



**St. Lucie Plant**

**RADIATION PROTECTION FUNCTIONAL AREA AUDIT**

**QSL-OPS-95-10**

**Audit Team:**

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Corporate Health Physics

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## Executive Summary

This audit was conducted to evaluate program adequacy and assess the implementation of activities associated with St. Lucie Radiological Protection Program. The conclusions of this audit are based on interviews with personnel, review of procedures and records, and observation of health physics activities. Many of these activities were documented in monthly Performance Monitoring Reports. Program adequacy was evaluated by comparison of site procedures, records and training lesson plans to guidance documents.

In addition to review of these documents, field observations and attendance in classroom training provided the opportunity to evaluate the implementation of the site procedures, generation of records and health physics lesson plans. Activities that have been observed include: radiation field and contamination surveys, counting room activities, gaseous and particulate atmospheric surveys, postings, worker compliance to the Radiation Work Permits, ALARA review, pre-job briefings, preparation of radioactive material shipments, and tours of the Radiation Control Area to observe the transport and storage of radioactive material. Class room presentations observed included General Employee Training, Radiation Control Area Access Training and Emergency Radiation Team Training.

Assistance from Corporate Health Physics provided an examination of the Internal Dose Monitoring and Total Effective Dose Equivalent (TEDE) As Low As Reasonably Achievable (ALARA) Evaluations. The results of this review developed some suggestions for improvement that were given to Health Physics.

This evaluation included a review of St. Lucie NRC Inspection reports for Radiation Protection, NRC monthly Resident Inspector Reports and State of Florida Department of Health and Rehabilitative Services inspection reports of radioactive waste shipments. No violations have been cited in these reports. These external observations have indicated satisfactory performance and provided favorable comments.

Several self assessments were determined to be in progress. Health physics has completed at least one documented self assessment. This review examined conduct of resin dewatering operations and contained several recommendations for improvements. The ALARA program provides for regular evaluation of jobs to identify opportunities to reduce personnel exposure. This program has been successful in achieving reduced exposures.

Corrective Action within health physics was examined. St. Lucie Action Requests (STARs) assigned to health physics were reviewed and determined to provide adequate corrective measures. Additional corrective action mechanisms within health physics include Skin and Clothing Investigations and Radiological Deficiency Reports. A trend was observed within recent Radiological Deficiency Reports regarding entry into the RCA without electronic dosimetry. A STAR was initiated to address this trend. QA recommends that periodic trend reviews of



radiological deficiencies be performed and guidance be developed to initiate STARs for trends or radiological deficiencies requiring increased management attention.

A Good Practice which was noted was the management control that Health Physics has been given to control work in the containment. A site procedure HPP-23 "Health Physics Activities in the Reactor Containment Building During Shutdown" was written and distributed to provide guidance to HP in establishing early radiological controls upon start of containment refueling outage work.

Based on the activities and objective evidence audited, it was determined that the requirements of the St. Lucie Radiation Protection Program were adequately addressed by procedures and the implementation of those procedures was effective.



**Location of Audit**      St. Lucie Plant

**Date of Audit**            April - June 1995

### **Audit Scope**

This audit evaluated the program adequacy and implementation of activities associated with Radiological Protection. The scope of this audit included the following:

- A. Verification that the necessary procedures exist and comply with 10 CFR, 49 CFR, FSAR, Emergency Plan and the Technical Specifications.
- B. Analysis of LER's, problem reports, in-house events, NRC inspection reports associated with radiological protection.
- C. Review of the effectiveness of Health Physics' self assessment activities.
- D. Assessment of the effectiveness of corrective action activities within Health Physics.
- E. Verify implementation of the Health Physics's requirements not verified through recent performance monitoring activities.
- F. Examination of the use of industry information relating to Health Physics.

### **Audit Details**

#### **Program and Procedure Evaluation**

The revised 10 CFR 20 instituted changes that involved administrative and physical requirements for licensees to protect personnel from radiation exposure. The transition to the "New Part 20" requirements were verified during recent Performance Monitoring activities and this audit. NRC Inspection Manual Temporary Instruction 2515/123 "Implementation of the Revised 10 CFR Part 20" was used to evaluate the plant implementation of these new requirements.

Procedures were reviewed to verify that the new requirements of 10 CFR 20 have been included. Procedures for radiation postings, access to high, locked high and very high radiation areas, radiation, contamination and airborne surveys, ALARA requirements, radioactive source control and labeling, and occupational dose limits were determined to contain new nomenclature and requirements. No deficiencies were identified.



