U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-237/93022(DRSS); 50-249/93022(DRSS)

Dockets No. 50-237; 50-249 License Nos. DPR-19; DPR-25

Licensee: Commonwealth Edison Company
Opus West III
1400 Opus Place
Downers Grove, IL 60515

Facility Name: Dresden Nuclear Generating Station, Units 2 and 3

Meeting At: Dresden Site, Morris, Illinois

Meeting Conducted: July 12, 1993

Inspection At: Dresden Site, Morris, Illinois

Inspection Conducted: July 19 - 29, 1993

Inspector: M. Kunowski — August 13, 1993
M. Kunowski Date

Reviewed By: M. Kunowski for — August 13, 1993
J. McCormick-Barger, Acting Chief Date
Radiological Controls Section 1

Approved By: W. G. Snell — August 13, 1993
W. G. Snell, Acting Chief Date
Reactor Support Programs Branch

Summary

Meeting on July 12, 1993, and Inspection on July 19 - 29, 1993 (Reports No. 50-237/93022(DRSS); 50-249/93022(DRSS))
Areas Discussed and Inspected: The Management Meeting was held to discuss radiological controls performance during the recently completed Unit 2 (cycle 13) refueling outage and was a follow-up to a Management Meeting held in October 1992. The inspection was a routine announced review of completed outage activities and of an ongoing problem with low-level contamination events (Inspection Procedure (IP) 83750). In addition, the inspector reviewed licensee actions on several inspection follow-up items (IFIs) and other previously identified items.

Results: Information discussed at the Management Meeting indicated improvements in radiological controls had been made since the previous Management Meeting (Section 7). Examples of good performance observed during

the inspection included the planning and implementation of in-service inspection (ISI) and control rod drive (CRD) replacement work (Section 6), and the use of experienced ALARA (as-low-as-reasonably-achievable) personnel in the station maintenance and radiation protection (RP) departments and in the Engineering and Nuclear Construction (ENC) group (Section 3). Examples of poor performance included the limited consideration of the exposure impact of an increase in Unit 2 outage scope, strained ALARA staff support because of the expanded outage scope, and poor control of contamination cleanup activities that resulted in numerous low-level contamination events (Sections 5 and 6). Welding and replacement pipe fit-up problems resulted in extra dose for work on the reactor work cleanup (RWCU) system (Section 6). With additional RWCU work planned for both units, management attention to address these problems is necessary. Additional concerns were identified for ineffective corrective actions for a mispositioned drywell temporary ventilation system (Section 5) and relatively high non-outage daily dose (Section 7). One violation was identified for failure to mark contact dose rates on bags of radioactive materials, a procedure violation (Section 8).

DETAILS

1. Persons Contacted

Commonwealth Edison

@D. Ambler, Executive Assistant to the Site Vice-President
@R. Burns, Maintenance and Technical Training Supervisor
*@R. Flahive, Technical Services Superintendent
*J. Grzemski, Safety and Quality Verification (SQV)
*@B. Gurley, NRC Coordinator, Regulatory Assurance
*M. Hayworth, Lead Health Physicist-Operational
*@L. Jordan, Health Physics Services Supervisor
@J. Kotowski, Operations Manager
@T. O'Connor, Maintenance Superintendent
@P. Piet, Licensing Administrator
@P. Quealy, Lead Health Physicist-Technical
@F. Rescek, Radiation Protection Director (Corporate)
*R. Rysner, SQV
*@J. Shields, Regulatory Assurance Supervisor
*@G. Spedl, Plant Manager
@R. Stachniak, Support Operating Engineer
@B. Viehl, Station Engineering and Construction, Modification Supervisor

The inspector also interviewed other licensee and contractor personnel.

Nuclear Regulatory Commission

@W. Axelson, Deputy Director, Division of Radiation Safety and Safeguards
@P. Hiland, Chief, Reactor Projects Section 1B
@B. Jorgensen, Acting Chief, Reactor Support Programs Branch
*@M. Leach, Senior Resident Inspector

@Denotes those individuals present at the meeting on July 12, 1993.
*Denotes those individuals present at the inspection exit meeting on July 29, 1993.

