

November 4, 1999

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: NRC RADIATION SAFETY INSPECTION REPORT 50-254/99022(DRS);  
50-265/99022(DRS)

Dear Mr. Kingsley:

On October 8, 1999, the NRC completed a routine inspection at your Quad Cities Nuclear Station. The results of this inspection were discussed on October 8, 1999, with Mr. J. Dimmette, Jr. and other 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 the implementation of your radiological access control and radiological instrumentation programs. In addition, we reviewed your staff's evaluation of the performance indicator for the occupational radiation safety cornerstone.

At the commencement of the pilot inspection program, your staff initially reported a White performance indicator for the occupational radiation safety cornerstone, which was attributed to six Technical Specification high radiation area occurrences. However, your staff identified that errors had been made in developing the original submission to the NRC, which resulted in a change to the performance indicator. During this inspection, we validated your staff's revised assessment and concluded that only two occurrences were within the definition of the performance indicator, which was in the Green performance band.

Based on the results of this inspection, no significant inspection findings 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 placed in the NRC Public Document Room (PDR).

O. Kingsley

-2-

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

Sincerely,

/s / Gary L. Shear

Gary L. Shear, Chief  
Plant Support Branch

Docket Nos. 50-254; 50-265  
License Nos. DPR-29; DPR-30

Enclosure: Inspection Report 50-254/99022(DRS); 50-265/99022(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  
J. Dimmette, Jr., Site Vice President  
G. Barnes, Quad Cities Station Manager  
C. Peterson, Regulatory Affairs Manager  
M. Aguilar, Assistant Attorney General  
State Liaison Officer, State of Illinois  
State Liaison Officer, State of Iowa  
Chairman, Illinois Commerce Commission  
W. Leech, Manager of Nuclear  
MidAmerican Energy Company

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C. Peterson, Regulatory Affairs Manager  
M. Aguilar, Assistant Attorney General  
State Liaison Officer, State of Illinois  
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Chairman, Illinois Commerce Commission  
W. Leech, Manager of Nuclear  
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-3-

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-254; 50-265  
License Nos: DPR-29; DPR-30

Report No: 50-254/99022(DRS); 50-265/99022(DRS)

Licensee: Commonwealth Edison Company

Facility: Quad Cities Nuclear Power Station  
Units 1 and 2

Location: 22710 206th Avenue North  
Cordova, IL 61242

Dates: October 4 - 8, 1999

Inspectors: S. K. Orth, Senior Radiation Specialist  
K. J. Lambert, Radiation Specialist

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

## **SUMMARY OF FINDINGS**

Quad Cities Nuclear Power Station, Units 1 & 2  
NRC Inspection Report 50-254/99022(DRS); 50-265/99022(DRS)

The report covers a 1-week period of announced inspection by two regional radiation specialists. This inspection focused on occupational radiation safety and included a review of the access control program, radiation worker practices, and radiological instrumentation. In addition, the inspectors reviewed the licensee's performance indicator (PI) associated with the occupational radiation safety cornerstone.

Inspection findings were assessed according to potential risk significance and were assigned colors of green, white, yellow or red. Green findings are indicative of issues that, while not necessarily desirable, represent little risk to safety. White findings would indicate issues with some increased risk to safety, and which may require additional NRC inspections. Yellow findings would be indicative of more serious issues with higher potential risk to safe performance and would require the NRC to take additional actions. Red findings represent an unacceptable loss of margin to safety and would result in the NRC taking significant actions that could include ordering the plant shut down. The findings, considered in total with other inspection findings and performance indicators, will be used to determine overall plant performance.

### **RADIATION SAFETY**

#### **Cornerstone: Occupational Radiation Safety**

\$ There were no inspection findings identified or documented.

#### **Performance Indicators Verification**

\$ Occupational Radiation Safety Performance Indicator (PI). The licensee identified errors in the PI reported to the NRC. Originally, the licensee reported six technical specification high radiation area incidents, which resulted in a white PI. After identifying a missed occurrence and a misinterpretation of the PI criteria, the licensee determined that only two incidents were applicable to the PI, which resulted in the PI indicating that performance was in the licensee response band (green).

## Report Details

### 2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

#### 2OS1 Access Control

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

###### 1. Inspection Scope

The inspectors performed walkdowns of the radiologically controlled area (RCA) to verify the adequacy of radiological boundaries and postings. Specifically, the inspectors performed confirmatory radiation measurements in the Reactor, Turbine, and Radwaste Buildings to verify that radiologically significant work areas (high radiation areas (HRAs), radiation areas, and airborne radioactivity areas) were properly posted and controlled.

###### 2. Observations and Findings

There were no findings identified and documented during this inspection.