Training for the new part 20 requirements was evaluated by attending classes or review of training outlines. Topics reviewed included emergency radiation team training, radiation control area access training (initial and annual requalification), and training for health physics technicians, supervisors and administrative personnel. Attendance rosters were reviewed for adequate record keeping.

The use of Merlin Gerin electronic dosimeters for accounting of personnel exposure was evaluated by procedure review and observation of usage. Health Physics Procedures reviewed were: HPP-30, "Personnel Monitoring" and HP-74, "Access Control Using Alarming Dosimeters." These procedures included applicable requirements of 10 CFR 20. A review was conducted of the 5059 Safety Evaluation performed to allow the use of these alarming electronic dosimeters. The PSL FSAR discusses use of the self reading pocket dosimeter only. It was further verified through discussion with Nuclear Engineering and Licensing that changes to the FSAR that include this form of dosimetry will be published in this year's amendment. The use of these dosimeters was found acceptable.

Technical assistance for this audit was provided by the Juno Beach Health Physics Staff. Their evaluation covered Internal Dose Monitoring as required by the New Part 20 Requirements reviewed included methods of internal dose calculations, assignment of DAC-hours, issuance of respiratory protection devices, and those for personnel monitoring as outlined in procedure HPP-30, "Personnel Monitoring." General comments on areas of improvement were copied to the Health Physics Department. During this review it was noted that an individual had issued respirators who did not possess qualifications in this area. This individual was a junior technician with a limited authorization in work assignments. Appropriate training modules for this activity had not been completed. Research indicates that this occurred only on one day and that the personnel that were issued the respirators were qualified to use them. This was considered an isolated event. Corrective action for this occurrence has been implemented. Only qualified junior technicians will be allowed to issue respirators in the future. This activity will be the subject of a Performance Monitoring Activity during the next refueling.

Corporate Health Physics reviewed the program for Total Effective Dose Equivalent (TEDE) As Low As Reasonably Achievable (ALARA) Evaluation. This consisted of review of procedures and records specific to respiratory protection. No TEDE ALARA evaluations were performed in 1994. The criteria for documenting the evaluations was not met for any of the jobs performed during the year. This program was determined to be satisfactory.

The quality assurance requirements of 10 CFR 71.105, Transport of Radioactive Material, were verified to be in place for radioactive material shipping. Plant procedures were verified in place and documents were reviewed for organization, procurement, procedures, controlled documents, material control, receipt inspection, identification & control of material, qualified inspectors, control of measuring and test equipment, and records. Radioactive material shipping has been examined during Performance Monitoring activities. This program is considered adequately established and implemented.





The general requirements of the Radiation Protection Program were verified through procedure review, record review and field observation. The activities verified include radiation surveys and postings, Radiation Work Permit requirements, proper use of dosimetry, Posting of Notice to Workers (NRC Form 4), handling and shipping of radioactive material, and sealed source control. A summary of the field observations which have been conducted is provided in the Performance Monitoring Section.

#### **Analysis of NRC Documents and Industry Information**

A review of NRC inspection reports indicates that no health physics violations have been issued to St. Lucie Plant in 1994/95. This review included four NRC Inspection Reports that were specific to Health Physics and monthly NRC Resident Inspectors reports. There were no LER's written due to Radiation Protection activities. Health Physics participated in corrective action for an LER that was due to other causes. This LER 389-95-003, was written due to a missed surveillance test by another department. Corrective action required other departments to check their scheduling for improvement opportunities. Changes to Health Physics schedules were not required. Industry Violation Alerts have been examined during Performance Monitoring activities to verify that activities at St. Lucie did not provide the same potential for citation.

An additional rule change to 10 CFR 20 was published during this audit (FR67657). A PSL STAR was initiated to track the review by the Health Physics Staff for determination that the change did not require any PSL program changes. This rule change carried forward the old Part 20 record retention not published in the new Part 20. St. Lucie's record retention requirements for Health Physics records were verified to be life of the plant and required no program or procedure changes. Health Physics was associated with one In House Event. This event (Ref. Problem Report 95-14) and corrective action involves Health Physics removing resin beads from the spent fuel pool. Completion of this activity was verified by chemistry and documented on 6/9/95. All items were considered satisfactory.

