

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 50-458
License No.: NPF-47
Report No.: 50-458/98-03
Licensee: Entergy Operations, Inc.
Facility: River Bend Station
Location: 5485 U.S. Highway 61
St. Francisville, Louisiana
Dates: February 23-26, 1998
Inspector(s): Gilbert L. Guerra, Jr.
Radiation Specialist
Approved By: Blaine Murray, Chief
Plant Support Branch
Attachment: Supplemental Information

EXECUTIVE SUMMARY

River Bend Station NRC Inspection Report 50-458/98-03

The announced, routine inspection reviewed radiation protection program activities. Areas reviewed included: external and internal exposure control programs and control of radioactive material and contamination.

Plant Support

- An effective radiation protection program was implemented. External exposure controls included proper radiological access controls, proper posting and control of radiological areas, and proper external dosimetry issue and tracking. Internal exposure controls included the effective implementation of whole-body counting and internal dosimetry programs and proper evaluations for respirator use.
- An effective external exposure control program was maintained. Housekeeping within the controlled access area was good (Section R1.1).
- Effective whole-body counting and internal dosimetry programs were implemented. Proper total effective dose equivalent/as low as is reasonably achievable (TEDE/ALARA) evaluations for respirator use were performed (Section R1.2).
- Proper radiation surveys were performed and documented. The portable radiation protection instrumentation program was properly maintained (Section R1.3).
- Radiation protection procedures contained appropriate detail (Section R3.1).
- A violation was identified for failure to maintain records of the radiation protection program content and implementation (Section R3.1).
- An appropriately staffed radiation protection organization was maintained (Section R6).
- Generally, corrective actions for radiation protection activities were implemented in a timely manner. The licensee was effective in identifying adverse trends in radiation protection activities (Section R7.1).
- A violation was identified for two examples of failure to follow radiation protection procedures regarding contamination area posting requirements and personnel decontamination (Section R7.1).
- Improvement was noted in the radiation protection program based on enhancement items implemented by the licensee. These included: entry turnstiles to prevent personnel from entering the controlled access area without electronic dosimetry, the use of standardized radiological postings, the initiation of the supervisory observation program, and the licensee's effectiveness in identifying adverse trends.

- The licensee continued to have problems with personnel performance; specifically, a lack of attention to detail. Condition reports written by the licensee cited personnel error as the cause.

Report Details

Summary of Plant Status

The River Bend Station was at power operations during this inspection. No events occurred during this inspection that adversely affected the inspection.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

R1.1 External Exposure Controls

a. Inspection Scope (83750)

The inspector conducted tours of the controlled access area. Discussions were held with radiation protection personnel. The following items were reviewed:

- Controlled access/radiologically controlled area access/egress controls
- Control of high radiation areas
- Issuance and control of locked high radiation area keys
- Dosimetry use and issue
- Neutron monitoring
- Housekeeping within the controlled access area

b. Observations and Findings

The inspector observed personnel process through the access/egress area of the controlled access area. Personnel observed wore dosimetry properly, including electronic dosimetry devices. Appropriate access controls were used, and radiation work permits were written containing appropriate safety information. The layout of the access/egress area was appropriate so that personnel processing in and out flowed smoothly. Electronic dosimetry was available for use, and radiation work permits were available for review. Radiation protection personnel manning the access control desk could view personnel processing in and out and were available to assist.

Tours of the controlled access area revealed that radiation areas, contamination areas, and high radiation areas were properly controlled and posted. Implementation of the Entergy Operations Inc., standardized radiological postings was noted as an improvement to the radiation protection program. The turnstiles at the controlled access entry was an improvement to prevent personnel from entering radiological areas without their electronic dosimetry.

All Technical Specification required locked high radiation area doors were locked and properly posted. Flashing lights were appropriately used to control access to locked high radiation areas where a lock could not be used. The inspector reviewed locked/very high radiation area key control and found that all locked/very high radiation area keys were

accounted for. All locked/very high radiation area keys were in the control of authorized radiation protection personnel. The keys were inventoried every shift. No problems were identified with the key control and issue program.

Personnel dosimetry was processed by the Waterford 3 station. The Waterford 3 thermoluminescent dosimeter processing program was National Voluntary Laboratory Accreditation Program (NVLAP) accredited in eight categories. The licensee utilized a four-chip thermoluminescent dosimeter consisting of two lithium borate chips and two calcium sulfate chips. A good dosimetry issue program was in place.

