NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-249/91041(DRSS)

Docket No. 50-249

License No. DPR-25

Enforcement Action No. 91-152

Licensee: Commonwealth Edison Company

Facility Name: Dresden Nuclear Power Station - Unit 3

Enforcement Conference At: Region III Office, Glen Ellyn, Illincis

Enforcement Conference Conducted: November 21, 1991

Inspector: M. A. Kunowski

2ABauf for M.C. Schunden

Approved By:

M. C. Schumácher, Chief Radiological Controls and Chemistry Section

Enforcement Conference Summary

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Enforcement Conference on November 21, 1991 (Report No. 50-249/91041(DRSS)) Areas Discussed: The circumstances surrounding the October 11, 1991, unplanned exposures of two workers during inservice inspection were discussed. Included in the discussion were the accuracy of Inspection Report No. 50-249/91033, in which this event is described in detail, root causes, and the short and long-term corrective actions.

<u>12-6-91</u> Date



PDR

DETAILS

Persons Present at the Enforcement Conference

Commonwealth Edison Company

1.

D. Galle, Vice President - BWR Operations K. Graesser, General Manager, BWRs T. Kovach, Nuclear Licensing Manager C. Schroeder, Station Manager P. Barnes, Compliance Supervisor D. Ambler, Health Physics Supervisor, Dresden F. Rescek, Nuclear Stations Radiation Protection Director D. Saccomando, Compliance Engineer R. Flessner, Administrative Engineer S. Trubatch, Counselor R. Krohn, Radiation Protection Supervisor, Dresden D. Hieggelke, Health Physics Supervisor, LaSalle A. Lewis, Health Physics Supervisor, Quad Cities K. Peterman, Regulatory Assurance Supervisor, Dresden R. Geier, Mechanical Maintenance Master, Dresden M. Horbaczewski, Inservice Inspection/Inservice Testing Group Leader R. Aker, Radiation Protection Assessment Administrator M. Lesniak, Health Physics Supervisor. Corporate W. Morgan, BWR Nuclear Operations K. Yates, Onsite Nuclear Safety Administrator, Dresden

P. Piet, Nuclear Licensing Administrator, Dresden

U. S. Nuclear Regulatory Commission

C. Norelius, Director, Division of Radiation Safety and Safeguards

- R. Greger, Chief, Reactor Programs Branch
- B. Berson, Regional Counsel
- M. Schumacher, Chief, Radiological Controls and Chemistry Section

W. Troskoski, Acting Director, Enforcement and Investigation Coordination Staff

P. Pelke, Enforcement Specialist

R. Lerch, Project Engineer

P. Louden, Radiation Specialist

N. Shah, Radiation Specialist

T. Kozak, Radiation Specialist

R. Paul, Senior Radiation Specialist

Enforcement Conference

2.

An Enforcement Conference was held in the NRC Region III office on November 21, 1991. The purpose of the conference was to discuss the circumstances surrounding the October 11, 1991, unplanned exposure of two workers who were conducting inservice inspection (ISI) on the components of the "B" recirculation pump discharge valve (valve 3-202-5B), a 28" double-disc gate valve. The ISI was conducted as part of a critical path job to remove, repair, and re-install the valve components. An

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inspection was conducted from October 15-25, 1991, and the inspection findings were documented in Inspection Report No. 50-249/91033(DRSS), transmitted to the licensee on November 8, 1991.

The conference agenda included (1) a discussion of the apparent violations, their causes and safety significance, the licensee's immediate and longterm corrective actions, and areas of concern, (2) a determination if there were any escalating or mitigating circumstances, and (3) obtaining further information which would help determine the appropriate enforcement action. The licensee did not identify any inaccuracies or discrepancies in Inspection Report No. 50-249/91033(DRSS).

The licensee described the events which led to the apparent violations, including the root causes, safety significance, and their corrective actions. The licensee indicated that the event was an isolated problem involving a non-routine inspection, with no potential for a regulatory overexposure. One of the long-term corrective actions for this event would include the revision of station procedure DAP 12-09, "ALARA Action Reviews," to ensure that non-routine inspection activities were adequately evaluated and workers assigned to those jobs were adequately briefed prior to the job. Other corrective actions are described in the attached copy of the licensee's handouts from the enforcement conference. These actions will be reviewed during future inspections.