Another outside agency that performs inspections of the Health Physics Department is the State of Florida Department of Health and Rehabilitative Services. This inspection is done on radioactive waste shipments leaving St. Lucie Plant using 49 CFR as acceptance criteria. A review of 11 Radioactive Material Shipment Record Packages found five of these records were radioactive waste shipments. A review of the HRS inspection reports and discussion with Health Physics showed that the State of Florida inspections of Radioactive Waste Shipments from St. Lucie Plant were satisfactory.



### **Performance Monitoring Activities**

The following Radiological Protection topics have been reviewed through the conduct of performance monitoring activities during 1994 - 95:

New 10 CFR 20 implementation

General Employee and Radiation Access Training of New Part 20

Postings and Radioactive Material Control

Radioactive Waste Shipping

Radiation Surveys

Health Physics Measuring and Test Equipment

Survey and Release of Clean Waste from the Radiation Control Area

Merlin/Gerin Electronic Dosimeter Procedures and Implementation

Radiation Work Permit Compliance

Radioactive Source Control

Sealed Source Leak Testing

High, Locked High and Very High Radiation Area Control

Emergency Radiation Team Training

Hazardous Material Certification for Shipping Personnel

Health Physics Technician Training

Radiation Monitor Alarms, Setpoints, Calibration and Surveillance

Control of PC-1 Resin Liners for Radwaste Shipping

Receipt and Inspection of New Fuel Assemblies



These activities were physically verified in the plant or classroom to determine compliance to valid requirements. Observation of plant maintenance and operations personnel has indicated satisfactory compliance with Health Physics procedures and requirements.

The above performance monitoring activities resulted in the identification of four audit findings. The subject of the findings were: Inadequate criteria for inspection hold points for Radioactive Material Shipping, Radioactive Sources not labeled according to the FSAR and 10 CFR 20, Special Nuclear Material not stored in a designated space, and PC-1 Radwaste Resin Liners were released for use prior to receipt inspection. Corrective action for these findings will be discussed in the Corrective Action Section.

A Good Practice which was noted was the management control that Health Physics has been given to control work in the containment. A site procedure HPP-23 "Health Physics Activities in the Reactor Containment Building During Shutdown" was written and distributed to provide guidance to HP in establishing early radiological controls upon start of containment refueling outage work. Additional controls such as evacuation of the 62' elevation during the reactor head lift have been proceduralized. This practice contributes to exposure control and personnel safety.

### Self Assessment

Health Physics personnel recently performed a formal, documented self assessment. It was indicated by Health Physics that formal assessments would be more common in the future. The recent self assessment was conducted on resin dewatering of radioactive bead resin. This assessment was prompted by a Quality Assurance Audit No. QSL-OPS-95-04. The assessment contained recommendations for improvements and is pending implementation.

The ALARA program acts as a self assessment technique to identify methods to reduce the exposure of personnel working in the Radiation Control Area. Historical files of repetitive activities have been maintained since 1987. These files contain man-hours, exposure, RWP number, notes on technique and general comments to assist in providing experience to improve performance. This history file is used during the next pre-job briefing to assist the workers and Health Physics in reducing exposure. A pre-job ALARA review, using present survey information and the history file, is conducted to develop a proper pre-job briefing for all participants. A post outage assessment of repeated jobs is conducted to compare exposure to a target. A report is produced which contains a review of all jobs with assigned dose greater than 1 manrem whose actual manrem differed from their projected manrem by more than 25%. This system has provided a positive impact on dose reduction at St. Lucie Plant. This program is considered effective as a self assessment tool to reduce radiation exposure.





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### Corrective Action

St. Lucie Action Reports (STARs) assigning corrective action responsibility to Health Physics were reviewed. The source of these STARs include Feedback of Operating Experience Program (FOP), Quality Assurance Audits, Quality Control Surveillance Reports, changes in federal laws, and In House Events.

Selected 1994/95 STARs were discussed with Health Physics. Objective evidence of corrective action was reviewed in selected areas. These items include FOP 94-004/SOER 94-2 which required HPP-23 to be revised, WANO area for improvement RP 2.1 which recommended area radiation monitors at primary sample sinks, and Licensee Event Report LER 389-95-003 which required a check of surveillance scheduling to verify Tech. Spec. Surveillance intervals. Completed corrective action was verified to be still in place. Other actions that are in the implementation phase were reviewed and will provide acceptable corrective action when carried out.