The inspector gathered data on neutron personnel exposures. The River Bend Station had not prepared a plant specific neutron spectrum and considered the published NVLAP factors to be appropriate. Specific dosimeters for neutron exposure were issued during drywell entries. Neutron doses were part of the deep dose equivalent that was reported when thermoluminescent dosimeters were processed. Personnel routinely entered the reactor building; however, they were not normally subjected to high radiation fields or neutron exposure. Drywell entries were conducted at reactor startup for leak detection in the piping systems. These drywell entries subjected station workers to neutron exposure. Three walkdowns occurred in 1996 and two in 1997. Personnel exposures due to neutron radiation for 1997 were as follows: 108 mrem for the maximum exposed individual and a collective dose of 525 mrem.

Overall, housekeeping within the radiological controlled area was good.

c. Conclusions

Appropriate radiological access controls were maintained. Radiation, contamination, and high radiation areas were properly controlled and posted. A good external dosimetry issue and tracking program was maintained. Housekeeping within the controlled access area was good.

R1.2 Internal Exposure Controls

a. Inspection Scope (83750)

Selected radiation protection personnel involved with the internal exposure control program were interviewed. The following items were reviewed:

- Respiratory protection program
- Whole-body counting program
- Personnel contamination events
- Internal dose assessment program

b. Observations and Findings

The licensee appropriately performed the required reviews for the use of respiratory protection equipment. TEDE/ALARA reviews were performed to determine whether

respiratory protection equipment would be effective in minimizing the total dose received. The inspector found the licensee's TEDE/ALARA review procedure to be appropriate.

A good respirator maintenance program was implemented. Proper storage of respirators was observed. Full-face respirators, including self-contained breathing apparatuses, for emergency use were inspected monthly. Air quality analyses for breathing air were performed as required. No problems were identified with the respiratory protection maintenance program.

A good whole-body counting program was maintained. The licensee utilized two types of whole-body counting systems. One utilized germanium detectors for gamma spectroscopy counting and the other used sodium iodide detectors. A proper calibration and quality control program was maintained for the whole-body counters. Appropriate phantoms were used to simulate the shielding provided by the human body.

The licensee utilized its portal monitors as passive whole-body counters. These monitors provided a qualitative evaluation of intakes as the workers exited the radiological controlled areas. A second set of portal monitors was located at the exit from the River Bend protected area. The licensee determined through extensive testing that these monitors were highly reliable in detecting gamma emitting isotopes at values less than 1 percent of an annual limit on intake.

Whole-body counts are performed following portal monitor alarm or when personnel are suspected of intake due to mouth/nasal region contamination. The licensee calculated the committed effective dose equivalent for each whole-body count which indicated the presence of any internal activity and entered this information into the individual's equivalent Form 5.

c. Conclusions

A good respirator maintenance program was implemented. Proper TEDE/ALARA evaluations for respirator use were performed. Whole-body counting and internal dosimetry programs were effectively implemented. Appropriate evaluations of internal intakes were performed.

R1.3 Control of Radioactive Materials and Contamination, Surveys, and Monitoring

a. Inspection Scope (83750)

The inspector interviewed radiation protection personnel and reviewed the following:

- Personnel contamination monitor use
- Control of radioactive material
- Portable instrumentation calibration and performance checking programs
- Release of items from the radiological controlled area
- Sealed radioactive source accountability
- Sealed radioactive source leak testing

b. Observations and Findings

Personnel contamination monitors were operable, appropriately used, and maintained. Personnel observed by the inspector used the personnel contamination monitors properly. Good support was provided by the radiation protection technicians stationed at the controlled access area.

All radioactive material observed was properly labeled and posted. Containers of radioactive materials were properly labeled and controlled. Contaminated areas were well posted and marked with radiation tape or rope. Posted radiation surveys appropriately identified the radiological conditions of plant areas. The radiation surveys were documented in a clear and consistent manner. The inspector noted that procedures for the control of radioactive material provided proper guidance with regard to the unconditional release of items from a radiologically controlled area.

A good portable radiation protection instrumentation program was maintained. Ample monitoring instrumentation was ready for immediate use located in a controlled storage area. All instrumentation (survey/contamination monitoring instruments) in use was calibrated and source response checked appropriately. A program to investigate the use of portable instrumentation when the source check failed was in place.

Neutron survey meter instrumentation was reviewed for proper calibration and energy response testing. Neutron survey instrumentation calibrations were performed by a vendor. Calibrations of neutron survey meters were performed using a moderated Californium-252 source. The inspector determined that the licensee obtained proper calibrations for the neutron survey instrumentation.