2. Licensee Actions on Previous Inspection Findings (IPs 83750 and 86750)

(Closed) Violation No. 50-237/92007-01(DRSS): An inadequate procedure contributed to a spill during the transfer of resin from the Unit 2 RWCU system to the spent resin tank. RWCU and fuel pool cooling procedures for both Units were revised to include appropriate precautions and limitations for transfers to the spent resin tank. In addition, the licensee addressed a related command and control problem through the issuance of an operations department directive that stated that the radwaste supervisor had authority over spent resin transfers.

(Closed) Open Item No. 50-237/92007-02(DRSS): Review the results of the licensee's evaluation of the continued use of action levels less conservative than those suggested in the NRC Branch Technical Position on waste classification. The evaluation indicated that the less conservative action levels were only occasionally used, but the licensee modified its practice, nonetheless, and appeared to be consistent with the Position.

(Closed) Open Item No. 50-237/91039-02(DRSS): This item tracked licensee action plans developed to address NRC SALP (Systematic Assessment of Licensee Performance) Reports No. 50-237/92001; 50-249/92001. Most of these plans were reviewed by the NRC resident inspector staff and found adequate. Review of the plan on the reduction of high collective and individual doses was assigned to the regional specialist. Further licensee effort in this area will be reviewed as part of the Inspection Follow-up Item discussed in Section 6.

(Open) Inspection Follow-up Item (IFI) No. 50-237/92019-04(DRSS); 50-249/92019-04(DRSS): Review corrective actions for the inadequate ventilation system in the maximum recycle (liquid radwaste processing) building. In letter dated November 25, 1992, the licensee indicated that two new high capacity exhaust fans would be installed by May 30, 1993. In a subsequent letter dated May 28, 1993, this was changed to July 31, 1993, because of outage demands. During the current inspection, the inspector noted that the air in the building was warm, stagnant, and odorous. According to the licensee, problems were encountered during installation of the fans and as of July 31 only one had been installed and was operational. At the exit meeting (Section 9), the licensee stated that a letter to the NRC containing a revised installation date was forthcoming.

Miscellaneous Inspection Issues: Further review by the inspector of licensee information on resin density and chelating agent quantity have resolved earlier questions. In addition, completion of the Unit 1 chemical decontamination waste solidification project and a station decision not to use fossil plant instructors for RP training of fossil plant employees who occasionally work at Dresden obviate further inspection effort in these areas at this time.

No violations of NRC requirements were identified.

3. Personnel Qualification and Training (IP 83750)

The inspector reviewed the qualifications and training of the person recently appointed as the Health Physics Services Supervisor. With a Bachelor of Science degree, nine years experience at Dresden-most of which was in the RP department, and supervisory experience in RP and another station department, this person met the qualifications requirement of Technical Specification (TS) 6.1.D. for this position.

The inspector also noted that the recently completed Unit 2, cycle 13 refueling outage (D2R13) was the first outage with designated ALARA coordinators in the mechanical, electrical, and instrument maintenance departments. The coordinators were experienced contract RP individuals. Although the large influx of work requests throughout the early part of the outage may have limited their time in the plant, they were viewed by the inspector as a positive addition to outage radiological controls. Notable, strong performance was also observed in the ENC ALARA group.

No violations of NRC requirements were identified.

4. Audits and Appraisals (IP 83750)

The inspector reviewed the results of several recent audits including: 1) a routinely scheduled, corporate audit of RP and environmental monitoring; 2) a special, in-depth review by station personnel of radiological work practices believed to be responsible for a significant increase during the outage in "reportable" personal contamination events (PCEs)--those that involve 1000 disintegrations per minute (dpm) or more as detected with a hand-held frisker probe; and 3) a special, in-depth review by corporate personnel of outage exposure performance and the 1993 annual exposure goal. The three audits appeared to be in-depth, performance-based, and conducted by experienced personnel. The results of the two special audits are discussed below. During the inspection, a review of a significant increase in "non-reportable" PCEs (those less than 1000 dpm) was also being conducted by the licensee. This review was initiated mainly because the number of non-reportable PCEs, particularly those involving only the shoes, continued to increase, although the number of reportable PCEs per entry into the radiologically controlled area (RCA) decreased near the end of the outage.

No violations of NRC requirements were identified by the inspector.

5. Contamination Control (IP 83750)

For the outage (including pre-outage preparation work), there were approximately 192 reportable PCEs and at least 2500 non-reportable PCEs. As discussed above, the rate of non-reportable PCEs, particularly involving shoes, remained high when the outage ended.

