

November 15, 2000

Mr. Oliver D. Kingsley  
President, Nuclear Generation Group  
Commonwealth Edison Company  
ATTN: Regulatory Services  
Executive Towers West III  
1400 Opus Place, Suite 500  
Downers Grove, IL 60515

SUBJECT: BRAIDWOOD - NRC INSPECTION REPORT 50-456/00-17(DRS);  
50-457/00-17(DRS)

Dear Mr. Kingsley:

On November 3, 2000, the NRC completed a routine inspection at your Braidwood Nuclear Power Station. The results were discussed on November 3, 2000, with Mr. Tulon and members of your staff. The enclosed report presents the results of that inspection.

The inspection was an examination of activities conducted under your license as they relate to radiation safety and to compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations of activities, and interviews with personnel. Specifically, this inspection focused on occupational radiation safety, the radiological controls implemented for access to radiologically significant areas, and the ALARA (as-low-as-reasonably-achievable) program implementation for the Unit 2 refueling outage (A2RO8).

No findings of significance were identified.

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).

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

***/RA Steven K. Orth Acting for/***

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

Docket Nos. 50-456; 50-457  
License Nos. NPF-72; NPF-77

Enclosure: Inspection Report 50-456/00-17(DRS);  
50-457/00-17(DRS)

cc w/encl: D. Helwig, Senior Vice President, Nuclear Services  
C. Crane, Senior Vice President, Nuclear Operations  
H. Stanley, Vice President, Nuclear Operations  
R. Krich, Vice President, Regulatory Services  
DCD - Licensing  
T. Tulon, Site Vice President  
K. Schwartz, Station Manager  
T. Simpkin, Regulatory Assurance Supervisor  
M. Aguilar, Assistant Attorney General  
State Liaison Officer  
Chairman, Illinois Commerce Commission

O. Kingsley

-2-

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Docket Nos. 50-456; 50-457  
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Enclosure: Inspection Report 50-456/00-17(DRS);  
50-45700-17(DRS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-456; 50-457  
License Nos: NPF-72; NPF-77

Report No: 50-456/00-17(DRS); 50-457/00-17(DRS)

Licensee: Commonwealth Edison Company

Facility: Braidwood Nuclear Plant, Units 1 and 2

Location: 35100 South Route 53  
Suite 84  
Braceville, IL 60407-9617

Inspection Dates: October 30 - November 3, 2000

Inspector: Mark Mitchell, Radiation Specialist

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

# NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas) reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

Reactor Safety	Radiation Safety	Safeguards
<ul style="list-style-type: none"><li>● Initiating Events</li><li>● Mitigating Systems</li><li>● Barrier Integrity</li><li>● Emergency Preparedness</li></ul>	<ul style="list-style-type: none"><li>● Occupational</li><li>● Public</li></ul>	<ul style="list-style-type: none"><li>● Physical Protection</li></ul>

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.

## SUMMARY OF FINDINGS

IR 05000456-00-17(DRS); IR 05000457-00-17(DRS), on 10/30-11/03/2000, Commonwealth Edison Company, Braidwood Nuclear Power Station, Units 1 and 2. The inspection covered the occupational radiation safety cornerstone.

The inspection was conducted by a regional radiation specialist. No findings of significance were identified.

## Report Details

Summary of Plant Status: The Unit 1 plant was at 100 percent power, and the Unit 2 plant was in a refueling outage throughout the inspection period.

## **2. RADIATION SAFETY**

Cornerstone: Occupational Radiation Safety

### 2OS1 Access Control to Radiologically Significant Areas

#### .1 Plant Walkdowns, Radiological Boundary Verifications and Radiation Work Permit Reviews

##### a. Inspection Scope

The inspector conducted walkdowns of the radiologically controlled area (RCA) to verify the adequacy of radiological area boundaries and postings for high and locked high radiation areas in the Containment, Auxiliary, and Radwaste Buildings. Confirmatory radiation measurements were taken to verify that these areas and selected radiation areas were properly controlled in accordance with 10 CFR 20, licensee procedures and Technical Specifications. Selected radiation work permits (RWPs) for tours and reactor cavity decontamination activities were reviewed for protective clothing requirements and dosimetry requirements, including alarm set-points. The inspector also observed radiation workers performing the activities described in Section 2OS2.2, evaluated their awareness of radiological work conditions, and verified the implementation of radiological controls specified in applicable RWPs and ALARA (as-low-as-is-reasonably-achievable) plans.