The inspector noted that inventories and leak tests of sealed radioactive sources were performed every 6 months. The inspector verified that radioactive sources were located at the identified locations in the inventory.

c. Conclusions

Station workers used the personnel contamination monitors properly. Proper radiation surveys were performed and documented in a clear and consistent manner. The portable radiation protection instrumentation program was properly maintained.

R3 Radiological Protection and Chemistry Procedures and Documentation

R3.1 Radiation Protection Procedures

a. Inspection Scope (83750)

The inspector reviewed selected radiation protection procedures and program documentation.

b. Observation and Findings

A list of radiation protection procedures reviewed for information pertaining to this inspection can be found in the attachment to this report. Good procedures were maintained that provided appropriate detail to the radiation protection staff.

10 CFR 20.1101(c) states that the licensee shall periodically (at least annually) review the radiation protection program content and implementation. 10 CFR 20.2102(a)(2) states that each licensee shall maintain records of the radiation protection program, including audits and other reviews of program content and implementation. The inspector noted that the licensee could show compliance with the requirements of 10 CFR 20.1101(c) based on reviews performed by its quality assurance organization and other reviews performed for the radiation protection organization. However, the inspector noted that prior to February 26, 1998, the licensee had not maintained records of reviews of the radiation program content and implementation as required by 10 CFR 20.2102(a)(2). The failure to maintain records of the review of program content and implementation is identified as a violation of 10 CFR 20.2102(a)(2)(50-458/9803-01).

c. Conclusions

Radiation protection procedures contained appropriate detail. A violation was identified for failure to maintain records of the radiation protection program content and implementation.

R6 Radiological Protection and Chemistry Organization and Administration

a. Inspection Scope

The inspector reviewed the radiation protection department organization and management.

b. Observations and Findings

The radiation protection organization was reorganized in July of 1997, which combined the radiation protection operational group and radiation protection technical support group. The reorganization resulted in an elimination of a layer of supervision and the creation of three technical staff positions that report directly to the superintendent. A new superintendent of radiation control was selected. The qualifications of the radiation protection manager were found to be appropriate. The inspector determined that the radiation protection organization was appropriate to carry out its duties.

c. Conclusions

An appropriately staffed radiation protection organization was maintained.

R7 Quality Assurance in Radiological Protection and Chemistry Activities

R7.1 Quality Assurance Audits and Surveillances

a. Inspection Scope (83750)

The inspector reviewed audits and surveillances for information. Condition reports were reviewed to determine the licensee's ability to identify, resolve, and prevent problems in radiological control.

b. Observations and Findings

The inspector noted that quality assurance activities for radiation protection program activities were properly implemented. The inspector noted that the licensee's identification threshold for generating condition reports was proper. Generally, corrective actions for identified conditions were initiated in a timely manner. The inspector noted that personnel error was the major cause for many of the condition reports reviewed. The inspector noted that the licensee was effective in identifying adverse trends in radiation protection activities. The inspector did not identify any negative trends other than were identified by the licensee. These are discussed below.

On October 18, 1997, three individuals exiting the controlled access area at the Turbine Building 95-foot 'T' Tunnel Control Point were observed to alarm the portal monitors and immediately began to decontaminate themselves. This action was contrary to Procedure RPP-0043, Revision 10, "Personnel Contamination Monitoring," Section 5.1, which states that "Personnel alarming portal monitors after resetting one time, must be evaluated by qualified personnel." This instruction was also provided to station personnel through radiation worker training. Condition Report 97-1865 was initiated to document this event and track corrective actions. This event was a repeat of a similar violation cited within the last 2 years in NRC Inspection Report 50-458/96-06, which documented that a number of workers attempted to decontaminate themselves without being under the direction of qualified radiological programs personnel. The inspector reviewed the corrective actions implemented as a result of this second event. These included the installation of prominent signs at the control/exit points reinforcing to station personnel that self-decontamination activities are prohibited by station procedures and radiation worker training.

Condition Report 97-0400 documented an adverse trend in radiological posting. Seven condition reports regarding posting errors were included in this adverse trend. The root cause was determined to be radiation protection personnel error (lack of self-checking). Condition Report 97-0400 was reviewed by the Corrective Action Review Board on May 20, 1997, and corrective actions were approved including: (1) discussing these events with all radiation protection technicians emphasizing the importance of radiological postings and attention to detail, (2) counseling the individual radiation protection technicians involved in each incident, and (3) initiating a supervisory observation program. However, on September 24, 1997, a technician noted that one

side of an area was posted as a contaminated area, while the other sides were not. The area exceeded procedural requirements to post a contaminated area.

