

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-374/92004(DRSS)

Docket No. 50-374

License No. NPF-18

Enforcement Action No. 92-003

Licensee: Commonwealth Edison Company

Facility Name: LaSalle County Station, Units 2

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

Enforcement Conference Conducted: January 21, 1992

Inspector: *P. L. Loudon*
P. L. Loudon

1/23/92
Date

Approved By: *William Snell*
William Snell, Chief
Radiological Controls Section

1/23/92
Date

Enforcement Conference Summary

Enforcement Conference on January 21, 1992 (Report No. 50-374/92004(DRSS))

Areas Discussed: The circumstances surrounding the December 17, 1991, unplanned exposures of two workers while hydrolazing the 2B Fuel Pool Cooling Heat Exchanger. Additionally, the apparent repetitive nature of radiological events with similar root causes identified in previous inspection reports was also discussed.

DETAILS

1. Persons Present at the Enforcement Conference

Commonwealth Edison Company

K. Graesser, General Manager, BWR Operations
T. Kovach, Manager, Nuclear Licensing
G. Diederich, Station Manager, LaSalle
W. Huntington, Technical Superintendent, LaSalle
W. Betourne, Nuclear Quality Programs Superintendent, LaSalle
F. Rescek, Director, Nuclear Stations Radiation Protection
D. Hieggelke, Health Physics Supervisor, LaSalle
D. Ambler, Health Physics Supervisor, Dresden
E. Roche, Health Physics Supervisor, Braidwood
A. Lewis, Health Physics Supervisor, Quad Cities
P. Barnes, Compliance Supervisor, Nuclear Licensing
P. Piet, Administrator, Nuclear Licensing
S. Trubatch, Counselor
J. Lockwood, Regulatory Assurance Supervisor, LaSalle
R. Flessner, Administrative Engineer, PWR Operations
B. Hanson, Nuclear Licensing
P. Horvat, Radiation Protection Foreman, Dresden
M. Lesniak, Health Physics Supervisor, Corporate
W. Luett, Operational Lead Health Physicist, LaSalle
M. Marchetti, ALARA Radiation Protection, LaSalle
J. Querciagrossa, Radiation Protection Technician
R. Ragan, Administrative Engineer, BWR Operations
R. Raguse, Health Physicist, Corporate
J. Rodriguez, Radiation Protection Technician, LaSalle
D. Saccomando, Compliance Engineer, Nuclear Licensing
C. Snyder, Regulatory Assurance
J. Steinmetz, Superintendent, Construction, LaSalle
M. Willoughby, Safety Assessment

U. S. Nuclear Regulatory Commission

C. Norelius, Director, Division of Radiation Safety and Safeguards
R. Greger, Chief, Reactor Programs Branch
W. Snell, Chief, Radiological Controls Section
M. Schumacher, Chief, Radiological Controls and Chemistry Section
C. Pederson, Director, Enforcement and Investigation Coordination Staff
C. Gill, Senior Reactor Programs Specialist
M. Kunowski, Senior Radiation Specialist
R. Paul, Senior Radiation Specialist
T. Kozak, Radiation Specialist
D. Nelson, Radiation Specialist
S. Orth, Radiation Specialist
N. Shah, Radiation Specialist
S. Wagner, Radiation Specialist

Illinois Department of Nuclear Safety

J. Roman, Resident Engineer, LaSalle

2. Enforcement Conference

An Enforcement Conference was held at the Region III Office on January 21, 1992. The purpose of the conference was to discuss the circumstances surrounding the December 17, 1991, unplanned administrative overexposure of two workers during hydrolazing activities on the 2B Fuel Pool Cooling Heat Exchanger. Inspection findings are documented in Inspection Report Nos 50-373/91028; 50-374/91029(DRSS), transmitted to the licensee on January 6, 1992.

The licensee described the event which led to the violation, including the root causes, safety significance, and their planned corrective actions. In addition the licensee discussed other previously documented events which appeared to contain similar root causes. The licensee indicated that no potential for a regulatory overexposure existed during the event. Planned corrective actions included a management letter emphasizing radiological performance, a review of training for radiation protection technicians, a re-emphasis of self checking practices, and a review of methods to improve hold points for work packages. The licensee also indicated that the prior radiological occurrences discussed were not similar to the December 17, 1991, event and corrective actions taken in response to those events appeared to be adequate.