Quality Assurance Findings written in the last year were reviewed for continued implementation of corrective action. An audit finding which identified inadequate acceptance criteria for inspection hold points for radioactive material shipments was corrected by revising the procedure to including valid requirements for inspecting attributes of these shipments. Radioactive Sources not labeled according to the FSAR and 10 CFR 20 were corrected by performing an inventory and affixing the new labels with required information. This was verified by performance monitoring during the next inventory and source leak test. Special Nuclear Material not stored in a designated location was discovered during review of the inventory record review. The procedure was revised to include all areas used to store these materials. PC-1 radwaste resin liners were identified as having been released for use prior to receipt inspection. Corrective action involved receipt inspection of the liners and review of the procedure with stores and maintenance personnel. Implemented corrective action for QA audit findings continues to satisfy the findings.

A review of discrepancies identified on Quality Control surveillance reports was conducted. Four unsatisfactory conditions were identified in the past year during Health Physics inspections. They include records missing required data, emergency lockers containing less than minimum required equipment, a nitrogen bottle not adequately stored, and HPP 1.4 form not always being completed when exiting the containment. These issues were discussed with the QC surveillance supervisor. It was determined during subsequent surveillance opportunities that corrective action was adequate and these items had been corrected.

A corrective action process specific to the Health Physics program is Skin and Clothing Contamination investigations. These investigations are documented on Form 70.1. This form includes personal information on the individual, location of contamination, description of incident, HP technical evaluation, countermeasures to prevent recurrence and signatures of personnel.



involved, including the Health Physics Supervisor. Ten completed record forms were reviewed. These were generated during 1994/95. The forms were complete and countermeasures, where applicable, were adequate.

The other process used by the Health Physics Staff is HP-101.2 Radiological Deficiency Report. This report is used to document deficiencies of a relatively minor nature such as nondeliberate violations of HP procedures or poor radiological work practices. This form, along with any supporting documentation, records the description of the event, action taken to prevent recurrence and signatures of personnel involved including the Health Physics Supervisor. Seventeen reports have been issued in 1995. These reports were reviewed for completion and adequacy of corrective action. Nine of these reports concerned the use of the Merlin electronic dosimeters. The deficiencies cited included improper wearing of the dosimetry and entry into the RCA without a Merlin dosimeter. The Health Physics Department anticipated personnel errors when use of electronic dosimetry and elimination of the RCA common access point was implemented. Technicians were stationed at the entry to the RCA to monitor performance. There were no indications that personnel repeated their mistake once counseled by Health Physics. Based on the number of entries into the Radiation Controlled Area on a daily basis, the number of occurrences was considered small. The level of management review and attention these deficiency reports receive was discussed with HP. It was noted that these reports receive limited review and management awareness when compared with nonradiological deficiencies identified by the STAR process. QA recommends periodic trending and the development of guidance for utilizing the STAR process when increased management awareness or attention is warranted to address trends in radiological deficiencies. An alternative would be to incorporate this process into the STAR program. This recommendation was discussed with HP supervision.

### Conclusion

Based on the activities and objective evidence audited, it was determined that the requirements of the St. Lucie Radiation Protection Program were adequately addressed by procedures and the implementation of those procedures was effective.



**Satisfactory Areas**

Health Physics Procedures

Health Physics Training

Surveys and Postings

High Radiation Area Control

ALARA

Implementation of New Part 20

Measuring & Test Equipment

Radioactive Material Shipments

Radiation Work Permits and Compliance

Personnel Monitoring

**Findings:** None



### Audit Participants

<u>Name</u>	<u>Department/Group</u>	<u>A</u>	<u>B</u>	<u>C</u>
D. A. Sager	Site Vice President			X
C. L. Burton	Plant General Manager	X		
J. Scarola	Operations Manager	X		X
H. Mercer	Health Physics	X	X	
H. Buchanan	Health Physics	X	X	
L. Large	Health Physics	X	X	
R. McCullers	Health Physics	X	X	
L. Pugh	Health Physics		X	
B. Sommers	Health Physics		X	
K. Payne	Health Physics		X	X
L. Jacobus	Health Physics		X	
A. Weir	Health Physics		X	
B. Johnson	Health Physics	X	X	
K. Mouring	Health Physics		X	
D. Haithcox	Health Physics		X	
J. Danek	Corporate Health Physics	X	X	
M. Jimenez	Corporate Health Physics		X	
D. Lowens	Quality Assurance		X	
L. Bladow	Quality Assurance			X
B. Parks	Quality Assurance		X	
J. Walls	Quality Assurance	X		X
K. Wecek	Quality Control		X	
J. Liefhelm	Training		X	
T. Ware	Training		X	
M. Cooper	Training		X	

