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

MAY 20 1994

Report No.: 50-348/94-11 and 50-364/94-11

Licensee: Southern Nuclear Operating Company, Inc.
600 North 18th Street
Birmingham, AL 35291-0400

Docket Nos.: 50-348 and 50-364 License Nos.: NPF-2 and NPF-8

Facility Name: Farley 1 and 2

Inspection Conducted: April 18-22, 1994

Inspector: for F. N. Wright — 5/18/94 Date Signed

Approved by: W. H. Rankin, Chief — 5/18/94 Date Signed
Facilities Radiation Protection Section
Radiological Protection and Emergency Preparedness Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, announced inspection of the licensee's radiation protection (RP) program involved a review of health physics (HP) activities primarily associated with the on-going Unit One refueling outage. The specific areas evaluated included: audits and appraisals; changes to the RP program; planning and preparation; training and qualifications of personnel; external and internal exposure controls; control of radioactive material and contamination, surveys, and monitoring; and As Low As Reasonably Achievable (ALARA) program implementation.

Results:

Based on interviews with licensee personnel, records review, and observation of work activities in progress, the inspector found the RP program adequately protected the health and safety of plant workers. A non-cited violation (NCV) was identified for failure to label radioactive material containers in accordance with licensee procedures and regulatory requirements (Paragraph 8.b).

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*W. Bayne, Safety Audit and Engineering Review Supervisor
J. Bouillon, Dosimetry Foreman
P. Farnsworth, Trainer
*M. Graves, Radwaste Supervisor
*P. Harlos, Safety Audit and Engineering Review Lead Auditor
R. Hill, General Manager
*J. Kale, Chemistry/Environmental Superintendent
*R. Livingston, Environmental Supervisor
*M. Mitchell, Health Physics Superintendent
*C. Nesbitt, Operations Manager
*P. Patton, Plant Health Physicist
*L. Stinson, Operations Assistant General Manager
*R. Tyler, Maintenance Supervisor
*J. Walden, Health Physics Supervisor
*W. Warren, Technical Training Supervisor

Other licensee employees contacted during the inspection included technicians, maintenance personnel and administrative personnel.

Nuclear Regulatory Commission

*M. Scott, Resident Inspector

*Attended April 22, 1994 Exit Meeting

Abbreviations used throughout this report are defined in the last paragraph.

2. Audits and Appraisals (83750)

Licensee activities, audits and appraisals were reviewed to determined the adequacy of licensee's identification and corrective action programs for deficiencies or weaknesses related to the control of radiation or radioactive material.

10 CFR 20.1101(c) requires that the licensee periodically review the radiation protection program content and implementation at least annually.

A qualified auditor with sufficient HP qualifications and experience was assigned to the station to implement the licensee's radiation protection assessment activities. The licensee had performed two audits in the radiation protection program area since the previous inspection

conducted in October 1993. The inspector reviewed the scope, objectives and checklist for the audits and determined that the audit plans were adequate for program assessments. A brief summary of each audit is shown below:

- Licensee audit WP-21, "1994 10 CFR 20 Implementation," was a special audit conducted during the period of January 10, 1994 through February 1, 1994. The audit report, issued February 4, 1994, identified a noncompliance concerning software change controls for the Access Control System. Several changes had been made to the Access Control System software without implementation of the licensee procedures for software control. Comments or recommendations were also included in the report. Comments included lac.. of guidance for: access and key controls into very HRAs; use of eye protection equipment; and reporting skin dose exposures.

- "Surveillance Testing-Health Physics," was performed September 1 through November 12, 1993. The report was issued December 9, 1994. The audit reviewed calibration and maintenance of radiological monitoring equipment. The audit report identified a noncompliance with electrical safety procedures concerning failures to take appropriate measures to ensure radiological monitoring equipment was de-energized during calibration and maintenance activities. The report also included comments concerning proper use of maintenance work request, revision of calibration procedures, and calculations for effluent monitor alarm setpoints.

The inspector discussed the issues and the proposed corrective actions for the audit findings with licensee representatives. The proposed corrective actions appeared appropriate for the identified findings.

No concerns were noted.

3. Changes (83750)

Changes in organization, personnel, facilities, equipment, programs and procedures, from the previous inspection, were reviewed to assess their impact on the effective implementation of the occupational RP program. The review was made by observations and discussion with cognizant supervisory and management personnel. The licensee had not made any significant changes in organization structure, equipment or facilities, RP goals or management controls since the previous inspection. However, the licensee had revised a significant number of HP procedures to reflect 10 CFR Part 20 changes.

a. Organization and Management Controls

The RP staff consisted of approximately 34 persons. The staff has been relatively stable. The HP Group did have two HP technician vacancies, that the licensee was not in the process of filling.