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: Licensee Handout from Enforcement Conference

JANUARY 21, 1992

LASALLE ENFORCEMENT CONFERENCE
UNPLANNED ADMINISTRATIVE OVEREXPOSURE

AGENDA

INTRODUCTION	K. GRAESSER
12/17/91 EXPOSURE EVENT	D. HIEGGELKE
OTHER RADIOLOGICAL ISSUES	D. HIEGGELKE
- RADIATION OCCURRENCE REPORTS	
- LOW LEVEL INTAKES	
- ADMINISTRATIVE OVEREXPOSURES	
RP/ALARA PROGRAM	G. DIEDERICH
CORPORATE INITIATIVES	F. RESCEK
CLOSING COMMENTS	G. DIEDERICH

RADIATION OCCURRENCE REPORT (ROR) PROGRAM BACKGROUND

- The ROR program documents the process for identification, investigation and correction of various radiological occurrences as they arise. The threshold for investigation is far below regulatory limits. Addressing minor issues and deficiencies helps to minimize the likelihood of subsequent events.
- The ROR Program is a key part of the overall Radiological Safety Program and supports both radiation safety improvement and ALARA.
- The overall program is working/improving:
 - No regulatory overexposures
 - Significantly reduced exposures both individual/collective
 - Significantly reduced personnel contaminations
- The ROR program is becoming more effective with experience. We are still finding opportunities to improve our performance and successfully eliminating recurrence for same root causes.
- ROR Lessons Learned indicate that events do not collectively indicate significant lack of attention or carelessness to licensed responsibilities.

FUEL POOL HEAT EXCHANGER CLEANING

Scope - Disassembly and hydrolazing of 2B Fuel Pool Heat Exchanger. The vertical heat exchanger is located between the 807 and 843 elevations. Access to the upper endbell is via the Refuel Floor (843 elevation). Pre-job surveys and staging (i.e. tent installation) was completed between 12/9-13/91. The method of staging the job had been changed to use a ladder instead of scaffolding in an effort to reduce total job dose.

12/16/91 DAYSHIFT

A folding ladder was installed on top of the endbell. RPT survey of the top of the endbell indicated 40 mR/hr with no contamination around (NCF).

12/16/91 AFTERNOON SHIFT

The pre-job briefing was held with the afternoon mechanics and RPT to discuss removal of the top and bottom endbells. It was believed that the folding ladder would be adequate for access to the heat exchanger.

The endbell cover was pulled and surveyed (NCF). Survey results of the 843 elevation and the floor opening to the heat exchanger pit indicated that conditions had not changed. The RPT was unable to gain access to the top of the heat exchanger using the ladder, therefore this area was not surveyed.

The RPT turned over to the night shift supervisor the need for a survey.

12/17/91 NIGHT SHIFT

The midnight RP Supervisor activated the RWP to support a visual inspection of the 807 level. He verbally turned over the need to survey the top of the tube sheet to the dayshift RP Supervisor. The dayshift supervisor was not actively listening. The need for a survey was not logged by the midnight shift supervisor.

FUEL POOL HEAT EXCHANGER CLEANING (Continued)

12/17/91 DAYSHIFT

No survey of the tube sheet area was performed.

The dayshift mechanic hydrolazed the heat exchanger by standing on the tube sheet. After approximately one hour he exited the area with 54 mrem by ED. His dosimetry had been placed at his waist.

12/17/91 AFTERNOON SHIFT

The dayshift maintenance supervisor and the mechanic turned over to the afternoon crew. The status of the job and the dose received was discussed.

The afternoon shift mechanic started to hydrolaze. After realizing that the chirp rate increased when he bent over, he repositioned his dosimetry from his chest to below his knee. He contacted the mechanical support person who called RP.

The mechanical support person called the RP desk and informed the RPT of the increased chirp rate. He was instructed to locate the RPT on the refuel floor for assistance. The desk RPT notified the RP Supervisor of the discussion. The RP Supervisor dispatched a RPT to the job site to stop work.

The mechanical support person presented the situation to the refuel floor RPT in a general sense rather than conveying specifics of the occurrence in the heat exchanger. Based on this, the RPT concurred that the dosimetry should be positioned below the knee.

The worker exited the area based on his ED accumulated dose alarm sounding prior to the RPT arriving to stop work.

The dayshift and afternoon shift mechanics received whole body dose equivalents of no more than 270 mrem and 317 mrem respectively, exceeding their administrative 100 mrem limit.

FUEL POOL HEAT EXCHANGER CLEANING (Continued)

CAUSAL ANALYSIS

- + Workers reviewed and signed RWP; pre-job briefings were held
- + Work was performed in accordance with appropriate instructions
- + The mechanic recognized a change in radiological conditions
- + The mechanic exited area on receiving ED dose accumulation alarm
- + RP supervisor/desk RPT displayed questioning attitude and the supervisor took initiative to stop the job
- The mechanic relocated his dosimetry rather than exiting
- The refuel floor RPT lacked a questioning attitude when presented with the general comment on dosimetry placement
- RP Supervisor turnover was not effective
- Tube sheet survey was not performed

APPARENT ROOT CAUSE

- The midnight to dayshift RP Supervisor turnover was not adequate:
 - The dayshift 12/17/91 RP Supervisor was not actively listening.
 - The need for a tube sheet survey was not documented.