##### .2 Reviews of Radiation Work Permits

###### 3. Inspection Scope

The inspectors reviewed radiation work permits (RWPs) and electronic dosimeter (ED) alarm set points for both dose rate and accumulated dose to verify that adequate work controls were in place to maintain worker exposures ALARA (as-low-as-is-reasonably-achievable).

###### 4. Observations and Findings

The inspectors observed that the licensee did not have a formal program or criteria for determining ED alarm set points. Members of the radiation protection (RP) staff indicated that radiological surveys and previous job evolution histories were frequently used to determine ED set points. However, the inspectors observed work evolutions in which the ED set points were not consistent with the radiological conditions present (i.e., during maintenance on the radioactive waste DOW pump and work in the steam affected areas of the plant).

During maintenance on the radioactive waste DOW pump, the inspectors observed that the ED dose rate alarm set point was set below the dose rates in the area of the intended work evolution. During maintenance in the steam affected areas of the plant (e.g., main steam isolation valve rooms and the low pressure heater bays), the inspectors noted that the dose rate alarm set points were greater than five times the

highest dose rates noted on survey forms and encountered during observations of work activities. Although the ED alarm set points were not set to reflect the actual dose rates encountered, accumulated doses for the work evolutions were maintained ALARA, and no unexpected doses were identified. Radiation protection management acknowledged the inspectors' observations and stated that they had similar observations, which had been incorporated into RP improvement efforts. No inspection findings were identified or documented.

.3 Reviews of Radiologically Significant Work

5. Inspection Scope

The inspectors reviewed the conduct of work activities in the RCA that were expected to result in significant radiological exposures. Specifically, the inspectors verified the adequacy of radiological controls (e.g., radiation work permits and ALARA reviews), surveys, and ALARA pre-job briefings for the following work activities:

- \$ Thermography measurements in the Unit 1 and Unit 2 low pressure heater bays;
- \$ Modification preparations (i.e., system measurements) in the Unit 1 low pressure heater bay;
- \$ Battery testing/replacement in the Unit 1 main steam isolation valve room; and
- \$ Maintenance on the radioactive waste DOW pump.

6. Observations and Findings

The inspectors observed some lack of preparation in work activities associated with the low pressure heater bay and the main steam isolation valve work. In certain cases, the work activities had been determined only hours before a pre-job ALARA briefing was conducted. As a result, the RP staff was challenged to obtain the necessary survey records, to perform additional surveys to support the work activities, and to develop an appropriate pre-job ALARA briefing package. Although the lack of preparation may potentially result in the omission of important information from the pre-job ALARA briefing, the inspectors found that adequate information was communicated to the workers. No inspection findings were identified or documented. However, RP management acknowledged the potential vulnerability and stated that they had similar observations, which had been incorporated into RP improvement efforts.

2OS3 Radiation Monitoring Instrumentation

.1 Source Tests and Calibration of Radiological Instrumentation

a. Inspection Scope

The inspectors verified that area radiation monitors (ARMs) locations were as



described in the Updated Final Safety Analysis Report and that the ARMs were appropriately calibrated. The inspectors reviewed calibration records for portable radiation survey instruments and continuous air monitors. The inspectors observed source checks of tool monitors and whole body friskers and calibrations of several portable survey instruments. In addition, the inspectors observed the collection of a liquid sample from

the post accident sampling system (PASS) and the comparison of both liquid and gaseous sample results with routinely collected samples.

2. Observations and Findings

The inspectors observed that the licensee was not implementing acceptance criteria for the comparison of routinely collected liquid and gaseous sample results with PASS liquid and gaseous results. The chemistry staff informally performed the comparisons using the chemistry staff's technical knowledge and judgement. Although the comparisons were informal, the inspectors reviewed the results and did not identify any notable discrepancies. Therefore, no inspection findings were identified or documented. However, the quality assurance organization had made a similar observation, which had been entered into the corrective action system.

.2 Radiation Protection Technician Instrument Use

7. Inspection Scope

The inspectors verified the calibration of selected radiation survey instruments and observed several RP technicians' selection and operational checks of portable radiation survey instruments for several jobs requiring technician job coverage.

8. Observations and Findings

There were no findings identified and documented during this inspection.

20S4 Radiation Worker Performance

1. Inspection Scope

During work evolutions (Section 20S1.3), the inspectors observed radiological control practices of personnel within the RCA.

2. Observations and Findings

There were no inspection findings identified and documented during this inspection.

**4 OTHER ACTIVITIES**

#### 40A1 Identification and Resolution of Problems

##### a. Inspection Scope

The inspectors reviewed the licensee's self assessments and audits, which had been performed by the licensee during the previous 12 months. In addition, the inspectors reviewed problem identification forms (PIFs) concerning RP technician performance, radiation worker practices, radiological instrumentation, and control of HRAs, which had been initiated since January of 1998.