Also at the conference, the licensee acknowledged that the technician who covered the ISI had worked four 14-hour shifts in the four days prior to the event, but stated that there was no indication that fatigue was a factor in his performance. Nonetheless, the licensee added that effective January 1, 1992, the overtime of all radiation protection personnel would be limited in accordance with NRC Generic Letter 82-12. Previously, the overtime of only one radiation protection technician per shift, the "duty" technician, was limited by the licensee in accordance with the generic letter. Based on the change in the overtime policy, Open Item No. 237/88009-01; 249/88011-01, which was opened to review the appropriateness of the previous policy, is closed. The licensee's implementation of the new policy will be reviewed during future inspections.

At the conclusion of the conference, the licensee was informed that they would be notified in the near future of the final enforcement action.

Attachment: As stated

NOVEMBER 21, 1991

DRESDEN ENFORCEMENT CONFERENCE UNPLANNED ADMINISTRATIVE OVEREXPOSURE

AGENDA

INTRODUCTION EVENT CHRONOLOGY EVENT SIGNIFICANCE CONCLUSIONS AND CORRECTIVE ACTIONS SUMMARY

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K. GRAESSER D. AMBLER F. RESCEK

C. SCHROEDER

D. GALLE

INTRODUCTION

The Radiation Work Control Program and the Radiation Work Permit Program are fundamentally sound.

- The root cause of the event is the failure to include a non-routine inspection activity in the pre-job planning process.
- Worker dose could have been reduced had RP personnel been more assertive.
- Actions of the Rad Tech showed that overtime is not an issue.
- The root and contributing causes will be addressed by both specific and general corrective actions.
 - Applicability to other CECo Stations will be addressed.
- Doses could not realistically have exceeded regulatory limits.
 - The event does represent a departure from management expectations regarding performance.

Conclusions are based on the following analysis of the event.





JOB PLANNING

- 1. Nuclear Work Request D90960 (02/90)
 - Initiated to replace the valve stem and nut of the recirculation pump discharge valve, 3-202-5B

2. Radiation Work Permit (RWP) Request (09/03/91)

Maintenance submitted a RWP request form to Rad Protection which included:

- A description of the work to be performed including:
 - Valve disassembly
 - Clean and inspect
 - Replace stem
 - Reassemble valve
 - The expected person hours to be expended for each job task.
 - Rad Protection reviewed the RWP request and performed surveys as required.
- The job exposure estimate, based on the surveys and previous work histories of similar valves, met the criteria for an ALARA Action Review (>1 person-rem).

3. ALARA Action Review (09/09/91)

The extent of pre-planning and reviews is based on the job's estimated collective person-rem expenditure.

- Work Request D90960 met the Action Level 3 criteria (>5 person-rem) requiring:
 - ALARA Action Review Pre-Job Checklist
 - ALARA Committee Review
 - Job Specific RWP with basic rad practices identified

JOB PLANNING (Continued)

Pre-Job Checklist identifies items to be considered in planning

Process Planning Items such as:

- Job procedures
- RP hold points
- Special training requirements
- Job Setup and Preparation Items such as:
 - Work area planned to reduce exposure
 - Low dose staging area
 - Remote monitoring equipment
 - Protective equipment
- Worker Preparation Items such as:
 - Worker selection and worker numbers
 Job rehearsals and mockups
- Additional Exposure Reduction Methods
 - Other items considered based on previous ALARA experience

4. ALARA Committee Review (ACR) (09/10/91)

An ACR was initiated based on the job estimate of 2.88 person-rem and an expectation that the job might exceed 5 person-rem.

The ACR reviews and evaluates jobs estimated to exceed 5 person-rem, ensuring effective dose reduction measures are applied.

The ACR reviewed the dose reduction recommendations and approved the work.

JOB PLANNING (Continued)

5. RWP Package initiated (09/11/91)

A job specific RWP was issued for the removal of the valve operator and stem, and replacement of the stem by complete disassembly of the valve at the bonnet.

Protective actions and special instructions were specified in the RWP to be implemented during performance of the job. This included:

- Use of protective clothing
- Use of respiratory protective equipment
- Application of ALARA
- Use of dosimetry
- Job coverage by RP personnel
- Special RP survey and sampling requirements
- 6. ALARA Action Review (09/20/91)
 - The Pre-Job Checklist was enhanced based on previous Quad Cities experience.

Analysis of Pre-Job Planning

- 1. Despite the limited attention to inspection, the RWP, in conjunction with the pre-job briefing process, was adequate to control radiological aspects of the maintenance job.
- 2. Use of the generic terms inspect or clean, without specific task details, does not allow for effective pre-job planning from an ALARA perspective.
- 3. VT-1 Inspection attributes were not reviewed/evaluated adequately because they were not delineated in the job task analysis.