Additional HP technicians (Approximately 90) and administrative support personnel, had been contracted to support radiation control activities for the U1RFO-12 refueling outage. During the Unit 2 refueling outage in the fall of 1993, the licensee supplemented the site's decontamination staff with approximately 20 contract personnel. The licensee did not utilize any contract deconners in the U1RFO-12 and there were fewer personnel available for the decontamination and movement of contaminated and radioactive material.

No concerns were noted.

b. Equipment and Facilities

The licensee planned to test and use of a portal monitor having greater efficiency for gamma radiation detection and use of a calibrator for DADs. The licensee plans to discontinue use of the vendor dosimetry program and begin using dosimeters processed by a unit within the company in 1994.

No concerns were noted.

c. Implementation of the new 10 CFR Part 20

A review of the licensee's implementation of the new 10 CFR Part 20 requirements was not specifically made during this inspection. However, the inspector did observe some implementation of the new requirements within specific program areas reviewed and several are discussed within this inspection report. No problems with the licensee's implementation of the requirements were identified. The inspector notified licensee personnel that a more thorough review of the licensee's activities for implementation of the new requirements would be made during a future inspection utilizing a NRC temporary instruction.

No concerns were noted.

4. Planning and Preparation (83750)

Licensee activities and documents were reviewed to determined the adequacy of management and staff efforts in planning and preparation of radiation work.

At the time of the inspection, the licensee was in days 45-49 of a 48 day refueling outage. The licensee's radiological control planning for U1RFO-12 included involvement of ALARA personnel in the early stages of the outage planning and increasing the HP staff by approximately 90 contract persons to support the planned outage activities. HP supervisory and management personnel maintained 24 hour supervision of

RP activities to monitor and support implementation of the outage plan. The inspector determined that there was adequate management support for planning and implementing effective radiological control measures for the refueling outage.

No concerns were noted.

5. Training and Qualifications (83750)

Training and qualifications were reviewed to determine whether HP technicians were receiving continued HP training, contractor HP technicians were qualified in accordance with the licensee's standards and procedures, and that radiation workers were receiving appropriate instructions for their work assignments. The programs were evaluated for any changes implemented since the last inspection of this area conducted October, 1993, and documented in NRC IR 93-23. In addition, the inspector reviewed various aspects of the licensee's radiation worker training program with respect to incorporation of information related to implementation of the revised 10 CFR Part 20. The licensee had conducted a significant amount of training related to implementation of the new 10 CFR Part 20 requirements in 1993.

10 CFR 19.12 required that licensees instruct all individuals working or frequenting any portion of the restricted areas in the health protection aspects associated with exposure to radioactive material or radiation, in precautions or procedures to minimize exposure, and in the purpose and function of protection devices employed, applicable provisions of the Commission Regulations, individuals responsibilities and the availability of radiation exposure data.

a. General Employee Training

The inspector reviewed "Radiation Worker Text" and observed a portion of a GET radiation worker retraining class. The text appropriately included an introduction to revised 10 CFR Part 20 terminology, definitions, very high radiation areas, declared pregnant woman, TEDE/ALARA concepts and regulatory limits.

The instructor was knowledgeable of the training subject and demonstrated good teaching techniques. The observed instructor was able to relate the subject topic to the radiation worker's activities and procedures.

The inspector selected several radiation workers that had been working in RCA during the U1RFO-12 and verified that their GET training was current through review of training attendance sheets. All selected personnel had received the training within one year and all records appeared in order.

No concerns were noted.

b. Health Physics Technician Training

The inspector reviewed continuing training presented to the HP technicians. The inspector verified that the licensee had conducted continuing training sessions for HP personnel through a review of selected HP training records. The inspector noted that the continuing training schedule for HPs in 1994, included a review of industry events, emergency monitoring team training, internal dosimetry overview, environmental sampling, training for equipment utilized by the HP technicians, and various procedures. Additionally, the inspector noted that there were several vendor training programs being offered throughout the year for HP technicians. The inspector discussed the training being provided to HP technicians with training department personnel and determined that the staff was maintaining an awareness of current HP issues and training needs at the site. The HP trainers were also receiving training for specific HP training topics to be provided in the continuing HP technician training program.

No concerns were noted.

c. Contractor HP Technician Qualifications

The inspector reviewed training records and qualifications (resumes) for selected HP contractor technicians involved in U1RF0-12 activities. For the records reviewed, the inspector determined that the contractor technicians met or exceeded ANSI Standard N18.1-1971 qualifications and had completed GET, indoctrination training, examinations, and procedural reviews in accordance with contract technician HP qualification requirements.

