returned to service. An REA was prepared to have engineering designate a qualified replacement unit for the existing obsolete equipment.

In response to PR 94-0098 the licensee set up a task team to provide the necessary data to develop a corrective action plan. The task teams summary of the event and the root cause were as follows:

The object of the rapid boration chemistry plan was to convert insoluble species of nuclides into soluble forms for transport and removal in order to reduce the total exposure during the refueling outage. In effect, Te-132 in soluble form was increased in the reactor coolant. Te-132 is a normal fission product and the parent nuclide of I-132. The Te/I nuclides are affected by pH, causing changes in their physical states. The acid conditions set up in the coolant, combined with evaporation as surfaces dried, caused the nuclides to be more easily transported as airborne contamination. Once the RCS was breached (OTSG and pressurizer vent) the potential for personnel contaminations due to airborne I-132 was established. Other contributors to this event were as follows:

- (a) The inadvertent actuation of the pressurizer heaters, due to equipment problems, caused boiling resulting in a steam release to the RB atmosphere thru the pressurizer vent. Sample analysis confirmed the highest activity of Te-132 and I-132 was found in that area.
- (b) There was a short duration in which the ventilation of the OTSG tents occurred without the benefit of RB ventilation. RB ventilation was lost for several hours due to equipment failure.
- (c) The original OTSG ventilation setup did not include charcoal filters on the OTSG tents or pressurizer vent locations. Based on past OTSG work experience, iodine activity was not expected and the use of charcoal filters at those locations was deemed unnecessary.

The combination of circumstances resulted in the spread of airborne Te-132/I-132 contamination which resulted in some workers becoming contaminated. The contaminations may not have occurred if the RB ventilation system had not been lost for several hours just after the RCS was breached.

The licensee's corrective actions to prevent recurrence are as follows:

- (a) Health Physics routinely evaluates the use of proper ventilation and filtration requirements (both HEPA and charcoal filtration). In this case the steam generator tents did not have charcoal filters. This will be included in the evaluation which is a normal outage evolution. Documentation of this evaluation will be in the Health Physics Guide for Outage Activities.
- (b) Ensure components related to RB ventilation are properly identified on WRs and maintained through a preventive maintenance program. Failure of the RB ventilation during many shutdown evolutions can produce unacceptable radiological conditions quickly. In these cases the outage shift manager must promptly evaluate the situation and provide appropriate direction to have repairs conducted if necessary.
- (c) Include the major tasks associated with the rapid boration process in the outage schedule. This will enhance the coordination and elevate the awareness to all disciplines of changing chemistry conditions.

The licensee's review of the I-132 exposure event concluded that the airborne I-132 levels that existed during this event peaked at approximately 1% of the permissible exposure levels and the total radiation dose to the workers skin and the thyroid was between zero to two mrem.

Due to the benefit of a significantly reduced overall exposure for the refueling outage, which is perceived to be primarily due to the early boration process, the licensee intends to continue the early boration process for future outages. The licensee's corrective actions as noted above should prevent a recurrence of this event. IFI 50-302/94-10-01 is closed.

Violations or deviations were not identified.

10. Exit Interview

The inspection scope and findings were summarized on September 9, 1994, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Status</u>	<u>Description and Reference</u>
URI 50-302/94-20-01	Open	Respiratory and Self Contained Breathing Apparatus Equipment Qualification Requirements for Control Room Personnel. (paragraph 3.b)
IFI 50-302/94-10-01	Closed	Monitor Licensee Determination of Personnel Contaminations Event and Early Boration Root Cause. (paragraph 9)

ii. Acronyms and Abbreviations

AI	- Administrative Procedure
ANSS	- Auxiliary Nuclear Shift Supervisor
AP	- Annunciator Response Procedure
BSP	- Building Spray Pump
CR	- Crystal River
DCHE	- Decay Heat Cooling Heat Exchanger
DCP	- Decay Heat Closed Cycle Cooling Pump
DHP	- Decay Heat Pump
ECCS	- Emergency Core Cooling System(s)
EFP	- Emergency Feedwater Pump
EFV	- Emergency Feedwater Valve
EFW	- Emergency Feedwater
EPRI	- Electric Power Research Institute
FPC	- Florida Power Corporation
FPP	- Fire Protection Plan
FSAR	- Final Safety Analysis Report
FSP	- Fire Service Pump
GET	- General Employee Training
HEPA	- High-efficiency Particulate Air
I-132	- Iodine 132
IFI	- Inspector Follow-up Item
IR	- Inspection Report
LCO	- Limiting Condition for Operation
LPMS	- Loose Parts Monitoring System
MAR	- Modification Approval Record
NaOH	- Sodium Hydroxide
NOV	- Notice of Violation
NRR	- Office of Nuclear Reactor Regulation
NSS	- Nuclear Shift Supervisor
OOS	- Out of Service
OP	- Operating Procedure
OTSG	- Once Through Steam Generator
PM	- Preventive Maintenance
PR	- Problem Report
PRC	- Plant Review Committee

PT - Performance Testing Procedure
QC - Quality Control
QA - Quality Assurance
RB - Reactor Building
RCA - Radiation Control Area
RCS - Reactor Coolant System
REA - Request for Engineering Assistance
RWP - Raw Water Pump
SCBA - Self Contained Breathing Apparatus
SP - Surveillance Procedure
SRO - Senior Reactor Operator
SW - Nuclear Services Closed Cycle Cooling System
SWHE - Nuclear Services Closed Cycle Cooling Heat Exchanger
TS - Technical Specification
URI - Unresolved Item
WR - Work Request