1. Maintenance Briefing (MEMO 300.12)

- Provides guidance to Maintenance Supervisors on the conduct of a pre-job briefing with assigned crew members. The briefing covers the scope of work to be accomplished that shift. The depth of the briefing is based on the experience of the worker on the job. As applicable, items for discussion include:
 - Personnel safety
 - Scope of work
 - Procedure adherence
 - RWP/ALARA requirements
 - Special tools required and their use
 - QC, NQP or other hold or witness points
 - VERANTSO (self check program)

Analysis of Maintenance Briefing

- 1. The briefing for the valve disassembly was very thorough including drawings and sketches. The timely, accurate completion of the valve's disassembly indicates an effective pre-job briefing for this phase of the job.
- 2. VT-1 Inspection attributes were not covered during the briefing.



JOB BRIEFING (Continued)

2. ALARA Briefing (DAP 12-9)

The pre-job briefing for Work Request D90960 was to include all work groups involved in the job for that shift.

The ALARA Pre-Job Briefing Checklist is to be completed by each Job Supervisor for each work crew on the job. The workers acknowledge attendance by signing the Checklist.

Checklist briefing includes items such as:

- Work area description, job layout, task assignments, routes
- Working dose rates, hot spots, low dose rate areas
- Requirements for protective clothing
- Work practices to minimize time and potential contaminations
- Guidelines for work in high dose rate gradients or localized hot spot areas

Analysis of ALARA Briefing

- 1. The ALARA briefing was based on the pre-job planning performed. It's focus for this shift's briefing was the valve's disassembly. The need for the VT-1 inspection was discussed in general terms.
- 2. Personnel not present Rad Tech #2, ISI engineer, Maintenance General Foreman
 - Rad Tech #2 knew from the beginning of his shift that he was to cover the 5B job on the second part of the shift.

ISI engineer did not know until mid-morning that he would be performing the VT-1 inspection.

Maintenance General Foreman, late in the morning, volunteered to conduct the maintenance aspects of the inspection rather than the Maintenance Supervisor who conducted the pre-job briefing. This was done because the General Foreman had less accumulated exposure.

3. Copies of the "Guidelines for Work in High Dose Rate Gradients or Localized Hot Spot Areas" were not provided to the workers involved in the job. However, the basic information contained in the guideline was conveyed to the workers during the pre-job briefing.

Non-attendance by these individuals is contrary to procedures and unacceptable. However, each worker did participate in field briefings for their specific job scope.



JOB PERFORMANCE

1. Valve Disassembly

Disassembly of the valve went smoothly. Overall completion of this task was efficient and effective from both a maintenance and ALARA perspective.

2. Post Disassembly Surveys

- Adequate surveys were taken based upon completion of the disassembly task.
 - Results of the survey were not immediately documented onto a one-line survey or survey map.

3. Inspection Activities

The General Foreman and ISI engineer arrived at the job site separately.

Dose extensions to 300 mrem were authorized for the two workers.

The General Foreman received a field briefing by the Job Supervisor, including a review of the work area at the video monitor.

Rad Tech #1 provided an ALARA briefing with respect to current radiological conditions, dosimetry placement and advised the worker on areas to stay away from.

The ISI engineer received a field briefing by the Job Supervisor. The specific inspection process was not discussed. The adequacy of the inspection mirror was addressed.

Rad Tech #1 provided an ALARA briefing with respect to current radiological conditions, dosimetry placement and advised the worker on areas to stay away from. The ISI engineer indicated that penetration of the valve body plane would be necessary to perform the inspection. The Rad Tech reiterated to stay out of the valve body. No follow through was made on this point of difference between the two workers.

As the workers entered the work area Rad Tech #2 arrived to relieve Rad Tech #1 on the job. The turnover included a discussion of the inspection, current radiological conditions, and time-keeping for the workers.

Continuous air samples were being taken in the work area.

The seat and disc inspections were carried out by the workers.

JOB PERFORMANCE (Continued)

Analysis of Field Pre-Job Briefings

- 1. The field briefings were not effective in that:
 - The maintenance and ALARA briefings were conducted separately.
 - The details of the inspection process were not fully discussed by any of the workers.
 - Communications between the Rad Tech and ISI engineer were not adequate.
- 2. The Rad Tech did not reach resolution with the ISI engineer when it was indicated that he would break the valve body plane.
- 3. The process for field briefings is not formalized.