No concerns were noted.

6. External Exposure Control (83750)

This area was reviewed to determined whether personnel dosimetry, administrative controls, and records and reports of external radiation exposure met regulatory requirements.

a. Personnel Dosimetry

10 CFR 20.1502(a) requires each licensee to monitor occupational exposure to radiation and supply and require the use of individual monitoring devices for:

(1) Adults likely to receive, in one year from sources external to the body, a dose in excess of 10 percent of the limits in 10 CFR 20.1201(a);

(2) Minors and declared pregnant women likely to receive, in one year for sources external to the body, a dose in excess of 10 percent of any of the applicable limits of 10 CFR 20.1207 or 10 CFR 20.1208; and

(3) Individuals entering a high or very HRA.

The licensee has utilized a DAD for daily exposure personnel monitoring since 1991. On March 21, 1994 a HP Instrumentation Technician notified HP supervision that a DAD had lost its calibration memory and was found to have a calibration memory of another DAD. A sample of DADs (25) revealed that the problem was wide spread as 5 of the 25 DADs also had modified calibration information. As a result, all DADs in operation at the time (348) were examined and a total of 84 DADs were found to have exchanged calibration information. All of the DADs with incorrect calibration were removed from service. The calibration memory for each DAD included the DAD identification number, calibration constant, dead time constant, and the date of calibration. A faulty entry/exit reader was found and suspected to have caused the loading of a DAD calibration memory onto another DAD. The reader was removed from service and no additional examples of improper exchange of calibration memory were observed. A RIR 94-03 was initiated on March 22, 1994, to document the adverse condition. The problem was investigated by the licensee's staff and the DAD vendor. When a DAD was inserted into the reader the DAD's calibration information was read as part of the Access Control System process. The investigation determined that when a DAD was inserted and promptly removed from a reader and another DAD promptly inserted into the reader the calibration information of the second DAD would be replaced with the calibration information of the first DAD inserted into the reader. The problem was limited to only one of the readers. However, the investigation revealed a problem with the software that could have permitted the problem to be repeated on the other readers. The software was modified and installed into the licensee's systems. The licensee did not believe the exchange of calibration factors (range plus or minus 20 percent) would have resulted in any overexposure based on the following; DADs were collocated with a another vendor supplied DAD for S/G work; no abnormal recorded doses were reported by workers; and there had not been any significant dose discrepancies reported among workers within the same radiation fields.

The sites TLD dosimetry program was a Sub-facility of a vendors dosimetry program accredited by NVLAP. The vendor provided calibration, technical and quality assurance services while the site's dosimetry staff operated a TLD reader. TLD reader results in nCs were sent to the vendor for exposure calculations. The date of last NVLAP inspection was April 1992.

In September of 1993, the site changed to a new set of Master Sensitivity Cards. Following the change the licensee determined that the measured exposure from the TLDs appeared to be significantly higher than the measured exposure from the DADs. On March 29, 1994, the FNP staff initiated a Dosimetry Incident Report, 94-001, that indicated TLD results from test exposures were high relative to the expected value. The licensee requested the dosimetry vendor and an independent dosimetry consultant investigate the discrepancy.

The licensee and dosimetry vendor conducted numerous test to determine the source of the error. The final report of the dosimetry vendor's investigation was issued April 20, 1994. The dosimetry vendor reported that the change to the new Master Sensitivity Cards had introduced a positive bias into the system which when compared to the old Master Sensitivity Cards resulted in a radiation exposure increase of about 15 percent. The vendor reported that the absolute bias was not quantified but was believed to be positive at least by 10 percent. The vendor also reported that the TLD system was set up to determine the deep dose at 1 cm depth in a 30 cm diameter, tissue equivalent sphere and that many of the test were conducted in free air. The report recommended the dose values obtained from cards with sensitivity factors determined with the new Master Sensitivity Cards be reduced by 15 percent and that the site should return to using the old Master Sensitivity Cards.

The licensee had also requested the issue be reviewed by an independent consultant. The independent consultant's assessments were obtained using ANSI N13.11 protocols. The inspector reviewed the results of the consultant's investigation into the issue in a draft report dated April 21, 1994. The consultant concluded the TLD reader, when calibrated with the new Master Sensitivity Cards and having a small precision term, would over report doses by approximately 20 percent.

The inspector concluded by a review of the documentation provided in the consultant's and dosimetry vendor's test data and reports that the assessments and the conclusions made by the vendor and the independent consultant appeared to be appropriate. Licensee representatives reported that there were no plans to modify any exposure records for the period of September through December 1993. However, the licensee was considering revising and reducing the 1994 exposure data collected using the new Master Sensitivity cards (January 1, 1994 to April 30, 1994) by 15 percent. The inspector discussed the possible consequences of lowering assigned dose records with dosimetry staff and the advantages of preparing a careful plan to address potential problems resulting from the lowering of personnel exposure records.

