U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-373; 50-374
License Nos:	NPF-11; NPF-18
Reports No:	50-373/97019(DRS); 50-374/97019(DRS)
Licensee:	Commonwealth Edison Company
Facility:	LaSalle County Nuclear Power Station Units 1 and 2
Location:	2601 North 21st Road Marseilles, IL 61341
Dates:	November 3-7, 1997
Inspectors:	W. Slawinski, Senior Radiation Specialist N. Shah. Radiation Specialist W. G. West, Radiation Specialist
Approved by:	G. L. Shear, Chief, Plant Support Branch 2 Division of Reactor Safety

EXECUTIVE SUMMARY

LaSalle County Nuclear Power Plant, Units 1 and 2
NRC Inspection Reports 50-373/97019; 50-374/97019

This inspection included a review of the as-low-as-reasonably-achievable (ALARA) controls for the ongoing Unit 1 forced outage and the implementation of the respiratory protection and radioactive contamination monitoring programs.

- Ongoing engineering evaluations to address station conformance to the design-basis continued to result in emergent work and an associated increase in station dose. Although the ALARA controls for these activities were good, there continued to be examples where problems with the station work planning and scheduling process had a negative impact on station dose (Section R1.1).

- The ALARA planning and controls for the removal of the intermediate range monitors/source range monitors (IRMs/SRMs) were good, with improvement noted in worker participation in the planning process. Although the root cause of a previous violation occurring during the Unit 2 refueling outage was effectively addressed, a recurrent problem was identified with the proper use of the station problem identification and resolution process (Section R1.2).

- Effective ALARA controls were used during the emergency core cooling system (ECCS) strainer replacement with appropriate consideration given to controlling diving activities and hot particles (Section R1.3).

- Implementation of the license's radiological respiratory control program was acceptable. Deficiencies in the respiratory protection training program were identified along with problems in the quality of the semi-annual surveillance checks of stored respirators. Some examples of procedural deficiencies and the need for additional procedural guidance were also identified (Section R2.1).

- Implementation of the calibration and routine surveillance programs for the whole body contamination and small article monitors were good. Monitor alarms were set at appropriate levels and acceptable instrument sensitivity and alarm operability was demonstrated. Worker compliance with monitor use requirements was good (Section R2.2).

- Radiological controls and radworker performance were observed to be generally good during plant walkdowns. One weakness with contamination control was identified while observing station laborer activities (Section R4.1).

Report Details

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Review of Radiological Performance and ALARA Controls

a. Inspection Scope

The inspectors reviewed the station's radiological performance and the ALARA planning and controls for the ongoing Unit 1 forced outage. The inspection consisted of interviews with workers, attendance at ALARA briefings, observations of activities in progress and a review of applicable documentation (i.e., Radiation Work Permits (RWPs), ALARA plans, etc).

b. Observations and Findings

The station was shutdown throughout 1997 in order to address engineering issues related to the plant design basis. For most of this period, activities were of a routine nature with the only significant exposure resulting from Unit 2 refueling outage work ending in the first quarter of 1997. Prior to the start of the Unit 1 outage, about 230 rem was accrued by the station. For the remainder of the year, the station was addressing issues identified by the engineering reviews. This work was estimated to account for an additional 230 rem, but may increase as more work was identified.

As of November 7, 1997, about 30% (65 rem) of this work had been completed. The most significant of these activities included: Reactor Water Cleanup (RWCU) modification and valve work; Residual Heat Removal (RHR) System valve work; drywell chiller modification and relief valve work; safety relief and motor operated (SRV and MOV) valve work; intermediate range and source range monitor (IRM and SRM) work; and replacement of the emergency core cooling system (ECCS) suction strainers. Sections R1.2 and R1.3 discuss the IRM/SRM and ECCS work in greater detail.

The RWCU modification had the single greatest impact on station dose. The existing scope consisted of: replacing the existing three recirculation pumps; changing the piping configuration to take suction from the hot leg of the reactor vessel, rather than the cold leg, to prevent voiding of the heat exchanger; and addressing recurrent valve problems. Essentially, the RWCU system was to be restored to that conceptualized in the original reactor design. Because the work was still in the engineering phase, it had a high probability of exceeding the current 76 rem estimate, owing to scope growth.