SAFETY CONSEQUENCES

- Health and safety risks to workers were minimal.
- Workers exposures did not challenge regulatory limits.
 - Worker responded to ED accumulated dose alarm
 - ED dose rate alarm feature would respond to higher dose rate fields

FUEL POOL HEAT EXCHANGER CLEANING (Continued)

CORRECTIVE ACTIONS TO ADDRESS ROOT CAUSE

- The RP personnel involved were counselled by the RP department head with respect to their performance and management's expectations. Special emphasis was placed on effective shift turnovers.
- The LaSalle Radiation Protection Department will review current practices such as turnovers, log keeping, documentation of field surveys and use of written controls on radiation work permits to identify areas for improvement. This review will be completed by March 1, 1992.
- The mechanic was counselled by the Master Mechanic with respect to moving his dosimetry.

OTHER CORRECTIVE ACTIONS

- The LaSalle Station Manager has issued a letter to all badged personnel emphasizing the radiological performance expectations, especially self checking practices (i.e. dosimetry placement, use and response).
- The LaSalle Training Department will review current RPT training to determine whether radiological aspects of work involving radioactive/non-radioactive system interfaces (i.e. heat exchanger work) can be enhanced. This review will be completed by April 1, 1992.
- The LaSalle Radiation Protection Department will reinforce in the technician continuing training program regarding self checking practices and referencing job specific radiation work permits prior to providing assigned job coverage. This training will be completed by July 1, 1992.
- The LaSalle Radiation Protection Department will review methods to improve the mechanism for establishing hold points in a work package and/or radiation work permit for activities such as surveys. This review will be completed by April 1, 1992.

OTHER RADIOLOGICAL ISSUES

- Radiation Occurrence Report Causal Analysis (10/89 - 07/90, IR 373/90024; 374/90025)
 - Causal Analysis Trending not effective
 - Weaknesses identified included:
 - Pre-job planning
 - Lack of worker to RP Department communications

- Low Level Intakes (02/91 - 03/91, IR 373/91008; 374/91007)
 - Working outside scope of RWP/personnel error
 - Workers failed to notify RP of changing work conditions

- Subsequent to the ROR issues and intakes appropriate corrective actions were implemented. Those actions did address the causal factors identified during that time period and appear to have been effective.

- Exceeding Administrative Exposure Limits (10/91 and 01/92, IR 373/91022; 374/91022)
 - Inadequate stay time calculations
 - RPT not actively monitoring/supporting ongoing work
 - Worker awareness of accumulated exposure

- Apparent root causes of exceeding administrative exposure limits were not repetitive from the previous ROR issues and intakes.

- Each issue grouping will be discussed in more detail.

OTHER RADIOLOGICAL ISSUES (Continued)

RADIATION OCCURRENCE REPORT (ROR) ANALYSIS (IR 373/90024; 374/90025)

In September 1990, the NRC identified an open item involving an apparent weakness in the causal factor analysis and corrective actions for some RORs documented between October 1989 and July 1990.

Although corrective actions taken for each ROR appeared to be adequate, repetitive occurrences suggested the existence of root causes not being identified and appropriately corrected by the program. A weakness was identified in pre-job planning and communications between workers and the RP Department.

STATION RESPONSE

- A cause code trending program was developed and implemented.
- The ALARA Planner now attends the daily planning meeting.
- The Radiation Work Permit (RWP) program was revised to include a task breakdown listing.
- RP Supervisors were assigned to Mechanical Maintenance for a one week period to share their respective responsibilities and to enhance interdepartmental communications.
- Radiation Protection (RP) attends weekly departmental communications sessions.

CURRENT STATUS

- A review of RORs and the 1991 CEC Co Station Comparative Audit indicate that communications from rad workers to the Radiation Protection Department have markedly improved.
- Pre-job evaluations have improved during 1991 and were not root causes of exceeding administrative exposure limits.
- ROR Causal Analysis did identify a trend during 1991 related to worker adherence to good rad practices. Corrective actions were taken prior to entering the current Unit 2 Refuel Outage.