Based on direct observation, discussion and review of records personnel dosimeters were being effectively utilized.

No concerns were noted.

b. Administrative Controls for External Exposures

10 CFR 20.1201(a) requires each licensee to control the occupational dose to individual adults, except for planned special exposures under 10 CFR 20.1206, to the following dose limits:

(1) An annual limit, which is the more limiting of:

(i) The total effective dose equivalent being equal to 5 rems; or
(ii) The sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 50 rems; and

(2) The annual limits to the lens of the eye, to the skin, and to the extremities, which are:

(i) An eye dose equivalent of 15 rems; and
(ii) A shallow-dose equivalent of 50 rems to the skin or to any extremity.

The inspector reviewed and discussed with licensee representatives external exposures for plant and contract personnel for the period January 1, 1994 through April 20, 1994. The dose tracking system DICADS tracked personnel exposures in order to ensure adherence to procedural administrative allowances as well as 10 CFR Part 20 limits. DICADS was also utilized to monitor worker qualifications for planned activities. The licensee reported that there had not been any personnel administrative limits over exposures since the last inspection and that only 1 individual had a DDE dose greater than 2 rem (2.260 rem) to date in 1994.

The inspector reviewed selected RWPs for their work activity and determined that they appeared to prescribe adequate radiation protection requirements for the assigned task. The inspector observed HP technicians interviewing radiation workers. HPs were asking workers appropriate questions to determined the nature and scope of the worker's specific task. HP technicians would review recent radiological survey information and discuss the radiological hazards that might be encountered by the workers and provided appropriate radiological protection coverage and guidance for the work. The inspector observed personnel reviewing RWPs and logging into Access Control System.

The inspector observed HP technicians in the plant monitor worker activities in their assigned locations, make radiation and contamination surveys and advise workers on appropriate radiological protection procedures.

No concerns were noted.

c. High Radiation Areas

Licensee TS 6.12 required, in part, that each HRA with radiation levels greater than or equal to 100 mrem/hr but less than 1,000 mrem/hr be barricaded and conspicuously posted as a HRA. In addition, any individual or group of individuals permitted to enter such areas were to be provided with or accompanied by a radiation monitoring device which continuously indicates the radiation dose rate in the area, or a radiation monitoring device which continuously integrated the dose rate in the area and alarms when a preset integrated dose is received, or an individual qualified in radiation protection procedures with a radiation dose rate monitoring device. Areas assessable to personnel with radiation levels such that a major portion of the body could receive in one hour a dose greater than 1,000 mrem shall be provided with locked doors to prevent unauthorized entry.

Procedures for posting, entry requirements and key controls for high radiation and exclusion high radiation areas and very high radiation areas were described in licensee Radiation Control and Protection Procedure, FNP-0-RCP-0, "General Guidance and Special Instructions to Health Physics Personnel," Revision 30, dated January 21, 1994. The licensee identified areas having a whole body dose rate greater than 1,000 mrem as an exclusion zone and areas having a whole body dose rate greater than 500,000 mrads as a very high radiation area. The licensee utilized a triangular shaped sign with the words "Danger High Radiation Area" for posting HRAs, and an octagonally shaped sign with the words "Danger Exclusion Area, High Radiation Area" for posting exclusion areas. Signs for very high radiation areas were also octagonally and included the words "Grave Danger, Very High Radiation Area Absolutely No Entry."

The inspector determined that the licensee had identified two areas within containment having the potential for exposures of 500,000 mrad/hr, the reactor vessel cavity and the containment sump area during movement of core detectors through the area. The licensee was posting the Containment Building, while at power, as a very HRA. The licensee was concerned with leaving postings for the very HRAs inside containment during periods of reactor operation. Therefore the licensee appeared to be over-posting containment while operating. Whenever containment entries were made the posting for the containment building was downgraded as a exclusion area. The exclusion area posting was utilized to reflect the actual entries into exclusion areas. However, the

licensee did not post the two potential very HRAs inside containment when the containment posting was downgraded. When the unit was shutdown the licensee posted the reactor vessel cavity and containment sump areas as very HRAs. At the time of the inspection, the licensee was re-considering the containment posting procedures. The licensee was considering removing the direction "Absolutely No Entry" from the very HRA sign, maintaining containment posting as a very HRA and permitting access into the very HRA as needed. Other areas considered for very high radiation postings were the fuel transfer shield when fuel movements through the tube were made and the spent fuel pool demin room. Licensee representatives reported that contact radiation levels within the spent fuel pool demin area had approached 400 rad/hr in the past. In addition to the monitoring or escort requirements for entry into HRAs, entry into exclusion areas required a special RWP, HP technician coverage, and HP Manager's approval. Entry into a very HRAs required the approval of the site HP Manager.