### Key:

- A - Pre-Audit Conference
- B - Interviewed or Contacted During Audit
- C - Attended Post-Audit Conference



**References:**

- 10 CFR 19
- 10 CFR 20
- 10 CFR 50
- 10 CFR 71
- 49 CFR 170-173
- St. Lucie Plant Units 1 and 2 Technical Specifications
- St. Lucie Plant Units 1 and 2 Final Safety Analysis Report
- St. Lucie Plant Health Physics Procedures

**Pre-Audit Conference:**

**Location:** St. Lucie Plant  
**Date:** April 18, 1995

**Post-Audit Conference:**

**Location:** St. Lucie Plant  
**Date:** July 26, 1995

**Summary of Post-Audit Conference:**

The results of the audit was discussed with those in attendance. There were no dissenting comments.

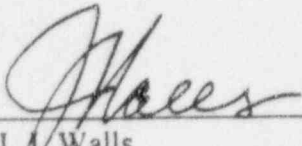
**Location of Audit**

St. Lucie Plant



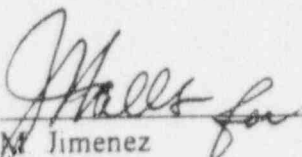


Principal  
Auditor:

  
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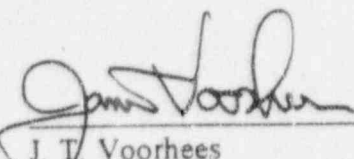
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Date

Accompanying  
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M. Jimenez  
Corporate Health Physics

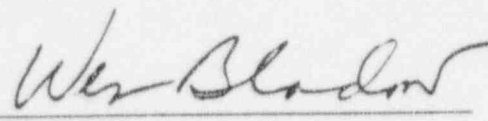
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Reviewed By:

  
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J. T. Voorhees  
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Date

Approved By:

  
\_\_\_\_\_  
L. W. Bladow  
Site Quality Manager - PSL

8/3/95  
\_\_\_\_\_  
Date

QUALITY ASSURANCE DEPARTMENT

AUDIT REPORT DISTRIBUTION

Mem

AUDIT REPORT: QSL-OPS-95-10

PLANT/DEPARTMENT: St. Lucie Plant

NUMBER OF FINDINGS: None

**CNRB**

R. J. Acosta - JNA/JB

W. H. Bohlke - JPN/JB

J. E. Geiger - JNA/JB

D. A. Sager - VP/PSL-1

T. F. Plunkett - VP/PTN

G. J. Boissy - JPN/JB

Dr. K. R. Craig - JPN/JB

H. N. Paduano - JPN/JB

Dr. W. R. Corcoran (CNRB)

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K. E. Gutowski - JNA/JB

**Additional Distribution**

C. Burton - Plt. Mgr./PSL

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J. Scarola - OPS/PSL

J. Danek - JNO/JB

**Additional Distribution**

J. H. Goldberg - JEX/JB

T. V. Abbatiello - JNA/PTN

L. W. Bladow - JNA/PSL

R. A. Symes - JNA/JB

D. A. Culpepper - JPN/JB

QAD Files w/Checklist & Audit Plan

Cheryl Robinson - JNA/JB

**Health Physics & Chemistry Related Audits**

Manager Nuclear Health Physics/Chemistry

**Emergency Preparedness Related Audits**

Manager - Nuclear Emergency Preparedness

**Fire Protection Audits**

S. Martin, Risk Management

**Nuclear Division Staff Related Audits**

D. H. West

**Nuclear Training Related Audits**

Manager Nuclear Training

**Security Related Audits**

\*Manager Nuclear Security

**Nuclear Materials Management Related Audits**

Director Nuclear Materials Management

\*Only Distribution outside the Plant for  
Security Audits Containing Safeguards

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Inter-Office Correspondence

JQQ-95-136

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To: C. L. Burton

Date: August 3, 1995

From: L. W. Bladow

Department: JNA/PSL

Subject: **Quality Assurance Audit**  
**QSL-OPS-95-10**

Attached is the report of a functional area audit conducted to assess the adequacy and implementation of Radiation Protection Programs at St. Lucie.

There were no findings in this audit and as such no response is required.

We sincerely appreciate the cooperation we received from your staff during the course of the audit. Please contact me at extension 4190 or the respective QA contact if you have any questions.

L. W. Bladow  
Site Quality Manager - PSL

LWB/JTV/JJW/slr

Copies to: Dist. Attached