##### b. Observations and Findings

There were no inspection findings identified and documented during this inspection.

#### 40A2 Performance Indicator Verification

##### 1. Inspection Scope

The inspectors verified the licensee's assessment of its performance indicator (PI) for occupational radiation safety. Specifically, the inspectors reviewed historical PIFs concerning HRA control problems and reviewed electronic dosimetry logs for entries into the RCA from January 1, 1998, to the date of this inspection.

##### 2. Observations and Findings

At the start of the NRC pilot inspection program, the licensee reported that it had identified six Technical Specification HRA (TS-HRA) control incidents (2nd Quarter of 1996 through the 1st Quarter of 1999) which caused the licensee to be in the white performance band. In August of 1999, the licensee conducted a self assessment using the NRC's draft inspection procedure (Inspection Procedure 71121, "Occupational Radiation Safety") and identified that it had omitted one TS-HRA incident from its May 1999 PI report to the NRC.

During the review of the above finding, the licensee determined that it had also misinterpreted the criteria for determining TS-HRA incidents. Specifically, the licensee failed to recognize that TS-HRA incidents (for the purposes of the PI program) were only considered in areas having radiation levels in excess of 1 rem per hour (rem/hr). Instead, the licensee had reported all HRA incidents in its PI submission to the NRC. Prior to this inspection, the licensee re-evaluated each of the events and determined that only two incidents occurred in HRAs having radiation levels in excess of 1 rem/hr.

Consequently, the PI was in the green performance band. Based on this evaluation, the licensee communicated the error to the NRC and corrected its historical data. The licensee's overall error was conservative and did not result in a change in NRC actions.

The inspectors reviewed the licensee's PIFs and related survey documentation and

verified that the licensee's most recent evaluation was adequate -- only two-of-the-seven HRA incidents occurred in areas having radiation levels in excess of 1 rem/hr. In addition, the inspectors did not identify any incidents involving an unintended exposure which exceeded 2 percent of the stochastic dose limits or 10 percent of the non-stochastic dose limits contained in 10 CFR 20.1201.

#### 40A5 Management Meetings

##### .1 Exit Meeting Summary

The inspectors presented the inspection results to Mr. J. Dimmette, Jr. and other members of licensee management at the conclusion of the inspection on October 8, 1999. The licensee acknowledged the findings presented and did not identify any information discussed as proprietary.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

E. Anderson, Radiation Protection Manager  
D. Barker, Radiation Protection, Lead Technical Health Physicist  
P. Behrens, Chemistry Manager  
K. Bethard, Regulatory Assurance, NRC Coordinator  
R. Chrznowski, Nuclear Oversight, Assessment Manager  
D. Cook, Maintenance Manager  
J. Dimmette, Jr., Site Vice-President  
K. Engle, Radiation Protection  
D. Harmon, System Engineer  
D. Histeroff, Radiation Protection  
D. Kallenbach, Radiation Protection  
M. McDowell, Operations Manager  
E. Moore, Engineering Assistant to Site Vice-President  
C. Peterson, Regulatory Assurance Manager  
G. Powell, Lead Operations Health Physicist  
W. Schmidt, Radiation Protection  
M. Sullivan, Maintenance, Superintendent  
C. Symonds, Operations Training Superintendent  
J. Wooldridge, Radiation Protection

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

None

### Closed

None

### Discussed

None

## LIST OF ACRONYMS USED

ALARA	As-Low-As-Is-Reasonably-Achievable
ARMs	Area Radiation Monitors
CFR	Code of Federal Regulations
DRS	Division of Reactor Safety
ED	Electronic Dosimeter
HRA	High Radiation Area
NRC	Nuclear Regulatory Commission
PASS	Post Accident Sampling System
PDR	Public Document Room
PI	Performance Indicator
PIF	Problem Identification Form
RCA	Radiologically Controlled Area
RP	Radiation Protection
RWP	Radiation Work Permit
TS-HRA	Technical Specification High Radiation Area
SDP	Significance Determination Process
URI	Unresolved Item

## LIST OF DOCUMENTS REVIEWED

### Assessments and Audits

Memorandum from the Radiation Protection Department to George Barnes, ADepartment Monthly Self Assessment Report for August 1999,@ dated September 15, 1999.