The audit of the reportable PCE problem identified the major cause as the failure of personnel to promptly identify and correct two leaks of contaminated water in the Unit 2 west LPCI (low pressure coolant injection) room. Other contributory causes identified included poor worker dress-out and frisking practices, improper handling of bagged contaminated material, juxtaposition of ventilation exhaust ducts and contaminated areas, and the lack of centralized control of the three clean-up groups onsite during the outage. These causes also appeared to be applicable to the non-reportable PCE problem; however, implementation of the major corrective actions was deferred until completion of the non-reportable PCE review.

Observations by the regional specialist and the senior resident inspector (SRI) identified additional problems with contamination control. During an inspection of the Unit 3 west LPCI room, the SRI observed a leaky cooling line on the core spray system (Inspection Reports No. 50-237/93020(DRP); 50-249/93020(DRP)). There was no catch basin attached and the contaminated torus water in the line was being allowed to drip to an "uncontaminated" area of the floor. A work request ticket attached to the line indicated that it was identified as leaking four months ago in March 1993. A subsequent meeting between licensee representatives, the specialist, and the SRI indicated that the program for hanging catch basins needed improvement. The SRI also observed that one of his non-reportable PCEs had not been logged by the RP technician (RPT). Further inquiry by RP management indicated that there was inconsistency among the RPTs about recording the non-reportable PCEs and that the number may be higher than recorded.

The inspector also noted apparent different sensitivities in the PCM-1B contamination monitors and a repeat problem with directing flow from the temporary drywell ventilation system through a contaminated area to an uncontaminated area. In a previous inspection (Inspection Reports No. 50-237/91031(DRP); 50-249/91034(DRP)), the inspector identified the improper set-up of the ventilation system for a Unit 3 outage. On February 12, 1993, the licensee identified a similar error with the system set up for outage D2R13. In another previous inspection (Inspection Reports No. 50-237/93007(DRSS); 50-249/93007(DRSS)), the inspector noted the hurried processing of contractor personnel through the protective clothing exercise in Nuclear General Employee Training; many of the reportable PCEs during the outage were attributed to poor work practices and use of protective clothing.

Although there was minimal health and safety significance to the reportable PCE problem and no health and safety significance to the non-reportable PCE problem at the time of the inspection, they represented a dramatic decline in the licensee's ability to control contamination and was, as such, a weakness. A concerted effort by the licensee to address the problems identified by the inspector and the SRI, and the problems identified by the licensee in the two special reviews of PCEs was warranted. Licensee actions in this area will be reviewed during future inspections (Inspection Follow-up Item (IFI) No. 50-237/93022-01(DRSS); 50-249/93022-01(DRSS)).

No violations of NRC requirements were identified; however, a weakness in contamination control was identified.

6. Outage Exposure Control (IP 83750)

The Unit 2 refueling outage ran from January 17 to May 25, 1993, and resulted in approximately 1245 person-rem (12.45 person-Sievert) of dose. It exceeded the original scheduled duration of 91 days and the dose goal of 600 person-rem (6 person-Sievert) because of emergent work, the addition of numerous work requests to resolve several longstanding equipment problems, and the conducting of first-time preventive

maintenance. In view of the outage dose total, the station's 1993 annual goal of 850 person-rem (8.5 person-Sievert) was eventually revised to 1725 person-rem (17.25 person-Sievert).

Examples of outage jobs that were well planned and implemented included: 1) ISI, where 50 person-rem (0.5 person-Sievert) was accrued compared to an estimate of 93 person-rem (0.93 person-Sievert), and 2) CRD removal and replacement, where new equipment and good mockup training resulted in a dose of 25 person-rem (0.25 person-Sievert) compared to an estimate of 47.7 person-rem (0.477 person-Sievert). Other examples of good exposure control efforts included the extensive use of lead shielding and a drywell model, chemical decontamination of the RWCU and reactor recirculation systems, a controlled or "soft" shutdown, reactor pressure vessel nozzle flushing, power brushing, replacement of 107 test port hollow plugs on the hydraulic control units with specially made solid plugs (for shielding and to eliminate a crud trap), and the use of wear-resistant, chromium-impregnated Graphitar seals in the CRDs.

