

April 5, 2001

Mr. John K. Wood  
Vice President - Nuclear  
FirstEnergy Nuclear Operating Company  
P. O. Box 97, A200  
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT - NRC INSPECTION  
REPORT 50-440/01-06(DRS)

Dear Mr. Wood:

On March 9, 2001, the NRC completed an inspection at your Perry Nuclear Power Plant. The enclosed report documents the inspection findings which were discussed on March 9, 2001, with Mr. Schrauder and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selected procedures and records, observed activities, and interviewed personnel. Specifically, this inspection focused on occupational radiation safety.

Based on the results of this inspection, the inspector identified one issue of very low safety significance (Green). This issue was determined to involve a violation of NRC requirements. However, because of its very low safety significance and because it has been entered into your corrective action program, the NRC is treating this issue as a Non-Cited Violation in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny this Non-Cited Violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region III; the Director Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector Office at the Perry Nuclear Power Plant.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Gary L. Shear, Chief  
Plant Support Branch  
Division of Reactor Safety

Docket No. 50-440  
License No. NPF-58

Enclosure: Inspection Report 50-440/01-06(DRS)

cc w/encl: B. Saunders, President - FENOC  
N. Bonner, Director, Nuclear  
Maintenance Department  
G. Dunn, Manager, Regulatory Affairs  
K. Ostrowski, Director, Nuclear  
Services Department  
T. Rausch, Director, Nuclear  
Engineering Department  
R. Schrauder, General Manager,  
Nuclear Power Plant Department  
A. Schriber, Chairman, Ohio Public  
Utilities Commission  
Ohio State Liaison Officer  
R. Owen, Ohio Department of Health

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-440  
License No: NPF-58

Report No: 50-440/01-06(DRS)

Licensee: FirstEnergy Nuclear Operating Company

Facility: Perry Nuclear Power Plant

Location: P. O. Box 97 A200  
Perry, OH 44081

Dates: March 5-9, 2001

Inspector: John E. House, Senior Radiation Specialist

Observer: Ronald V. Schmitt, Radiation Specialist

Approved by: Gary L. Shear, Chief, Plant Support Branch  
Division of Reactor Safety

## SUMMARY OF FINDINGS

IR 05000440-01-06(DRS), on 03/05-03/09/2001, FirstEnergy Nuclear Operating Company, Perry Nuclear Power Plant, Unit 1. Radiation safety specialist report.

The inspection was conducted by a senior radiation specialist. The significance of most/all findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609, "Significance Determination Process" (SDP). The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at <http://www.nrc.gov/NRR/OVERSIGHT/index.html>. Findings for which the SDP does not apply are indicated by "no color" or by the severity level of the applicable violation.

Cornerstone: Occupational Radiation Safety

### A. Inspector Identified Findings

Green. The NRC inspector identified a Non-Cited Violation for two examples of a failure to provide locked or continuously guarded doors to prevent unauthorized entry into a Locked High Radiation Area (LHRA) as required by Technical Specification 5.7.2.

The finding was of very low safety significance because, although the areas were not controlled with locked doors that would have prevented unauthorized entry, no unauthorized entries were gained to the areas and the licensee's administrative controls (alarming electronic dosimetry), postings and area dose rates would have reduced the potential for an unauthorized entry and an overexposure (Section 2OS1.4).

### B. Licensee Identified Findings

No findings of significance were identified.

## Report Details

Summary of Plant Status: The plant was shutdown for re-fueling throughout the inspection period.

### **2. RADIATION SAFETY**

Cornerstone: Occupational Radiation Safety (OS)

#### 2OS1 Access Control

##### .1 Plant Walkdowns and Radiological Boundary Verifications

###### a. Inspection Scope

The inspector performed walkdowns of the radiologically restricted area to verify the adequacy of radiological boundaries and postings. Specifically, the inspector performed confirmatory radiation measurements in the Containment and Auxiliary Buildings and toured the Drywell in order to assess the licensee's radiological control practices and to verify that high radiation areas and radiation areas were properly posted and controlled in accordance with 10 CFR Part 20 and the licensee's procedures.

###### b. Findings

No findings of significance were identified.