Quad Cities Station Radiological Protection Area 2nd Quarter 1999 Report.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-PS04, AChemistry Instrumentation, Qualification, Chemical Control, and Radiological Effluent Monitoring,@ dated October 4, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-008, AControl of Radioactive Sources and Control of Radioactive Material,@ dated March 29, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-045, AExposure Control,@ dated July 15, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-003, AExposure Control, Source Term Reduction, Internal Dose Control,@ dated February 15, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-005, AOrganization & Administration, Qualifications, Instrumentation, Contractor Control,@ dated April 19, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-001, APlant Support Corrective Actions,@ dated February 8, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-029, APlant Support Corrective Actions,@ dated May 7, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-PS01, APlant Support Corrective Actions,@ dated July 29, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-006, ARadiation Protection Department's Work Practices, Surveys, Frisking, and Posting,@ dated March 26, 1999.

Quad Cities Station Assessment Report, Nuclear Oversight Assessment NOA-04-99-042, ARadiation Worker Practices and RWP Adherence,@ dated May 20, 1999.

Radiation Protection Department AFocus Area Self-Assessment of Access Control to Radiologically Significant Areas, August 2 through September 21, 1999,@ dated September 22, 1999.

Radiation Protection Department A Focus Area Self-Assessment of Area Radiation Monitors and Continuous Air Monitors, September 1, through October 4, 1999, @ dated October 5, 1999.

Radiation Protection Department A Focus Area Self-Assessment of Radiation Monitoring Equipment, August 2 through September 1, 1999, @ dated September 10, 1999.

Radiation Protection Department A Scorecard and Tour Data for August 1999, @ dated September 10, 1999.

#### Instrument Calibrations and Quality Control Tests

QCHRSS 0300-04 (Revision 3), A Attachment A (Page 1 of 1), ESS Fill Pump Grab Sample Surveillance Checklist, @ performed October 7, 1999.

PM-7 [portal Monitor] Calibrations: No. 1 (dated November 25, 1998), No. 2 (dated May 20, 1999), No. 3 (dated May 24, 1998), No. 4 (dated October 1, 1999) and No. 15 (dated April 1, 1999).

SAM-9 [small articles monitor] Calibrations: Instrument No. 1 (dated August 5, 1999; February 16, 1999; August 25, 1998; and February 26, 1998), Instrument No. 2 (dated August 11, 1999; February 16, 1999; and August 25, 1998), Instrument No. 4 (dated August 9, 1999; February 9, 1999; August 11, 1998; and February 12, 1998), and Instrument No. 6 (dated June 10, 1999; December 10, 1998; and June 10, 1998).

#### Miscellaneous

Radiation Work Permit Nos. 993058 (Revision 2) and 993236 (Revision 0).

Instrument Availability Log.

Continuous Air Monitor Calibration Records for 1999.

Frisker Weekly Inventory Record.

#### Problem Identification Forms

Q1996-01225, Q1996-01609, Q1997-02321, Q1997-02374, Q1997-02801, Q1997-03652, Q1997-03715, Q1997-04363, Q1997-04368, Q1997-04437, Q1997-04765, Q1998-00030, Q1998-00060, Q1998-00061, Q1998-00119, Q1998-00144, Q1998-00149, Q1998-00290, Q1998-00692, Q1998-01072, Q1998-01522, Q1998-02841, Q1998-03316, Q1998-03946, Q1998-04056, Q1998-04888, Q1998-05294, Q1998-05431, Q1999-00926, Q1999-00947, Q1999-01425, Q1999-02625, and Q1999-02927.

#### Procedures

QCAP 06000-6 (Revision 8), A Radiation Work Permit Program; @  
QCCP 1200-04 (Revision 3), ANMC Continuous Air Monitor Calibration; @



QCHRSS 0300-01 (Revision 3), AReactor Water Recirculation B Loop Grab Sample;@  
QCHRSS 0300-04 (Revision 3), AESS Fill Pump Grab Sample;@  
QCHRSS 0700-03 (Revision 3), AContainment Air Sample Using a 4700cc Marinelli Beaker;@  
QCHRSS 1200-02 (Revision 4), AReactor Water Clean-up Inlet In-line Analysis;@  
QIP 1800-01 (Revision6), AARM Calibration;@  
QCRP 5300-01 (Revision 8), AALARA Action Reviews;@  
QCRP 5821-34 (Revision 5), ANMC Multi-Channel Continuous Air Monitor;@  
QCRP 5822-07 (Revision 6), AOperation and Calibration of the IPM Whole Body Monitors;@  
QCRP 5822-10 (Revision 7), AThe Eberline PM-7 Portal Monitor;@  
QCRP 5822-11 (Revision 4), ASAM-9 Small Articles Monitor;@  
QCRP 5822-25 (Revision 3), AVictoreen Model 425 Count Rate Meter;@  
QCRP 5823-16 (Revision 6), ABicron RSO-5, RSO-50 & RSO-50E Survey Metrers;@  
QCRP 5823-33 (Revision 6), AADM-300 Survey Meter;@ and  
QCRP 6200-05 (Revision8), AWriting Radiation Work Permits.@