In spite of these successes, the addition of numerous work requests near and shortly after the start of the outage resulted in deficiencies in job planning and coordination of a large work force, and kept many of the ALARA personnel at their desks processing paperwork instead of monitoring jobs in the plant. Examples of outage jobs with planning and implementation problems included: 1) the replacement of two sections of RWCU pipe, where welding problems and replacement pipe that was too short and was misaligned resulted in 66.8 person-rem (0.668 person-Sievert) compared to the pre-job estimate of 22.9 person-rem (0.229 person-Sievert); 2) the inspection and repair of the 2-1001-1A and -1B valves on the shutdown cooling system, where contamination control tent problems and poor audio-visual equipment resulted in 50 person-rem (0.5 person-Sievert) compared to the pre-job estimate of 13 person-rem (0.13 person-Sievert); and 3) the reactor disassembly/reassembly, where after good performance on the disassembly, equipment problems for the reassembly and schedule delays of the head re-set because of other priority work resulted in 44 person-rem (0.44 person-Sievert) compared to the pre-job estimate of 23.4 person-rem (0.234 person-Sievert).

As indicated in Section 3, a review of the station's radiation exposure performance was conducted (March 22-26, 1993) by corporate personnel and one person from the LaSalle County Station ALARA group. The review documented several examples of good exposure control performance (several were discussed above), but also identified several problems including a lack of a detailed breakdown of outage work relative to department goals (except ENC), failure to evaluate the exposure impact of the approximately 200 backlogged work requests added late to the outage, failure to modify the outage and 1993 exposure goals to reflect the addition of significant work to the outage, and the lack of in-progress job oversight by ALARA personnel. These and other problems identified by the review team, issues previously identified by the NRC concerning the balancing of area work loads and coordinating work support activities (Inspection Reports No. 50-237/93007(DRSS); 50-

249/93007(DRSS)), and the work implementation problems noted in the previous paragraph, indicated a weakness in exposure control. While some corrective actions were evident during the current inspection as the licensee prepared for the upcoming Unit 3 refueling outage (D3R13), further actions are necessary. This area will be reviewed during future inspections (IFI No. 50-237/93022-02(DRSS); 50-249/93022-02(DRSS)).

No violations of NRC requirements were identified; however, a weakness in outage exposure control was identified.

7. Management Meeting

On July 12, 1993, the NRC and licensee personnel denoted in Section 1 met at Dresden to discuss the status of radiological controls at the station. The licensee's handout from the meeting is attached to this report. The meeting was a follow-up to a similar meeting held on October 15, 1992 (Inspection Reports No. 50-237/92029(DRSS); 50-249/92029(DRSS)) and discussions indicated that radiological controls had improved since the previous meeting. In addition, the new station and RP department management was introduced, D2R13 outage exposure and contamination control performance was discussed, and the expectation to incur several additional high dose outages to improve equipment reliability was stated. During a tour of the plant conducted after the meeting, NRC personnel raised a concern over the 1-1.5 person-rem (0.01-0.015 person-Sievert) accumulated per non-outage day. Although the licensee had active hydrolazing and lead shielding programs, additional effort to reduce this exposure appeared necessary. For example, daily exposure of work groups and individuals could be reviewed to identify activities and individuals from which incremental dose savings could be obtained. Another area for improvement was noted by the inspector in the radwaste storage bay area where on two occasions, poor placement of water shields and radwaste containers with high dose rates resulted in unnecessarily high dose rates in the general area (see also Section 8). The licensee's efforts on reducing non-outage daily dose will be reviewed during future inspections.

No violations of NRC requirements were identified.

8. In-plant Observations and Independent Dose Rate Measurements (IP 83750)

In addition to the concern with the general area dose rate in the radwaste barrelling area, the inspector observed on July 19 a large number of bags of radwaste in Bay 7 that were not marked or tagged to indicate the contact dose rate. One bag on which the inspector tentatively measured 0.22 rem/hour (2.2 milliSievert/hour) was subsequently surveyed by the licensee and found to have a maximum contact reading of 700 millirem/hour (7 milliSievert/hour). The failure to mark, tag, or label the bags with the contact dose rate reading is contrary to procedure DRP 1160-03, Revision 5, "RADIOLOGICAL SIGNS, LABELS, SIGNALS AND CONTROLS," and is a violation of Technical Specification 6.11.1 that requires that procedures for personnel radiation protection be adhered to (Violation No. 50-237/93022-03(DRSS);

50-249/93022-03(DRSS)). This is the third example this year of inadequate labeling of high dose rate containers. Previously, high dose rates were found on unlabeled bags of dirty protective clothing (Inspection Reports No. 50-237/93007(DRSS); 50-249/93007(DRSS)) and on a drum of compacted bags of radwaste (identified by the licensee on March 1).