OTHER RADIOLOGICAL ISSUES (Continued)

LOW LEVEL INTAKES (IR 373/91008;374/91007)

During February and March 1991 low level intakes occurred:

- 02/19 - An Insulator Supervisor received an intake during bellows seal insulation removal.
- 03/25 - A fuel handler received an intake during a refuel bridge cable replacement.
- 03/26 - Two contractor laborers received intakes while cleaning the outboard MSIV Room.

EVENT CAUSES

- Failure of personnel to inform RP of planned work scope or changes in work conditions
- Working outside the scope of the RWP
- Personnel error

STATION RESPONSE

- Stressed need for worker/department communication with RP
- Stressed need to include all work groups in pre-job briefings
- Provided training to specific work groups

CURRENT STATUS

- Communications between station departments, rad workers and RP have improved. ROR reviews indicate that rad workers work within the scope of their RWP.

OTHER RADIOLOGICAL ISSUES (Continued)

10/31/91 RAD WASTE EQUIPMENT DRAIN TANK ROOM CLEAN UP

Scope - Removal of sludge from tank room floor. Pre-job survey and job preparation (installation of floor drain screens and video cameras) were completed between 8/6/91 to 10/30/91. Surveys indicated general dose rates of 250 mR/hr to 1 R/hr and 4 R/hr located at the base of the waste collector tank. Contamination levels ranged from 200,000 to 500,000 dpm.

10/31/91 DAYSHIFT

A pre-job briefing was held to discuss the cleaning method with the station laborers and radiation protection.

One station laborer performed test cleaning of area using a water lance and squeegee. Favorable cleaning results were achieved. The laborer received 45 mrem in 15 minutes.

An additional pre-job briefing was held. Its focus was on the test cleaning results and the dose incurred. The scope of work was estimated to take 2 person hours with each person authorized a 300 mrem administrative limit. Although current survey maps were available the established stay times were based upon the dose received during the test cleaning. Because of the expected short duration of the job, two-way communications had not been established.

Two station laborer supervisors began room cleaning while the RPT viewed their activity via a video monitor. During work, attempts to read the electronic dosimetry (ED) were unsuccessful. The EDs were double bagged and covered with sludge. RPT assumed that personnel had successfully read their dosimetry and had enough remaining dose margin to complete work. Upon exiting the work area, it was identified that the two workers exceeded their 300 mrem limit. Whole body dose equivalents of 449 mrem and 313 mrem were received.

OTHER RADIOLOGICAL ISSUES (Continued)

10/31/91 RAD WASTE EQUIPMENT DRAIN TANK ROOM CLEAN UP (Continued)

CAUSES

- The RPT inappropriately calculated stay time and anticipated dose based on prior dose received during test cleaning rather than current survey data.
- The RPT did not actively monitor the workers in that no adjustment in stay time was made for workers moving into the higher dose rate fields. In addition, one-way communication (i.e. hand signals) from the workers to the RPT for monitoring EDs was not established.

STATION RESPONSE

- The RPT involved was counseled with respect to his performance weaknesses and management expectations.
- Lessons learned were reviewed with the workers involved and other RP personnel. A General Information Notification is under development for RP personnel to further reinforce the event and causes. Special focus is applied to updating RWP radiological conditions, comparing survey data with other known data to identify discrepancies and continuous monitoring responsibilities.
- General Employee Training with respect to ED alarms and appropriate worker response is to be performed.
- RP procedures were reviewed and will be revised to ensure clarity of continuous monitoring requirements, responsibility for ED alarm set points and guidance on stop work orders.

CURRENT STATUS

- Corrective actions are ongoing but will be re-evaluated in conjunction with the other occurrences of exceeding administrative exposure limits.

OTHER RADIOLOGICAL ISSUES (Continued)

01/06/92 UNIT 2 DRYWELL LEAD INSTALLATION

Scope - Wire rope hangers were to be installed to facilitate hanging of lead on the jet pump ring header. The work package detailed the lead installation but attachment points for hangers were to be specifically identified in the field consistent with usual practice and ALARA considerations. Radiation Protection discussed the task with the Contract Alara Coordinator and they determined that the job could be completed without the usual dose extensions. This change from the past practice of granting dose approvals of 300 mrem/person was discussed. At the ALARA pre-job briefing, the Contract ALARA Coordinator reviewed the job with the crew of six. He used the drywell model, maps and drawings to show the dose rates and approximate stay times. He emphasized that the daily dose limit of 100 mrem would require increased individual monitoring.

1/6/92 AFTERNOON SHIFT

A contract job supervisor accompanied a contract RPT to the job site to discuss work and location. The general location of the lead blankets and the pipe support was discussed. However, the specific attachment points for the wire rope hangers were not discussed. The RPT conducted a survey of the identified area.