##### .2 Radiation Worker Performance

###### a. Inspection Scope

The inspector evaluated radiation worker (radworker) performance by observing the use of low dose waiting areas and proper use of protective clothing, based on radiation work permit (RWP) requirements. Radiological conditions were discussed with radworkers to determine worker awareness of significant radiological conditions and electronic dosimetry set points. Radiological problem condition reports were reviewed to determine if weaknesses in radworker performance had been identified.

###### b. Findings

No findings of significance were identified.

##### .3 Radiation Protection Technician Performance

###### a. Inspection Scope

Radiation protection technician (RPT) performance was evaluated. The inspector observed job coverage, control of contamination, and exit boundaries during job evolutions, control of radworkers, and reviewed RPT response to radiological incidents. Radiological problem condition reports were reviewed to determine if RPT errors had been identified.

b. Findings

No findings of significance were identified.

4. High Risk Significant, High Dose Rate HRA, and VHRA Controls

a. Inspection Scope

The inspector reviewed the licensee's controls for elevated radiation dose rate areas. During plant walkdowns, the inspector observed areas that met the definition of locked high radiation areas (LHRA) and very high radiation areas to evaluate if they were adequately secured. The inspector reviewed licensee condition report 01-0667 which documented a misplaced key for a LHRA and an individual intentionally locked in a LHRA.

b. Findings

One Green finding was identified. The NRC inspector identified a Non-Cited Violation for two examples of a failure to provide locked or continuously guarded doors to prevent unauthorized entry into a Locked High Radiation Area (LHRA) as required by Technical Specification 5.7.2. Specifically, inadequate radiation barriers to the Auxiliary Building steam tunnel pit and the traversing incore probe area were identified.

Condition report (CR) 01-0667 documented issues related to access control of the Auxiliary Building steam tunnel pit which was a Technical Specification LHRA. The entrance to the steam tunnel pit consisted of a safety railing and a waist high gate, about 3.5 feet high that could be padlocked.

On February 20, 2001, two maintenance personnel were assigned to perform work in the steam tunnel pit. This area was controlled by the licensee as a LHRA at that time by locking the gate. During the work process the workers determined that additional materials were needed for the job. They discussed the situation and decided that one worker would obtain the materials, and the other would remain at the job site and continue working. The workers also discussed an escape plan which included climbing over the gate or climbing through the safety railing and concluded that there would be no difficulty in leaving the area should the need arise. The worker who remained inside the LHRA continued with the job for a period of time and then went to a low dose waiting area that was described during the as-low-as-is-reasonably-achievable (ALARA) pre-job briefing.

When the worker returned to the gate with the material, he discovered that he had lost the key to the gate. The worker immediately contacted radiation protection (RP) who dispatched an RP technician to the site. The RP technician instructed the worker inside the LHRA to exit the area by climbing over the gate, which he did. The two workers involved in this job received four and eight millirem respectively, and the dose rate for the area in which they were working was approximately 10 millirem per hour. This job did not involve working in that part of the LHRA where the dose rates were in excess of

one rem per hour at 30 centimeters. The component that exhibited this elevated dose rate was very difficult to access.

During a walkdown of the steam tunnel pit area, the inspector determined that the gate could easily be climbed over and that the safety railing could be climbed through with little difficulty. The inspector also determined that the workers were not confined inside this LHRA and could easily exit the area should the need arise as was evidenced by the worker exiting the area when directed to by the radiation protection technician. Consequently, the LHRA barrier, the locked gate, and safety railing was not sufficient to preclude unauthorized entry.

During a walkdown of LHRAs, the Radiation Protection Manager (RPM) identified to the inspector that a traversing in-core probe (TIP) area was controlled as a LHRA when the TIPs were operational. The LHRA barrier to the TIP area consisted of a gate approximately 5.5 feet tall connected to a concrete wall, with strobe lights mounted adjacent to the gate. During TIP operation, the gate was locked. The strobe lights did not activate upon personnel entry into the area and did not inform supervisory personnel on an entry into the area. Therefore, the strobe lights did not constitute a barrier as defined in 10 CFR 20.1601(a)(2). The concrete wall had an opening through which an individual could easily enter the TIP area, thus bypassing the locked gate. The wall opening was covered by a fire hose reel mounted on hinges which were attached to the wall. The reel could swing away from the wall opening, and provide access to the TIP area. Consequently, the barrier was not sufficient to prevent unauthorized entry.