Through a review of the procedure and discussions with licensee representatives, the inspector determined that the HP Shift Foreman maintained a key check-out logbook for the control of HRA keys. The keys to HRAs were maintained in a key cabinet on a wall in the HP work area. The licensee also maintained an exclusion and very high radiation key logbook and a locked key cabinet in the HP work area for the control the exclusion and very high radiation area keys. Appendix B of FNP-0-RCP-0 described the procedures and requirements for the control and use of an exclusion and very HRA keys. The inspector verified through review of key control logs and storage cabinets that the keys were being controlled and issued in accordance with licensee procedures.

No concerns were noted.

d. Posting

During tours of the plant, the inspector noted that the licensee's posting and control of radiation areas, HRAs, airborne radioactivity areas, contamination areas, and radioactive material areas were generally adequate. All high, exclusion, and very HRAs were locked as required.

No concerns were noted

7. Internal Exposure Control (83750)

This area was reviewed to determined the adequacy of licensee's, use of process and engineering controls to limit exposures to airborne radioactivity, adequacy of respiratory protection program, licensee's

administrative controls for assessing the TEDE in radiation and airborne radioactive materials areas, assessments of individual intakes of radioactive material, and records of internal exposure measurements and assessments.

a. Use of Process or Engineering Controls

The use of process and engineering controls such as containments and HEPA air handling units to limit airborne radioactivity concentrations in the plant were discussed with licensee representatives and the use of such controls were observed during tours of the plant.

No concerns were noted.

b. Respiratory Protection Program

FNP-0-RCP-0 stated that the use of process or other engineering to the extent feasible will be considered to keep airborne activity limits below regulatory levels before respiratory protection is considered in accordance with 10 CFR Part 20.1703 and the FNP ALARA program. The licensee utilized a form "Evaluation To Determine If Respirator Use Would Be ALARA" to evaluate and document ALARA considerations related to the use of respirators.

The inspector reviewed licensee records of ALARA reviews for respirator usage and verified that the procedures were being implemented. Through discussions with licensee representatives, the inspector determined that in previous Unit 1 outage the licensee had utilized approximately 3,200 respirators. In the Unit 2 outage, in the fall of 1993, the licensee utilized approximately 900 respirators. At the time of the inspection, near the end of the U1RF0-12 outage, the licensee had only utilized approximately 100 respirators. To limit the possibility for facial contamination in some work environments the licensee had increased the use of plastic face shields for personnel contamination controls. The number of PCEs had not increased significantly as a result of reducing the use of respirators (see paragraph 8.d). Licensee representatives reported estimates of 20 person-rem may have been saved during the Unit 1 refueling outage with implementation of the program. Based on those reviews and discussions with licensee representatives, the inspector determined that the licensee had made efforts to maintain TEDE exposures ALARA.

No concerns were noted.

c. Internal Exposure Assessments

10 CFR 20.1204 stated that for purposes of assessing dose used to determine compliance with occupational dose equivalent limits, the licensee, when required to monitor internal exposure, shall take

suitable and timely measurements of concentrations of radioactive materials in air, quantities of radionuclides in the body, quantities of radionuclides excreted from the body, or combinations of these measurements. When specific information on the behavior of the material in an individual is known, that information may be used to calculate the CEDE.

The inspector reviewed and discussed the licensee's program for monitoring internal dose. The inspector reviewed that procedures for operation of the WBC systems and reviewed calibration and QC records. The calibration and QC checks were clearly documented and very organized. The records indicated the WBC systems were properly calibrated and maintained. The operating and QC procedures for WBC systems were clearly written with good detail for technician purposes.

The inspector reviewed the results of assessments for selected personnel having indications of positive intakes of radioactive material identified in PCE records. The number of request for investigated WBCs had increased significantly in 1994. The dosimetry staff had conducted approximately 30 investigative WBCs in 1993 and had already conducted approximately 130 during the first four months of 1994. The results of most WBCs perform in 1994, were less than one percent of an ALI. No problems were found during a review of the procedures or of selected bioassay records. There were no intakes greater than 10 percent of the limits.

The inspector concluded that the licensee's program for monitoring, assessing, and controlling internal exposures was conducted in accordance with regulatory and procedural requirements with no exposures in excess of 10 CFR Part 20 limits identified.

No concerns were noted.