One violation of NRC requirements was identified.

9. Exit Meeting

The scope and tentative findings of the inspection were reviewed with licensee representatives (Section 1) at the conclusion of the inspection on July 29, 1993. The licensee did not identify any likely inspection report material as proprietary. The following matters were specifically discussed by the inspector:

- actions on previous inspection findings (Section 2),
- outage exposure control successes and the weakness (Section 6),
- contamination control problems (Section 5),
- the delay in correcting the maximum recycle building ventilation exhaust system problems (Section 2), and
- the violation (Section 8).

Attachment: Licensee Handout

Dresden Station

NRC
RADIATION PROTECTION
MANAGEMENT MEETING

July 12, 1993

Contents

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Gary Spedl
Station Manager

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ISSUES AFFECTING RP PERFORMANCE

Roger Flahive
Technical Superintendent

- Station Collective Radiation Exposure
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  - Top 50 Technical Issues
  - Improving Radiation Protection Involvement In The Station Planning Process

- Station RP Challenges
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  - Contamination Control
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STATION RADIATION EXPOSURE OVERVIEW

Roger Flahive
Technical Superintendent

- Original Goal
- Current Status
- Revised Goal
- Future

MAINTENANCE

Timothy O'Connor
Maintenance Superintendent

Management has taken aggressive steps during the refuel and forced outages to assure the quality of maintenance activities with the expectation of long term improvement in equipment reliability and operability

- **Outage Scope**

  - **Planning for 1993 Unit 2 Outage**
  - **Original Scope**
  - **Final Scope**
  - **Forced Outage - Unit 3**

- **Strong management support for resolution of longstanding equipment problems**

  - **Tri-shielded cable installed in drywell on SRM and IRM detectors**

  - **Significant motor overhauls**
    - ✓ 2A Rx Recirc
    - ✓ 2B FW
    - ✓ 2C LPCI
    - ✓ 2D LPCI
    - ✓ 2B CS
    - ✓ 2A CB
    - ✓ 2B CB
    - ✓ 2A SDC
    - ✓ 2C CB
    - ✓ 2D CB
    - ✓ D LIFT PUMP
    - ✓ 2A EHC
    - ✓ 2B EHC
    - ✓ 2A RWCU
    - ✓ 2A SBLC

  - **70 drives replaced with new seals by GE (Partnerships recommendations)**
    - ✓ 12 drives were original since installation

MAINTENANCE (cont'd)

- **Strong management support for resolution of longstanding equipment problems (cont'd)**

  - **MOVs**
    - ✓ 61 safety related MOVs overhauled
    - ✓ 65 BOP MOVs overhauled
    - ✓ 3 dp tests performed
    - ✓ 39 design changes performed to upgrade MOVs
    - ✓ On schedule to meet GL 89-10 commitments

  - **Management of the Unit 2 refuel outage significantly improved over previous outages**
    - ✓ High percentage of packages, parts, RWP's, and ALARA reviews at the working department prior to the start of the outage
    - ✓ Contingency plans were in place
      - Local leak rate testing
      - Primary containment bellows
      - RWCU weld inspections

  - **Used outside consultants to increase our specific understanding of equipment**
    - ✓ Assure proper implementation of root cause corrective actions
    - ✓ Do the job right!

  - **The P2 computerized scheduling tool was effectively used by all departments**
    - ✓ Tracking of 10,000 activities during D2R13

MAINTENANCE (cont'd)

- Strong management support for resolution of longstanding equipment problems (cont'd)
  - **Adequacy of post maintenance testing (PMT) improved**
    - ✓ Work Analyst Guide created
    - ✓ PMT matrix created
    - ✓ PMT data sheets enhanced
    - ✓ PMT tracking system created
      - All testing performed during one equipment run
      - Equipment operability assured prior to declaring equipment operable

- Progress has been made in enhancing safety and performance
  - **Effective root cause analyses were performed**
    - ✓ Reactor recirc pump seals
    - ✓ SBLC pump/motor vibration
    - ✓ Stator water cooling pump vibration
    - ✓ Condensate/booster system
    - ✓ LPCI pump vibration
    - ✓ Reactor feed pumps
    - ✓ CCSW system
    - ✓ Reactor water cleanup aux pump vibration

MAINTENANCE (cont'd)