##### b. Findings

No findings of significance were identified.

#### .2 Problem Identification and Resolution

##### a. Inspection Scope

The inspector reviewed the licensee's self-assessments and the condition report (CR) database that related to radiation protection technician performance, radiation worker practices, and high radiation area access controls during the Unit 2 refueling outage (A2RO8). The inspector evaluated the effectiveness of the radiation protection self-assessment process to identify problems and trends and to implement corrective actions.

##### b. Findings

No findings of significance were identified.

## 2OS2 As-Low-As-Is-Reasonably-Achievable (ALARA) Planning and Controls

### .1 ALARA Planning

#### a. Inspection Scope

The inspector reviewed the station's collective exposure histories for 1997 to present, current exposure trends for the ongoing Unit 2 refueling outage, and planned and completed radiological work activities for the outage to assess current performance and exposure challenges. The inspector used the exposure data and the station's three-year rolling average exposure information and compared it with national pressurized water reactor industry data.

#### b. Findings

No findings of significance were identified.

### .2 Job Site Inspections and ALARA Controls

#### a. Inspection Scope

The inspector selected the following potentially high exposure or high radiation area active or recently completed job activities and evaluated the licensee's use of ALARA controls:

- Scaffolding Placement and Removal;
- Insulation Removal and Replacement;
- Pressurizer Loop Gallery Work; and
- Reactor Refuel Cavity Decontamination Activities.

The inspector surveyed work areas to verify that radiation levels were consistent with the licensee's survey data and verified that low dose areas were designated and appropriately used by workers. The inspector evaluated the licensee's engineering controls at selected locations and verified that the controls were consistent with those specified in the ALARA plans. The inspector also observed and questioned workers at job locations to determine that they had adequate knowledge of radiological work conditions and exposure controls.

#### b. Findings

No findings of significance were identified.

### .3 Source Term Reduction and Control

#### a. Inspection Scope

The inspector reviewed the status of the licensee's source term reduction program, focusing on those initiatives taken for the outage which included hydrolazing and other

decontamination work and installation of temporary shielding. The inspector also evaluated other ongoing source term reduction strategies, such as hot spot reduction initiatives, and verified that a viable source term control program was in place. The inspector also performed surveys within the radiologically controlled area to verify the accuracy of the licensee's records of identified hot spots and to identify any other significant unidentified sources of radiation exposure.

b. Findings

No findings of significance were identified.

.4 Radiological Work Planning

a. Inspection Scope

The inspector selected the following outage job activities that were estimated to exceed five person-rem or were conducted in high radiation areas and assessed the adequacy of the radiological controls and work planning:

- Steam Generator Eddy Current Testing;
- Scaffolding Placement Installation and Removal;
- Steam Generator Secondary Side Work;
- Remove and Install Insulation in Unit 2 Containment and Auxiliary Building; and
- Collective Contracted Valve Work.

For each job activity, the inspector reviewed ALARA evaluations and associated dose mitigation techniques and evaluated the licensee's exposure estimates and performance. The inspector also assessed the integration of ALARA requirements into work packages and attended pre-job briefings, if the work was ongoing, to evaluate the licensee's communication of work plans and radiological safety precautions.

b. Findings

No findings of significance were identified.

.5 Verification of Exposure Estimate Goals and Exposure Tracking System

a. Inspection Scope

The inspector reviewed the methodology and assumptions used for the A2RO8 exposure estimates and exposure goals and compared job dose rate and man-hour estimates for accuracy. The inspector verified that job dose history files and dose reductions anticipated through industry and corporate lessons learned were appropriately used to forecast outage doses. The inspector also reviewed the licensee's exposure tracking system to determine if the level of exposure tracking detail, exposure report timeliness, and exposure report distribution was sufficient to support control of collective exposures. The inspector verified that the licensee's dose estimates for the outage were reasonably accurate and confirmed that no outage jobs greater than five person rem exceeded respective dose estimates by more than 50 percent.

b. Findings

No findings of significance were identified.