8. Control of Radioactive Materials and Contamination, Surveys, and Monitoring (83750)

This program are was reviewed to determine whether survey and monitoring activities are performed as required and control of radioactive materials and contamination met requirements.

a. Surveys, Personnel Monitoring and Instrumentation

10 CFR 20.1501(a) requires each licensee to make or cause to be made such surveys as (1) may be necessary for the licensee to comply with the regulations and (2) are reasonable under the circumstances to evaluate the extent of radioactive hazards that may be present.

During tours of the plant, the inspector noted that portable radiation detectors, air samplers, and friskers and contamination monitors had current calibration stickers and had been source-checked as required. The inspector reviewed the calibration records for many of the instruments the inspector observed in use during plant tours. All instruments appeared to have valid calibrations within the instruments calibration frequency.

The inspector reviewed selected records of routine and special radiation and contamination surveys performed during the current refueling outage and discussed the survey results with licensee representatives. During tours of the plant, the inspector independently verified radiation levels in selected areas of the auxiliary, waste processing, and fuel handling buildings. No concerns with the adequacy or frequency of the radiological survey activities were identified.

No concerns were noted.

b. Control of Contamination and Radioactive Material

10 CFR 20.1904(a) requires the licensee to ensure that each container of licensed material bears a durable, clearly visible label bearing the radiation symbol and the words "Caution, Radioactive Material," or "Danger, Radioactive Material." The label must also provide sufficient information (such as radionuclides present, and the estimate of the quantity of radioactivity, the kinds of materials and mass enrichment) to permit individuals handling or using the containers, to take precautions to avoid or minimize exposures.

TS 6.11 states that procedures for personnel radiation protection shall be prepared consistent with the requirements of 10 CFR Part 20 and shall be approved, maintained, and adhered to for all operations involving personnel radiation exposure.

Radiation Control and Protection Procedure FNP-0-RCP-57, "Radioactive and Potentially Radioactive Material Handling," revision dated March 8, 1994. FNP-0-RCP-57 provided guidance in the radiological control and accountability of radioactive and non-radioactive materials. The procedure also provided guidance on labeling requirements for radioactive material.

Failure to label radioactive material was identified as a violation of licensee procedures during a previous inspection in July 1993 (50-348, 364/93-16-01). The licensee's control of radioactive materials was closely examined throughout this inspection during tours of the facilities to verify that the licensees corrective actions had been effective. The review was made near the completion of the refueling outage which was typically a peak period for movement and storage of contaminated and radioactive material. During a facility tour on April 19,

1994, the inspector found four 55 gallon steel drums that were not properly labeled in the "Waste Drumming and Processing Area" (Room 2420) on the 155 foot elevation of the Auxiliary Building. The drums were located inside a high radiation and radioactive materials storage area within an area controlled as a locked high radiation area. The drums contained strippable paint which was indicated on the top of the drums with a black marker along with contact dose rates of 20, 140, 200, and 320 mrem/hr for the individual drums. The inspector notified the HP staff of the unlabeled containers of radioactive material in the storage area. Immediate corrective actions taken by the HP staff included another survey of the drums, labeling the containers and relocation of the drums to reduce the background radiation in the area. The licensee documented the adverse condition in a RIR 94-15 and initiated an investigation to determine the activities and events that resulted in the unlabeled drums of radioactive material. An isotopic spectrum analysis, requested by the inspector, showed the drum contents contained various radioactive isotopes at concentrations and quantities sufficient to exceed the quantity of licensed material requiring labeling as identified in Appendix C of 10 CFR Part 20. The Cobalt-60 quantities in the 55 gallon steel drum containers ranged from 4.2 to 6.7 millicuries. The quantity of radioactive Cobalt-60 requiring labeling in Appendix C was 0.001 millicuries. The inspector stated that failure to label the radioactive material containers in accordance with the requirements of 10 CFR 20.1904(a) was a violation of those requirements.

The identified violation was similar to the previous violation documented in inspection report 50-348, 364/93-16. However, the safety significance concerning the violation was low considering the violation involved containers having the contact dose rates on top of each drum and were in a locked HRA. Licensee corrective actions for the 93-16-01 violation included training radiation workers in GET and training of HP personnel on the requirements of FNP-0-RCP-57, "Radioactive and Potentially Radioactive Material Handling."

Step 3.1.1, "Radioactive material containers which were equal to or greater than 2 mrem/hr at 18 inches," of FNP-0-RCP-57 required, " The label, bag, tag, or sign enclosing the radioactive material include the following information...."

- A contact maximum radiation level on the surface of the radioactive material or the surface container housing the radioactive material;

- Normally, fixed/smearable radioactive contamination levels on contents; and

- Clearly identify the contents.