- Areas for improvement have been identified, and steps are being taken to address them

  - **Training needs have been identified**
    - ✓ Vertical pump alignment

- Challenges to address
  - ✓ Selection and use of tools in a manner to minimize equipment damage
  - ✓ Radiological practices
  - ✓ Administrative controls
    - Out-of-service program adherence
  - ✓ Improve efficiencies with the workers by reducing barriers

- Procedural improvements have been identified
  - ✓ How to recognize problems during component disassembly/assembly
  - ✓ Tool techniques
  - ✓ Team formed to implement changes

MAINTENANCE(cont'd)

- **Areas for improvement have been identified, and steps are being taken to address them (cont'd)**

  - **Major improvements to vendor manuals possible**
    - ✓ Correct critical dimensions
    - ✓ Coupling sizes/configurations
    - ✓ Disassembly/reassembly clarifications
    - ✓ Vendor or modification enhancement
    - ✓ Elimination of non-Dresden specific sections

  - **Videotaping of major equipment repairs was performed**
    - ✓ Tool technique
    - ✓ Problems noted (what to look for)
    - ✓ Visual aids to support classroom sessions
    - ✓ Mock-ups for vertical pump alignment

EXPOSURE SUCCESSES

Lois Jordan
Health Physics Supervisor

- Lead Shielding

  - Approximately 50,000 pounds of lead shielding were used in drywell

  - Person-rem savings for the temporary shielding installed in the drywell was 430 person-rem.
    - General area dose savings was 120 person-rem
    - Job specific dose savings of 310 person-rem

  - General Area dose rate reduction of 33%

  - Good Tech Staff support for permit analysis

  - Good Laborer support for shielding installation

  - The use of "Lead PC" (computer software) for the Reactor Water Cleanup (RWCU) system to increase the allowable weight limit of the system.

  - Lead shielding was used as an effective ALARA tool in several other areas of the plant during the D2R13 outage. These areas included:
    - The use of lead in the RWCU pump room contributed to a calculated dose savings of just over 40 person-rem
    - In the RWCU pipeway a calculated dose savings of almost 44 person-rem achieved using lead shielding
    - In the Shut Down Cooling pump room over 7 person-rem saved
    - Dose savings of almost 34 person-rem in Isolation Condenser #2 Valve Room
    - Almost 19 person-rem saved in the Isolation Condenser #3 Valve Room

EXPOSURE SUCCESSES (cont'd)

- Chemical Decontamination

  - Recirculation system chemical decontamination resulted in a drywell decon factor of four
    - Estimated dose savings of 250 person-rem

  - Chemical decontamination of the RWCU obtained an average decon factor of two to three
    - Estimated dose savings of 120 person-rem

- In-Vessel Nozzle Flushing

  - Reductions in contact dose rates and general area dose rate (dose reduction of 2 to 5)

  - Expended 0.343 Person-rem for flushing activities

  - Dose savings resulting from the flushing estimated to be 17.2 person-rem

  - Average decontamination factor of twelve for the instrument nozzles

  - General area dose rates were reduced by a factor of 2.7 for the N-4 nozzles.

EXPOSURE SUCCESSES (cont'd)

- Source Term Reduction

  - There were several successes related to the source term reduction program during D2R13. Among these successes were:

    - Completion of 31 hydrolazes related to outage work
      - An average decon factor of ten from completed hydrolazes

    - 107 of 177 P4 plug change outs completed
      - An average dose reduction factor of twenty was realized from the P4 plug change outs

- ALARA Camera Usage

  - The use of ALARA cameras to monitor specific areas for specific jobs proved to be extremely effective

    - Camera usage was highly effective in minimizing the person-rem expenditure on supervisory and support personnel

    - The combination of an intercom system and cameras to enhance communications between the work area and supervisory personnel in a low dose area greatly enhanced dose savings as well

EXPOSURE SUCCESSES (cont'd)

- Contamination Control

  - Use of "Cool Suits" to help reduce heat stress while still providing waterproof protection.

  - Reactor reassembly put back together "clean" during D2R12, therefore deconning of the cavity reactor components was not necessary

  - Use of large HEPA units

  - Encapsulation to fix contamination

  - Glove bags for hydrolazing

- CRD Pull/Put

  - A total of 70 drives were replaced this outage.