A pre-job briefing was held at the drywell control point with the crew by the supervisor and the RPT. The RPT reminded each worker to check their EDs and to leave the area if it alarms.

The work crew performed their task at the predetermined location while working in an assembly line fashion (in dose rates of 20 to 300 mR/hr). The RPT periodically reviewed ongoing work. Pump noise interfered with the ED audible function. The workers exited the area approximately 1 hour later with 20 to 69 mrem dose received by ED.

The crew later returned to the drywell control point. The two workers that received the highest dose on the previous entry were reassigned and were replaced. The work crew returned to the job site.

OTHER RADIOLOGICAL ISSUES (Continued)

01/06/92 UNIT 2 DRYWELL LEAD INSTALLATION (Continued)

Unable to reach an attachment point, Worker #3 crawled onto the grating above the recirc pump, where dose rates were 300 mR/hr, similar to the general area dose rate below the grating. However, this area had not been included in the pre-job survey.

Checking his ED, Worker #1 noticed that he was near his dose limit, told the other workers and exited the area with 68 mrem. Worker #2 continued to work until he noticed the dose alarm indicator on his ED, informed Worker #3 that he was leaving the area and exited with 96 mrem. Worker #3 finished tightening some bolts and exited the area with 120 mrem.

Total accumulated whole body dose equivalents for Workers #1, #2 and #3 were 92, 116, and 149 mrem respectively.

APPARENT ROOT CAUSE

- Workers should have been more aware of their daily accumulated exposure and monitored their ED more frequently during the second part of their shift.

CONTRIBUTING CAUSES

- Deviating from past practice, a more restrictive dose limit of 100 mrem was used for this job. However, RP did not provide adequate job support given the lower dose limit, general area dose rates of up to 300 mR/hr and environmental conditions (high noise level).
- Personnel experienced difficulty hearing their EDs.
- Job site reviews did not fully identify worker positions for attachment of the hangers resulting in an incomplete survey.

OTHER RADIOLOGICAL ISSUES (Continued)

01/06/92 UNIT 2 DRYWELL LEAD INSTALLATION EVENT (Continued)

CORRECTIVE ACTIONS TO ADDRESS APPARENT ROOT CAUSE

- On January 7, management ordered a one hour stand down from outage work to review this event:
 - For RP personnel, management reviewed expectations with respect to RPT site coverage and ALARA.
 - Construction management covered with workers the review of RWPs, knowledge of dose limits, reading of and response to EDs and the need to look out for fellow workers.
- A notice has been placed in selected drywell RWPs that alert workers to check dosimetry more frequently because of high ambient noise levels.

OTHER CORRECTIVE ACTIONS

- On January 9, a requirement was implemented that only top reading EDs (which are easier to read than front readers) will be allowed for drywell entry.
- Strobe light and ear phone options for EDs have been ordered for use in low visibility/high noise areas. The Vendor expects an early February 1992 delivery.
- A Teledose System (remote dosimeter readout system using radio frequencies) has been successfully tested in the containment. This system is now in use for selected high dose/high dose rate jobs.
- Other corrective actions are under consideration and may be pursued upon completion of the event investigation.