The inspector stated that the licensee's procedures did not appear to provide sufficient guidance to meet the requirements of 10 CFR Part 20 requirements, in that, the procedure did not require the containers be labeled with a radiation symbol and the words "Caution or Danger, Radioactive Material." The licensee reported that the reference to labels and tags for the material indicated the radiation symbol and the words "Caution (or Danger) and Radioactive Material" would be located on the container as the labels and tags contained the radiation symbol and the warning. However, the licensee initiated a procedure change to remove the ambiguity and clearly indicate the requirements for the symbol and warning on radioactive material containers. In general, the inspector determined that the licensee had control of radioactive material and that the inspector's finding concerning the labeling of radioactive material containers during the inspection appeared to be an isolated case.

The previous violation shall remain open pending review of the licensee's revisions to procedures for labeling radioactive materials and pending followup inspection that does not identify additional examples of failure to label radioactive material.

NCV 50-348, 364/94-11-01: Failure to label radioactive material containers in accordance with licensee procedures.

This NRC identified violation is not being cited due to its low safety significance (rad material was within a locked HRA and labeled with contact dose rates) and because the remaining criteria specified in Section VII.B of the Enforcement Policy were satisfied.

The inspector noted that housekeeping, despite the end of outage circumstances, could be improved. For example, the inspector noted that some empty containers in the plant contained radioactive labels or tags that were several years old. Containers of radioactive material were stored in numerous locations with a significant portion of the RCA posted as a radioactive materials storage area. Labeling radioactive material containers was not consistent, in that, the method for labeling varied. The inspector found similar containers with similar contents in the same location that were identified as radioactive material with "area posting signs," tags, radioactive material tape and painted information. The inspector stated that the licensee's corrective actions for the previous violation had not been effective to preclude the identification of an additional example of failure to properly label radioactive material in the RCA and that the licensee's corrective actions for the identified violations will be reviewed in a future inspection.

An NCV was identified.

c. Control of Contaminated Areas

During facility tours, the inspector noted that contamination control was adequate. Surface contamination was aggressively being controlled at its source. During tours of the facilities, the inspector observed the use of catch basins to minimize the spread of contamination.

No concerns were noted.

d. Personnel Contaminations

The number of PCEs had not increased significantly as a result of reducing the use of respirators. In 1993, the PCE goal was less than 95 and the actual number of PCEs was 78. The 1994 PCE goal was less than 85 while the actual number through April 1994 was at 52 through the date of the inspection. Review of selected contamination events noted that the licensee documentation and follow-up on the individual events were appropriate, and skin dose assessments were performed, when required. For reports reviewed, resultant exposures were minor.

No concerns were noted.

9. Program for Maintaining Exposures As Low As Reasonably Achievable (83750)

This program area was reviewed to determine the adequacy of ALARA program. Areas reviewed included organization support, training, goals and objectives, radiation source reduction, worker awareness and involvement, ALARA plans and reviews, and ALARA results in the implementation of the licensee's ALARA program.

10 CFR 20.1101(b) requires that the licensee use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are As Low As Reasonably Achievable.

During the period of 1990 to 1992, the site's annual radiation exposures increased considerably each year with values of 458, 648, and 805 person-rem, respectively. However, the site's collective dose dropped significantly in 1993. The licensee's collective dose goal for 1993 was 337.0 person-rem and the actual dose for the year was 333.3 person-rem. As a result, the licensee's three year collective dose average dropped in 1993 from about 318.3 person-rem/unit (1990-1992) to about 298 person-rem/unit (1991-1993). The licensee's collective dose goal for 1994 was again 337 person-rem. The collective 1994 exposure through the end of the inspection was approximately 225 person-rem.

Licensee representatives reported that there was a combination of several ALARA initiatives that had contributed to the significant dose reduction in 1993. The Farley ALARA Coordinator reported that the detailed outage planning, training of staff, source reduction activities and management involvement in monitoring and budgeting person-rem were significant elements in the dose reduction activities in 1993. Unit performance in 1993 also helped the licensee meet the annual dose goals. The licensee had been tracking the correlation between availability of the units and the collective exposures for the previous years. Farley's availability had declined each year from 1990 to 1992 as collective doses increased. The unit availability factor for 1993 increased and was 97.3 percent for Unit 1 and 75.9 percent for Unit 2.

Many of the licensee's dose reduction techniques and methodologies were clearly described in a document titled "Exposure Reduction Program", dated May 1993. The inspector reviewed the status of those activities with the Farley ALARA Coordinator. Site management established focus areas to concentrate dose reduction activities. The areas included outage exposure, maintenance, S/G maintenance and radioactive source reduction. S/G work enhancements included the use of remote control cameras, monitors, improved communication equipment and telemetric electronic dosimetry for monitoring radiation workers. The equipment permitted radiological protection staff personnel the ability to monitor live time dose and dose rates for S/G work in low dose areas.