Analysis of Inspection Activities

- 1. There was no discussion of the disc separation during any phase of the job planning/briefing. Appropriate surveys were not performed upon disassembly of the valve disc to ensure radiological conditions were as expected.
- 2. The workers were over-zealous with respect to completing their assigned task without evaluating/performing the task in a radiologically conservative manner.
- 3. The RP personnel were not sufficiently aggressive in admonishing the workers to comply with their directions. Neither the Rad Tech nor the ALARA Coordinator stopped the job to better evaluate radiological conditions and dosimetry placement.
- 4. Results of a 1210 air sample indicated 3.3E-8 uc/cc in the tent. This information was not made available to RP personnel in the bullpen. This should have prompted additional RP action.



APPARENT CAUSES/CONTRIBUTORS

Apparent Root Cause

1. The scope of inspection activities, including the separation of the disc for inspection, were not adequately discussed or communicated during the pre-job planning/briefing. Had this been properly considered, subsequent actions would have been appropriate to preclude an overexposure (i.e., dosimetry placement, enhanced worker knowledge, appropriate surveys).

Apparent Contributing Causes

- 1. Inadequate communications between the workers involved in the job including a lack of follow through when differences were identified.
- 2. Failure of workers to implement radiologically conservative work practices.
- 3. Failure to fully implement station procedures.

Other Issues

- 1. Corrective actions associated with the prior administrative over-exposure events in 1989 and 1990 were evaluated. These actions appeared to be appropriate to those events' root causes. However, job planning, and specifically inspection activities, was not fully evaluated as part of these actions.
- 2. Rad Tech #2 did work four 14 hour days preceding the day of the event. Based on a review of the event, and the performance of Rad Tech #2 during that period, it is not apparent that overtime worked by the Rad Techs was a contributor to the event.



EVENT SIGNIFICANCE

OVERVIEW

- 1. Health and safety risks to the workers were minimal.
- 2. Worker exposures could not have exceeded regulatory limits.
- 3. The event is significant in that the administrative dose limits were exceeded by a wide margin.

DOSE EQUIVALENTS RECEIVED BY THE WORKERS

- 1. Dose assessment methodology provided a realistic upper bounding calculation.
- 2. Doses to be credited:

	WB DOSE	SKIN of WB	EXTREMITY
ISI Engineer	1175 mrem	1429 mrəm	1683 mrem
Maintenance Foreman	558 mrem	746 mrem	846 mrem

3. Post-event whole body dose totals:

	<u>4th QTR</u>	YEAR
ISI Engineer	1178	2340
Maintenance Foreman	582	1226



EVENT SIGNIFICANCE (Continued)

CONTROLS/CONDITIONS

- 1. Work scope was limited.
 - Valve body inspection took about 7.5 minutes.
 - Disc inspection took about 12.1 minutes.
- 2. Dose approvals were for 300 mrem.
 - Electronic dosimetry alarm setting was 240 mrem.
- 3. Rad Tech was timekeeping based on 20 mrem/minute at the ankle.
- 4. Measured dose rate gradients for the disc inspection were not large enough for a portion of the whole body to exceed 3 rem before the electronic dosimeter alarmed.
- 5. The workers were knowledgeable of their approved dose of 300 mrem and that the dose alarm was set at 240 mrem accumulated dose.
- 6. Remote video monitoring and communication devices were available.
 - Workers received instructions to back away from the disc.

SUMMARY

- 1. Two individuals received unplanned dose equivalents above administrative limits.
- 2. Given the radiological conditions and scope of work, the controls in place ensured that no worker could receive a dose equivalent in excess of regulatory limits.

CONCLUSIONS

- 1. Regulatory limits were not exceeded and a substantial potential for exceeding these limits was not evident.
- 2. The use of video equipment was a valuable tool in the identification and analysis of this event.
- 3. The managerial and administrative systems of the radiation protection program provide multiple layers of control and are essentially sound. However, we need to enhance the process with respect to evaluation of inspection activities for certain challenging non-routine/high dose jobs [procedure content].
- Contributing to this event were individual failures to follow certain elements of established procedures and conservative radiological work practices [procedure adherence].
- 5. This event represents a departure from management expectations regarding performance [communications/management expectations].



IMMEDIATE ACTIONS COMPLETED

- 1. Stopped work on job; informed upper station management and Corporate Radiation Protection.
- 2. Reviewed similar ongoing jobs (no similar problems found).
- 3. Notified NRC Senior Resident Inspector of the event.
- 4. Prohibited the two workers from entering the RCA pending evaluation.
- 5. Counseled workers.
- 6. Investigation completed by team of station/corporate personnel.
- 7. Lessons Learned Initial Notification report was issued on 10/15/91 to all CECo nuclear stations.
- 8. The Station Manager and Vice President BWR Operations met with station supervisors on 10/24/91 to discuss recent performance problems and management expectations.
- 9. On 10/25/91, station supervisors met with station employees to discuss recent performance problems, including this event, and to convey corporate management's expectations regarding conduct of work.