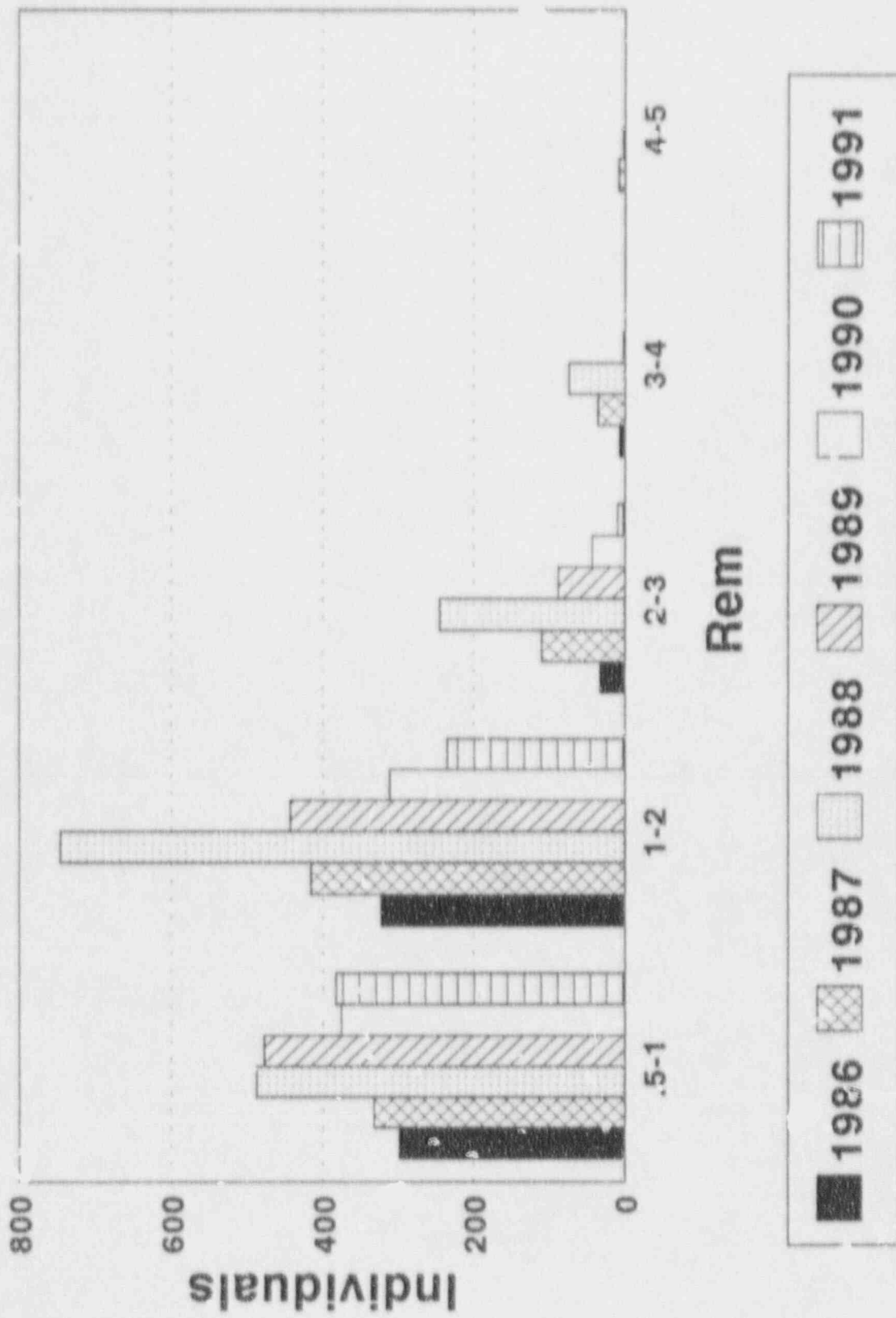
RAVIAATION PROTECTION/ALARA PROGRAM

- During April 1990, NRC RIII conducted a special team assessment of the LaSalle ALARA Program (373/90008; 374/90009). While the program was judged to be generally adequate, a number of improvement areas were identified and recommendations made.

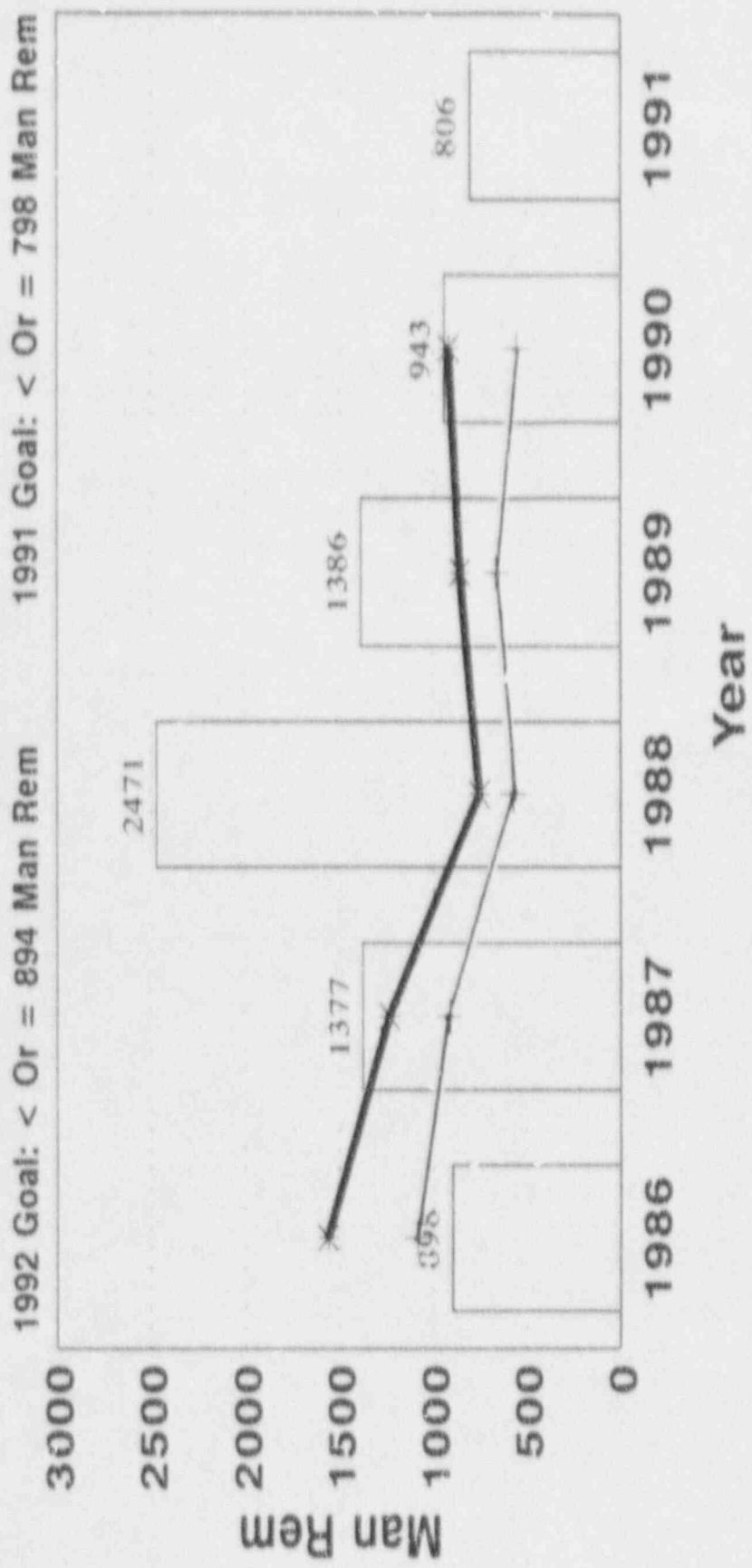
- LaSalle aggressively addressed each recommendation with the goal of overall program improvement. Significant progress has been made, particularly in dose reduction and personnel contaminations.