The inspector, in conjunction with Region III and NRR management, reviewed the construction of the LHRA barriers and determined that the barriers were inadequate. If left uncorrected, the root cause of this event could become a more significant concern and could cause a significant unintended and unplanned dose to workers. Therefore, this issue was reviewed using the NRC Significance Determination Process (SDP). The finding was not an ALARA finding, did not involve an overexposure, the ability to assess the dose to occupationally exposed worker was not compromised, and substantial potential for an overexposure did not exist. Therefore, in accordance with the SDP, this issue is a Green finding.

Technical Specification 5.7.2 requires, in part, that areas accessible to personnel with radiation levels such that a major portion of the body could receive in one hour a dose greater than or equal to 1000 millirem shall be provided with locked or continuously guarded doors to prevent unauthorized entry and the keys shall be maintained under the administrative control of the shift supervisor on duty or the radiation protection supervisor. The areas described above were not provided with locked or continuously guarded doors that would prevent unauthorized entry to the areas. This finding of very low significance (Green) is a violation of NRC requirements. However, because of the very low safety significance of the item and because the licensee has included this item in its corrective action program (Condition Report numbers 01-1230,01-0667, and 99-1279) this violation is being treated as a Non-Cited Violation (NCV 440/01-06-01) in accordance with Section VI of the NRC Enforcement Policy, NUREG-1600.



.5 Reviews of Radiation Work Permits

a. Inspection Scope

The inspector reviewed selected RWP for RFO8 including electronic dosimeter alarm set points for both dose rate and accumulated dose. The inspectors also verified that adequate engineering controls were in place to maintain worker exposures ALARA. Specifically, the following RWPs were reviewed:

- 01-6001 Radiation Protection Section
- 01-6007 ALARA Activities
- 01-6111 Drywell/Containment Scaffolding/Insulation
- 01-6117 Drywell/Containment Activities
- 01-6119 Bioshield Activities
- 01-6120 Drywell 576' Under Vessel Activities
- 01-6502 Reactor Disassembly and Support

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

.1 Job Site Inspection and ALARA Control

a. Inspection Scope

The inspector reviewed jobs being performed in areas of elevated dose rates, examined exposure estimates and work sites, and evaluated the ALARA briefing documentation including the use of engineering controls. During job site walkdowns, radworkers and supervisors were observed to determine if low dose waiting areas were being used appropriately, and to evaluate the effectiveness of job supervision including equipment staging, use of shielding, availability of tools, and work crew size.

In addition, the inspector reviewed RWP No. 01-6118, "Cutting of drain line on G33F0505A," and RWP No. 01-6101, "Installation of Vent Caps/Clean-up in Suppression Pool," for protective clothing requirements, dosimeter use including radiotelemetry dosimetry, and electronic dosimeter alarm set points for both dose rate and accumulated dose. The inspector attended the pre-job ALARA and work control briefings, and observed major portions of each work evolution via deck plate observation and the licensee's remote closed circuit monitoring system, in order to verify that adequate work controls were in place to maintain worker exposures ALARA.

b. Findings

No findings of significance were identified.

## .2 Radiological Work Planning

### a. Inspection Scope

The inspector reviewed a selection of the highest radiological dose jobs for RFO8. The methodology and assumptions used for outage exposure estimates and exposure goals, and the comparison of those estimates to the final job exposures were evaluated. Job planning (ALARA) and job dose estimates were evaluated along with dose mitigation efforts which included time, distance, and shielding. Worker instructions, protective clothing requirements, engineering controls to minimize contamination, and the use of predetermined low dose waiting areas were reviewed to determine if the licensee had maintained the radiological exposure ALARA for those jobs.

### b. Findings

No findings of significance were identified.

## .3 Source-Term Reduction and Control

### a. Inspection Scope

The inspector evaluated the licensee's source term reduction program in order to verify that the licensee had an effective program in place, and was knowledgeable of plant source term and techniques for its reduction. Topics reviewed included:

- Trending of reactor coolant activation products
- Zinc injection into reactor coolant
- Hot spot reduction program
- Vessel nozzle flushing
- System flushing
- Noble metal chemical addition
- Gamma Spectroscopy analysis of system piping for isotopic characterization
- Feed water iron control
- Reactor water cleanup following outage shutdown
- Source term evaluation

### b. Findings

No findings of significance were identified.