  - The dose/drive for this evolution was 428 mRem/drive (This figure encompasses pull/put as well as removal and installation of interferences and shielding)
    - Previous Commonwealth Edison average 1.1 Rem/drive

EXPOSURE SUCCESSES (cont'd)

- CRD Pull/Put (cont'd)

  - No CRDs failed the friction testing.

  - NES CRD removal tool was purchased and used with great success

  - NES personnel extremely helpful

  - Communication problems eliminated by using a telephone-wire driven system

  - All shoot out steel removed; ALARA shields installed on drives not removed

- Soft Shutdown

  - The Soft Shutdown was effective in reducing the Co-60 released to reactor coolant

  - Peak reactor coolant Co-60 activity reduced by a factor of 6.46 when compared to the normal shutdown on 8-2-92. The Co-60 activity increased by a factor of 373 for the normal shutdown on 8-2, while during soft shutdown the activity increased by a factor of 57.3

  - Total Co-60 concentration released to reactor coolant at peak decreased by 85% when compared to the normal shutdown on 8-2-92. The maximum Co-60 concentration on 8-2 was 9.7E-2 uCi/ml, while during soft shutdown the maximum concentration of Co-60 was 1.5E-2 uCi/ml

  - Total shutdown time attributed to soft shutdown was 8 hours

EXPOSURE SUCCESSES (cont'd)

- Pre-Job Briefings

  - The extensive use of pre-job briefings during the outage were an effective and very informative ALARA tool.

  - During the pre-job briefing the following issues were covered:

    - Location of work to be performed
    - Radiological conditions at the work site
    - RP requirements such as engineering controls, clothing, shielding
    - Understanding of dosimetry alarms
    - Work practices to minimize potential contamination
    - DAW minimization

  - The use of the drywell model and surrogate tour system helped to enhance the effectiveness of the pre-job briefings.

  - Photographs, P&IDs and an opportunity for workers to ask questions to familiarize themselves with the work and the work area proved to be very beneficial.

EXPOSURE SUCCESSES (cont'd)

- ISI Activities
  - Several controls were implemented in order to expedite work and reduce exposure for the tasks

    - The removal of scaffolding was not performed until the shielding was installed to reduce the additional exposure of reinstalling scaffolding.

    - A detailed schedule was developed which encompassed scaffold requirements, shielding installation, insulation removal and installation, nozzle hydrolazing, work area congestion

    - Each inspection point was assigned an inspection number

    - Each point was marked with a neon pink tag and also marked on the drywell model. The model proved to be extremely beneficial for ISI work by answering worker questions about point locations, hot-spots, and interferences that might be encountered.

    - Dedicated personnel were assigned to this project for completion of all activities. This provided consistent surveys of the area by the R.P. personnel, and continuity of the work flow

    - Daily team meeting were held to establish priorities, confirm support needed and identify problems which may exist

    - Shiftly meetings were also held to inform the work crews of conditions on a point by point basis

    - These activities were completed with a dose expenditure of 50 person-rem with an original estimate of 98 person-rem

EXPOSURE SUCCESSES (cont'd)

- SRM-24 Removal

  - Duane Arnold involvement

  - Shielded bucket method quick, safe, and effective. Good method for hot or highly activated detectors (Nuclear Network)

  - Total dose for removal of both the IRM-16 and the SRM-24 was 507 mREM

  - Contact dose rates on SRM-24 disposal spool were 40R/hr. This was consistent with GE's calculations

  - Lessons learned from pulling the "cold" IRM-16 successfully incorporated into the "hot" SRM-24 removal

  - "Tiger Team" concept was highly effective in promoting teamwork on high risk or high attention jobs

  - Duane Arnold interest in forming a partnership and trade information on a regular basis

  - No Administrative Over-Exposures

  - Contaminations Controls

EXPOSURE SUCCESSES (cont'd)

- Spent Resin Tank Room Ventilation Mod

  - Reverse air flow of spent resin tank room from positive to negative

  - Estimated 4.800 person-rem
    Actual .949 person-rem

  - Design was reviewed and modified so that all work could be performed from the outside of the room

  - Vent duct and hangers were pre-fabricated in the shop

  - Penetration plate was pre-fabricated and pre-assembled prior to installation

  - Existing scaffolding in the area was modified rather than new scaffolding built

  - Usage of temporary lead shielding

EXPOSURE SUCCESSES (cont'd)

- Waste Collector System Mod (Radwaste Upgrade Project) - in Progress

  - Demolition and replacement of Waste Collector System Piping, Valves and Pumps

  - Estimated 13.221 person-rem
    Actual 3.259 person-rem
    40% of job completed using 25% of estimate dose.