- Chart 1 - LaSalle County Station Individual Personnel Exposure
- Chart 2 - LaSalle County Station Personnel Exposure
- Chart 3 - LaSalle Ccounty Station Personnel Contaminations

© LaSalle County Station Annual Whole Body External Exposure

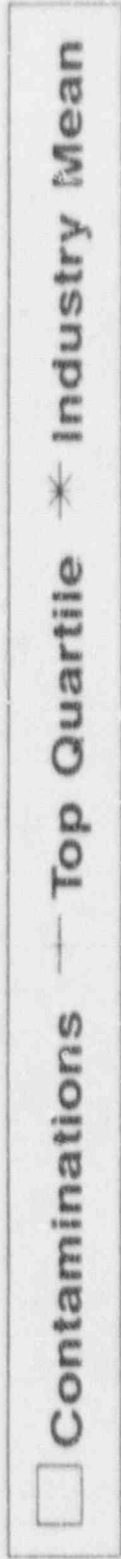
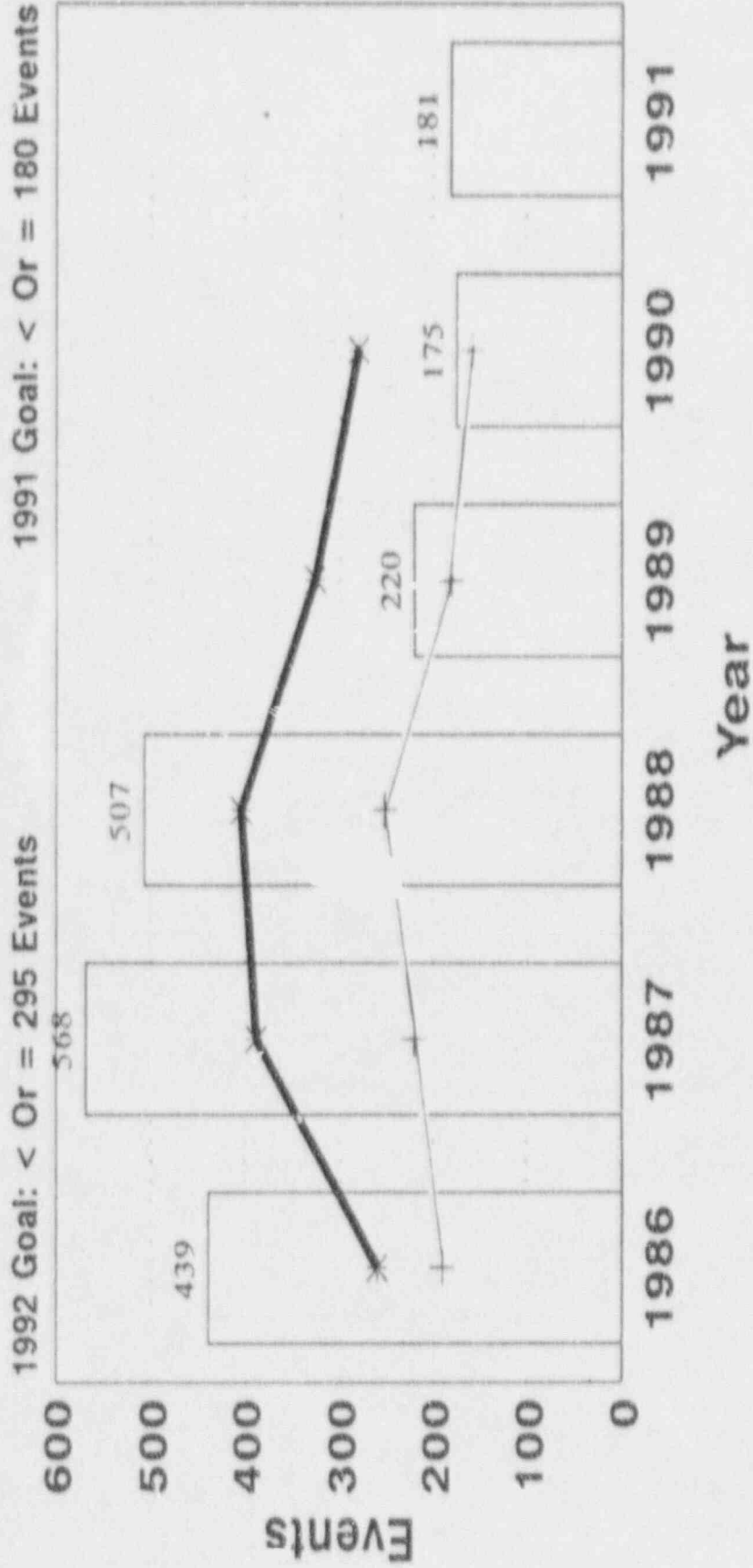