## .4 Problem Identification and Resolution

### a. Inspection Scope

The inspector reviewed audits, self-assessments, and condition reports related to the ALARA program to determine if problems were identified, properly characterized, prioritized, and entered into the corrective action program. The inspector also reviewed outage generated condition reports to assess the adequacy of the licensee's ability to identify problems, and reviewed licensee evaluations of the previous outage (RFO7) and

planning for RFO8 to determine if radiological work problems/deficiencies had been identified, and entered into the licensee's corrective action system.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES (OA)**

4OA6 Management Meetings

Exit Meeting Summary

The inspector presented the inspection results to Mr. Schrauder and other members of licensee management at the conclusion of the inspection on March 9, 2001. The licensee acknowledged the information and findings presented. No proprietary information was identified by the licensee.

## LIST OF PERSONS CONTACTED

N. Bonner, Director, Maintenance Department  
D. Forbush, Supervisor, Radiation Protection  
T. Henderson, Regulatory Affairs  
J. Kloosterman, Supervisor, Quality Assurance  
T. Lentz, Manager, Design Engineering  
R. Leib, Supervisor, Radiation Protection  
B. Luthanen, Regulatory Assurance  
R. Schrauder, General Manager  
J. Sears, Radiation Protection Manager  
S. Trent, Radiation Protection  
L. VanDerHorst, Supervisor, Radiation Protection  
J. Wood, Site Vice-President

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

50-440/01-06-01	NCV	Technical Specification Locked High Radiation Areas had an inadequate barrier (two examples), in violation of Technical Specification 5.7.2 (Section 2OS1.4).
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### Closed

50-440/01-06-01	NCV	Technical Specification Locked High Radiation Areas had an inadequate barrier (two examples), in violation of Technical Specification 5.7.2 (Section 2OS1.4)
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### Discussed

None

## LIST OF ACRONYMS USED

ALARA	As-Low-As-Is-Reasonably-Achievable
CFR	Code of Federal Regulations
LHRA	Locked High Radiation Area
NRC	Nuclear Regulatory Commission
OA	Other Activities
Radworker	Radiation Worker
RFO8	Refueling Outage 8
RPT	Radiation Protection Technician
RWP	Radiation Work Permit
TIP	Traversing In-core Probe

## LIST OF DOCUMENTS REVIEWED

### Procedures

PAP-0123, Control of Locked High Radiation Areas, Revision 6, December 29, 1999  
HPI-C005, Radiation Work Permit Preparation and ALARA Reviews, Revision 6, December 29, 1999  
RPI-0504, Radiologically Restricted Diving Program, Revision 2, March 5, 1998

### Radiation Work Permits

01-6118, Cutting of Drain Line on G33F0505A  
01-6101, Installation of Vent Caps/Clean-Up in Suppression Pool  
01-6001, Radiation Protection Section  
01-6007, ALARA Activities  
01-6111, Drywell/Containment Scaffolding/Insulation  
01-6117, Drywell/Containment Activities  
01-6119, Bioshield Activities  
01-6120, Drywell 576' Under Vessel Activities  
01-6502, Reactor Disassembly and Support

### Assessments and Audits

Radiation Protection Section, Third Quarter 2000 (3Q00) Condition Report Binning, Self-Assessment 212RPS2000  
Audit PA 00-01, Radiation Protection Program, March 6, 2000

### Condition Reports

01-0620, 01-0976, 01-1021, 01-1022, 01-1024, 01-1051, 01-0667, 01-1230, 99-1279  
01-1054, 01-0947, 01-0960

### Miscellaneous

BRAC Point Survey Data, Ion Chamber and Shielded GM Detectors Results  
Memorandum, RPS-RPTU-00-00018, Source Term Determination Report for Cyclic Period-Through Mid-Cycle 8  
RFO8 Radiation Protection Section Update, January 2001  
CENTEC, Perry Primary System Radiation Level Assessment Following Fuel Cycle Seven, April 1999  
Memorandum, Occupational Radiation Safety Cornerstone data for January, 2001  
Perry Nuclear Power Plant Technical Specifications  
Regulatory Evaluation of CR 01-0667  
Radiological Survey Reports  
High Gaseous Levels in Dry-well and Annulus: February 20, 2001