Radioactivity source reduction activities implemented included: early boration; elevated pH, Boron/Lithium management; Nickel/Cobalt removal; crud trap flushing; sub-micron filtration; and maintenance procedure cleanliness controls. Radioactivity source reduction activities under review or planned included: full RCS decontamination; S/G channel head decontamination; RHR Hx decontamination; Letdown Regen Hx decontamination; enriched boron; and zinc reduction. The licensee was planning to add low concentrations of zinc borate to the primary system in May 1994, to reduce cobalt deposition on the piping and to reduce the primary stress corrosion cracking of steam generators. Farley would be the test facility for zinc injection process in PWR plants.

The organizational structure and responsibilities for the ALARA staff were clearly defined in organizational charts and licensee procedures. The licensee's full-time ALARA staff consisted of a plant health physicists (ALARA Coordinator) and a HP technician. Two plant HP technicians were also assigned to each of the day and night shifts to monitor ALARA activities during the outage.

Inspector determined that the licensee's ALARA policy and objectives were clearly described in GET training and included ALARA dose reduction techniques.

The activities of the ALARA staff with the apparent support of site management appear to be advancing the effectiveness of the sites ALARA program.

No concerns were noted.

10. Effectiveness of Licensee Controls (83750)

This area was reviewed to evaluate the effectiveness of licensee's program and performance in identifying, documenting and reporting, determining root causes and implementation of appropriate corrective actions for the identified problems. The licensee's radiation protection staff did not have a program for conducting any formal self-assessments. The licensee did document radiological adverse conditions in RIRs. The inspector reviewed the RIRs written from the period of November 1993 through April 1994. The number of RIRs increased from four in 1993 to 17 in the first four months of 1994. Many of the RIRs were written for personnel receiving a total of three radiation warnings within a 12 month period. No adverse trends were identified by the inspector. The inspector also reviewed documents of PCE Reports. The inspector noted that the licensee appeared to be documenting radiological problems very well in PCEs and RIRs. However, the inspector noted that the immediate corrective actions completed or corrective actions to prevent recurrence were not always clearly documented while corrective actions were being made. The need to clearly document corrective actions for adverse conditions was discussed with the RPM

No significant concerns were noted.

11. Action on Previous Inspection Findings (92701)

(Open) VIO 50-348, 364/93-16-01: Failure to label radioactive material as required by licensee procedures. The identification of an additional example of failure to label radioactive material was identified during the inspection (Paragraph 8.b). The item will remain open pending a review of the licensee's corrective actions for the most recent failure to control radioactive material in accordance with licensee procedures.

12. Exit Meeting (83729)

On April 22, 1994, an exit meeting was held with those licensee representatives denoted in Paragraph 1 of this report. The inspector summarized the scope and findings of the inspection including new examples of failure to label radioactive materials. The inspector received no dissenting comments. Upon review of licensee corrective actions for the reported violation a decision was made to identified the violations as a NCV as shown below. Proprietary information was not identified.

Type	Item Number	Status	Description and Reference
NCV	50-348, 364/94-11-01	Closed	Failure to label radioactive material containers (Paragraph 8.b).

13. Index of Abbreviations Used in this Report

ALARA	As Low As Reasonably Achievable
ALI	Annual Limit on Intake
ANSI	American National Standards Institute
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
DDE	Deep Dose Equivalent
DICADS	Dosimetry Issue Control and Documentation System
FNP	Farley Nuclear Plant
GET	General Employee Training
HEPA	High Efficiency Particulate Air-filter
HP	Health Physics
HRA	High Radiation Area
Hx	Heat Exchanger
IR	Inspection Report
mrad	Milli-Radiation Absorbed Dose
mrem	Milli-Roentgen Equivalent Man
nC	nano-Coulomb
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NVLAP	National Voluntary Laboratory Accreditation Program
PCE	Personal Contamination Event
QC	Quality Control
RCA	Radiation Control Area
RCP	Radiation Control Procedure
RCS	Reactor Coolant System
REV	Revision
RHR	Residual Heat Removal
RIR	Radiation Incident Report
RPM	Radiation Protection Manager
RWP	Radiation Work Permit
S/G	Steam Generator
TEDE	Total Effective Dose Equivalent
TLD	Thermoluminescent Dosimeter
TS	Technical Specifications
U1RFO	Unit 1 Re-Fueling Outage
VIO	Violation
WBC	Whole Body Counting