LaSalle County Station Personnel Exposure



Exposure
 + Industry Median
* Top Quartile

e LaSalle County Station Personnel Contaminations



CORPORATE INITIATIVES

- Corporate Radiation Protection is chairing a working committee to review and develop lessons learned from 1991 CECo administrative overexposures. The focus of the committee is on the radiological job preparation, performance and review process. The committee report with recommendations will be issued in February 1992.
- A RWP effectiveness review, by Corporate Radiation Protection is in progress. The first step of the review is to solicit feedback from rad workers on the positive/negative aspects of the RWP Program. The second step is a Human Factors review of the RWP form. Completion of this review is expected by May 1, 1992.
- Corporate Radiation Protection will review and evaluate the state of electronic dosimetry use within Commonwealth Edison by July 1, 1992. Appropriate dosimetry program enhancements will be made based on evaluation results. In conjunction with Production Training, Corporate Radiation Protection will review the N-GET B lesson plans currently under revision with respect to expanding training on proper application of advanced monitoring technology.
- Corporate Radiation Protection, in conjunction with Production Training, will review the Radiation Protection Technician training on identification of multiple radiation sources and application of the source information to the establishment of stay times and dosimetry placement. Additionally, training on radiological aspects of work involving radioactive/nonradioactive system interfaces will be evaluated. This review will be completed by July 1, 1992.
- Corporate Radiation Protection, in conjunction with Corporate Maintenance and Engineering and Construction will review the maintenance job briefing procedures at each CECo station to determine how they are: planned, conducted, who attends and the scope of information covered with respect to radiological aspects of work. Based on this review, guidance will be developed and provided to all CECo stations. This review will be completed by July 1, 1992.

CLOSING COMMENTS

- Programmatic improvements started during 1989-1990 are ongoing, and have included decreasing administrative exposure limits and increasing attention to radiation work practices. These improvements will continue to reveal opportunities for further attention, consistent with the ALARA philosophy.
- Individually, the events where personnel exceeded administrative limits have minimal radiological significance. Regulatory limits were not challenged. Collectively, the events do show the continuing need for closer scrutiny of personnel performance and program implementation as we continually lower collective and individual exposure.
- Appropriate actions have been and are being taken to assure that the event causes are addressed.
- Corrective actions implemented in response to the ROR root cause and intake issues appeared to be effective. They are not apparent root causes of subsequent events.
- CECo recognizes the need to address radiation events individually and collectively to ensure root and contributing causes are adequately addressed to preclude recurrence.
- The effectiveness of our efforts is reflected in significant reductions in individual and collective exposures and personnel contaminations.