  - Utilization of remote cutter

  - Utilization of temporary lead shielding

  - Hydrolyzing of Waste Collector Tank and flushing of hot spots to reduce working dose rates

  - Established a dedicated work crew using most experienced workers

  - Pre-fabrication of materials in a low dose area

EXPOSURE SUCCESSES (cont'd)

- Unit 3 Fuel Pool Cleanup

  - Cut and shipped 56 control rod blades

  - Estimated 4.856 person-rem
    Actual 4.284 person-rem

  - Established a dedicated work crew

  - Underwater hydrolazing

  - Weekly inter-departmental meetings

  - Efficiency in blade cutting and loading resulted in 22 blades loaded into one liner (normal loading is 13-18) thus eliminating the need for a further shipment

LESSONS LEARNED DURING D2R13

Patrick Quealy
Operational Health Physicist

- ALARA and RP Actions

  - Lead Shielding
    - Detailed mock-up training
    - Evaluate increased use of washable sleeves
    - Evaluate enhancements to lead installation training

  - Chemical Decontamination
    - Investigate the need to restrict work above decontamination hoses
    - Look into restricting use of PCMs near decontamination equipment

  - Nozzle Flushing Lance Redesign

  - Source Term Reduction
    - Evaluate methods to enhance communication between ALARA and crew
    - Investigate need to define and enhance communication between departments involved with Source Term Reduction

  - ALARA Cameras
    - Evaluate benefits to use of voice activated communications systems to enhance camera usage
    - Evaluate need for camera on CRD platform
    - Pre-installation of sleeving on cameras

LESSONS LEARNED DURING D2R13 (cont'd)

- Contamination Control
  - Evaluate expansion of drywell bullpen
  - Investigate the possible methods to reduce shoe contaminations
  - Investigate the concept of a "Decon Team"
  - Evaluate types of PC clothing
    - -- Nylon Raingear
    - -- "Cool Suits"
    - -- Nylon patched clothing

- HEPA Ventilation
  - Evaluate feasibility of drywell "octopus"
  - Enhance HEPA program

Major Events

- ISI Inspections
  - Assess further benefit to "dedicated" project personnel

- RVWLIS Modification
  - Look into enhancements in temporary ventilation process

- IRM/SRM Cable Replacement
  - Evaluate crew sizes
  - Investigate benefit from sealing room

LESSONS LEARNED DURING D2R13 (cont'd)

- Valve Activities

  - Investigate enhancements to tent/containment program

  - Evaluate potential new valve decontamination methods:
    -- Encapsulation
    -- Bead blasting
    -- Hydrolazing

- Communication to better capture the outage

  - Extensive Use of CC:Mail

  - Outage Diary

EXPOSURE CHALLENGES

Lois Jordan
Health Physics Supervisor

- Source Term Reduction

  - Successes
  - Tip of the Ice Berg
  - Remaining Issues
    - line rerouting
    - line elimination
    - expanded chemical decontamination issues
    - effective trending, identification, and resolution
    - cobalt reduction
    - industry initiatives

- Estimating Strategies

  - Goal
  - Team Concept
  - Current: Establish D3R13 Outage Work Scope
  - Developed Strategies/Action Plans
  - Establishing an Exposure Budget
  - "Building in" the Engineering Control Costs to Achieve ALARA
  - Work the Schedule

EXPOSURE CHALLENGES (cont'd)

- Work Control/Scheduling Process

  - Goal
  - Team Concept
  - Decision Making Process
  - Establishing Engineering Controls

STATION RP CHALLENGES

Lois Jordan
Health Physics Supervisor

- Contamination Control

  - Percentage of plant contaminated

  - Personnel contamination events

    - trend
    - detriments
    - root cause evaluation
      - ✓ potential areas for review
      - ✓ interim actions

- Radioactive Materials Control

  - Self identified need to improve the program

  - Key elements

  - Expected results

STATION RP CHALLENGES

Rich Burns
Maintenance/Technical Training Supervisor

- Radiation Worker Training
  - Topics
  - Targeted Groups
  - Goal

PLANT TOUR

Lois Jordan/Roger Flahive/Timothy O'Connor

QUESTIONS/ANSWERS/CLOSING REMARKS

Gary Spedl/Lois Jordan