.6 Problem Identification and Resolution

a. Inspection Scope

The inspector reviewed the licensee's independent audit plan for A2RO8, surveillances, and the CR database for the outage related radiological incidents involving personnel contamination events and radiation protection technician and radiation worker performance to evaluate the licensee's ability to identify and correct problems. The inspector verified that there were no radiation protection department licensee event reports or internal exposures in excess of 100 millirem committed effective dose equivalent.

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. Tulon and other members of licensee management at the conclusion of the inspection on November 3, 2000. The licensee acknowledged the findings presented. No proprietary information was identified.

## PARTIAL LIST OF PERSONS CONTACTED

K. Aleshire, Operational Health Physicist  
J. Bailey, Regulatory Assurance-NRC Coordinator  
J. Eggert, Operational Health Physicist  
M. Finney, Lead Operational Health Physicist  
D. Goldsmith, Radiation Protection Manager  
R. Graham, W.C. Superintendent  
P. Griggs, Radiation Protection ALARA Analyst  
J. Neyhart, Operations and Training  
T. Saksefski, Nuclear Oversight Assessor  
B. Schramer, Chemistry Manager  
T. Simpkin, Regulatory Assurance Manager  
T. Tulon, Site Vice-President

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

None

### Closed

None

### Discussed

None

## LIST OF ACRONYMS USED

ADAMS	Agencywide Documents and Management System
A2RO8	Unit 2 Refueling Outage
ALARA	As-Low-As-Reasonably-Achievable
CFR	Code of Federal Regulations
CR	Condition Report
DRS	Division of Reactor Safety
NRC	Nuclear Regulatory Commission
OA	Other Activities
PARS	Publically Available Records
RCA	Radiologically Controlled Area
RWP	Radiation Work Permit

## PARTIAL LIST OF DOCUMENTS REVIEWED

The following is a list of licensee documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort.

### Condition Reports

A2000-03766, A2000-03959, A2000-03961, A2000-03963, A2000-03969, A2000-03970, A2000-03990, A2000-04024, A2000-04039, A2000-04048, A2000-04058, A2000-04069, A2000-04070, A2000-04072, A2000-04076, A2000-04080, A2000-04082, A2000-04089, A2000-04097, A2000-04098, A2000-04113, A2000-04132, A2000-04137, A2000-04147, A2000-04152, A2000-04158, A2000-04169, A2000-04204

### Miscellaneous

Braidwood Station Daily Exposure Report - A2RO8, October 31 - November 3, 2000  
A2RO8 Daily Report of Outage Events at Braidwood Station  
Outage Experiences - A2RO8, October 30 - November 3, 2000  
Nuclear Vision - The Screaming Eagle, October 30 - November 3, 2000

### Procedures

BwRP 5400-7A1 Revision 1, Defined Investigational Levels  
BwRP 5822-3, Revision 1, Operation and Calibration of the Eberline PM-7 Portal Monitors  
RP-AA-400, Revision 1, ALARA Program  
RP-AA-401, Revision 1, Operational ALARA Planning and Controls

### Radiation Work Permits

00-6010, Revision 0, Contractor Valve Work in Unit 2 Containment  
00-0614, Revision 0, All Reactor Cavity Decontamination, Coating Striping and Associated Work Including Flange Cleaning  
00-6017, Revision 0, Miscellaneous Reactor Head Work to Include "O" Ring Removal/Replacement, All Conoseal and RVLIS Work  
00-6029, Revision 0, Repair/ Replace Nuclear Instrumentation Detectors  
00-6031, Revision 0, CECO/Contractor Work in Containment on the RY Valve Gallery IMB 377+10 Feet  
00-6032, Revision 0, Install/Remove Scaffolding During Outage  
00-6040, Revision 0, Install/ Remove Shielding for the Outage and Associated Work  
00-6042, Revision 0, Remove/Replace Insulation During Outage in All RPAs Except U-1 Containment  
00-6076, Revision 0, All Phases of S/G Eddy Current Testing and Robotic S/G Repair, No Body or Head Entries, Reach Ins Only