SPECIFIC CORRECTIVE ACTIONS TO BE TAKEN

- 1. The ALARA Action Review process, DAP 12-09, will be revised by December 31, 1991 to correct deficiencies identified from the analysis of this event including:
 - Evaluation of non-routine inspection activities.
 - Evaluation of the adequacy and detail of the job tasks identified.
 - Methods to ensure that all workers are appropriately briefed.
 - Senior station management will communicate it's expectations to all personnel regarding their responsibilities for radiological safety, minimization of exposure and performance of work in a radiologically conservative manner. This will be included in all station meetings which will be conducted by January 31, 1992. Also, 1992 performance appraisals will include items regarding radiological performance of work.
- 3. During the 1992 Rad Tech Continuing Training, a lessons learned session will be conducted to review the 1991 Unit 3 refuel outage. Specific emphasis will be placed on:
 - Open discussion between the Rad Techs, RP Supervisors and Operations Health Physics personnel regarding outage problems.
 - Barriers encountered during performance of work.
- 4. The station will develop lesson plans addressing conduct of radiologically challenging jobs to be used in departmental continuing training. The lesson plans will be focussed at three levels of radiation workers including: (1) RP Department personnel, (2) supervisors and planners, and (3) other personnel who routinely perform work in radiologically controlled areas. This will be accomplished by March 31, 1992.
- 5. Corporate Radiation Protection will direct the preparation of a Lessons Learned Report based on the evaluation of recent CECo unplanned exposure events. Appropriate recommendations will be made by February 1992 to improve overall processes.
- 6. The station will incorporate application of good rad practices/ALARA into the long term review action plan of planning, scheduling, work control activities.

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CORRECTIVE ACTIONS IN RESPONSE TO RECENT STATION EVENTS

Based on an overall review of recent Dresden events several short and long term actions have been identified. This review and the actions to be taken were reviewed with senior NRC management during the November 12, 1991, NRC/CECo Management Meeting.

SHORT TERM ACTIONS

1. IMPLEMENTATION OF MANAGEMENT EXPECTATIONS

- Focused and frequent senior management presence in the plant
- Daily senior management meeting to review plant observations
- Personnel error interviews by senior managers
- Assistant Superintendent of Operating one-on-one expectations meetings
- Control room overviews
- Shift crew visits to other stations
- Continue Maintenance 2nd line supervisor observations
- Implement corporate oversight meetings

2. COMMUNICATIONS

- Improve shift turnover process
- Continue Operations Improvement Team
- Significant station event communications
- Continue and enhance HLA briefings
 - Further implement 3-Level Down Meetings

3. PROCEDURE ADHERENCE

- Develop clear, concise statement of procedure adherence expectations
- Communicate the procedure adherence expectations to all personnel through multiple methods
- Monitor implementation of adherence policy via the senior management plant observations

4. PROCEDURE QUALITY

- Assign overall procedure manager for the station
 - Implement the new work package expectations guideline

5. ENGINEERING AND LICENSING SUPPORT

- Revise ENC Operability Review Procedure
- Additional resources for technical issues, equipment problems and acceleration of UFSAR rebaseline
 - Increased licensing resources
 - Address Dresden licensing priorities with NRR

CORRECTIVE ACTIONS IN RESPONSE TO RECENT STATION EVENTS (Continued)

LONG TERM ACTIONS

- 1. Dresden Situational Review Team
 - Chartered by VP BWR Operations and new Station Manager to identify issues that negatively impact station performance
 - Output is starting point for Dresden strategies
- 2. Strategies will be developed
 - Improve definition and implementation of the station vision/mission/strategy/expectations
 - Improve the team
 - Communications
 - Empowerment and accountability
 - Performance appraisal
 - Improve task management
 - Prioritization and resource management
 - Planning, scheduling and work control
 - Procedures upgrade
 - Commitment management
 - Resolution of technical issues
 - Other backlogs
- 3. Action plans
 - To be prepared for each strategy
 - To be tracked/monitored like ZMAP
- 4. Ongoing 6 month situational review
 - To refocus
 - Living process self correcting ongoing
- 5. Additional resources are being applied
 - To address the issues
 - To overview improvement.