Procedure RPP-0005, Revision 12, "Posting of Radiologically Controlled Areas," Section 6.7.3.3 states that "contamination area posting signs shall be conspicuous, bear the radiation symbol, and the words: (1) 'CAUTION' or 'DANGER,' (2) 'CONTAMINATION AREA' or 'CONTAMINATED AREA.'"

Although these events were licensee identified, the conditions are programmatic and corrective actions implemented were not effective in preventing the recurrence of the identified conditions. These two examples of the failure to follow radiation protection procedures are identified as a violation of Technical Specification 5.4.1.a (50-458/9803-02).

c. Conclusions

Generally, corrective actions for radiation protection activities were implemented in a timely manner. The licensee was effective in identifying adverse trends in radiation protection activities. A violation was identified for two examples of failure to follow radiation protection procedures.

R8 Miscellaneous Radiological Protection and Chemistry Issues

8.1 (Closed) Violation 50-458/9606-01: four examples of failure to follow procedures.

The inspector verified that the corrective actions described in the licensee's response letter, dated April 5, 1996, were implemented. Additional problems were identified during this inspection regarding the failure to follow procedures. These are addressed in this report.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at an exit meeting on February 26, 1998. The licensee acknowledged the findings presented. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. McGaha, Vice President, Operations
L. Ballard, Supervisor, Quality
M. Chambers, ALARA Coordinator
P. Chapman, Superintendent, Chemistry
M. Davis, Specialist, Health Physics/Chemistry
M. Dietrich, Director, Quality Programs
J. Dimmette, General Manager
C. Fantacci, Health Physics Specialist
B. Fountain, Technical Specialist IV
J. Goudeau, Supervisor, Health Physics
D. Heath, Supervisor, Radiation Protection
R. King, Director, Nuclear Safety & Regulatory Affairs
D. Lorfing, Supervisor, Licensing
D. Myers, Senior Licensing Specialist
W. O'Malley, Manager, Operations
J. O'Neil, Senior Technical Specialist
J. Ward, Director, Training
D. Wells, Superintendent, Radiation Control

NRC

G. Replogle, Senior Resident Inspector

INSPECTION PROCEDURES USED

83750

Occupational Radiation Exposure

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-458/9803-01	VIO	Failure to maintain records of radiation protection program reviews
50-458/9803-02	VIO	Two examples of failure to follow radiation protection procedures

Closed

50-458/9606-01	VIO	Four examples of failure to follow radiation protection procedures
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Discussed

None

LIST OF DOCUMENTS REVIEWED

Procedures

RHP-0017 Calculation of Internal Dose, Revision 7
RHP-0030 Calculation of Dose from Skin Contamination, Revision 8A
RHP-0034 Quantitative Respirator Mask Fit Testing, Revision 4
RHP-0106 Calibration of the Canberra In-Vivo Counting System, Revision 0A
RPP-0005 Posting of Radiologically Controlled Areas, Revision 14
RPP-0006 Radiological Surveys, Revision 9
RPP-0007 Basic Radioactive Counting, Revision 5C
RPP-0013 Survey Instrument Response Testing, Revision 7A
RPP-0018 Personnel Decontamination, Revision 5
RPP-0022 Respiratory Protection Equipment Cleaning, Inspection and Repair, Revision 10
RPP-0043 Personnel Contamination Monitoring, Revision 7
RPP-0043 Personnel Contamination Monitoring, Revision 9
RPP-0043 Personnel Contamination Monitoring, Revision 10
RPP-0116 Calibration of the Eberline PM-7 Personnel Monitor, Revision 0A
RPP-0117 Calibration of Portable Radiological Instruments, Revision 0A
RSP-0200 Radiation Work Permits, Revision 13
RSP-0201 Respiratory Protection Program for River Bend Station, Revision 8
RSP-0202 Radiation Protection Calibration Program, Revision 6A
RSP-0203 Personnel monitoring, Revision 14
RSP-0213 Control and Handling of Radioactive Materials, Revision 12
RSP-0216 Radioactive Source Control, Revision 2
RSP-0217 Access Control, Revision 1A
Standing Instruction 97-0006 Radiological Respiratory Protection Equipment Evaluations

Audits

Audit 96-08-1-RP RBS QA Radiation Protection Evaluation
Surveillance Reports - 707010, 707003, 707002, 706005, 706003, 705002
Observation Reports - 802001, 801002, 711004, 708002

Other

Condition Reports regarding radiation protection issues
Breathing air quality analysis reports