During plant walkdowns, the inspectors observed continued good use of ALARA controls such as remote cameras and dosimetry, lead shielding and hydrolazing of high dose rate piping. Workers were observed to be aware of these initiatives, including emphasizing smaller crew sizes and utilizing low dose areas. For those jobs requiring significant engineering (primarily the RWCU and drywell chiller modifications), the

inspectors noted that the respective RP planners had developed ALARA initiatives to reduce future station dose. For example, in both modifications, the associated piping was designed to minimize the number of crud traps (i.e., sharp piping bends) and the use of high cobalt containing components. For the RWCU modification, the new pumps were being installed in a vertical configuration partially to make future maintenance activities easier.

However, there continued to be examples where problems with the station work planning and scheduling process had a negative impact on station dose. For example, owing to several reevaluations of the scope of the RWCU modifications, a proposed chemical decontamination of the RWCU system was canceled, as it could not be performed within the existing outage schedule. This initiative could have saved an calculated 66 rem based on the existing scope. Another example, was the failure of the operations department to adequately drain associated piping during work on the "A" RHR 1E12-F003 valve. This resulted from a failure of the operations group to recognize, during the job planning process, that the existing procedure for draining the RHR system would not affect this valve. These and other similar issues were being addressed by the licensee as outage lessons-learned.

For those activities reviewed, the inspectors verified that the ALARA plans were performed in accordance with station procedure no. LAP 2200-7 (revision (rev.) 0) "ALARA Plan," including review, as applicable, by the station ALARA committee.

c. Conclusions

Ongoing engineering evaluations to address station conformance to the design-basis continued to result in emergent work and an associated increase in station dose. Although the ALARA controls for these activities were good, there continued to be examples where problems with the station work planning and scheduling process had a negative impact on station dose.

R1.2 Observations of IRM/SRM Removal

a. Inspection Scope

The inspectors reviewed the removal of IRMs/SRMs, focusing on those ALARA controls documented in NRC Information Notice (IN) no. 88-63 and associated supplements. The inspection consisted of interviews with workers, a review of applicable documents, attendance at ALARA briefings, and observations of IRM/SRM removal on November 3 and 6, 1997. Included in this review was a follow-up of Violation no. 50-373/374-96014-01, regarding an inadequate survey during similar Unit 2 refueling outage work.

b. Observations and Findings

The job scope consisted of removing and replacing seven IRMs/SRMs. The expected dose was about 12 rem and as of November 6, 1997, about 10 rem was accrued with 95% of the scope completed. The ALARA plan addressed the issues documented in IN

no. 88-63 and, the failure to adequately determine the detectors' irradiation history, which resulted in the inadequate evaluation violation in 1996.

During the ALARA briefings, the inspectors observed good worker participation including questioning of the RP department controls. In similar prior briefings during the Unit 2 refueling outage, the inspectors had noted that workers were less participatory and did not question the RP department. The inspectors observed that RP technicians were appropriately monitoring dose rates while the IRM/SRMs were being removed and that workers remained cognizant of the contingency actions discussed in the ALARA briefing. Although not considered ALARA, respirators were used during this job owing to industrial safety concerns. The inspectors verified that those workers assigned respirators had received the necessary training and fit testing, and were aware of their proper use.

However, the inspectors identified a weakness with the licensee's follow-up actions for an unexpected occurrence during the job. Specifically, while removing the "C" IRM on October 26, 1997, higher than expected dose rates (20 rem per hour (rem/hr) at contact) were encountered prompting stoppage of the job and evacuation of the undervessel area. The expected dose rates were 50-100 millirem (mrem)/hr (contact), given that the IRM had been in storage (i.e, out of the core) for several months. The cause of the higher dose rates was being evaluated, but was believed to be activated corrosion products on the IRM cabling from reactor coolant leakage. Although the RP staff halted further removal of IRMs until more stringent ALARA controls were established, the event was not documented in a station problem identification form. While not specifically a violation, the failure to use the formal problem identification and resolution process was a contributing cause to violation no. 50-373/374-96014-01. At the exit meeting, station management agreed with the inspectors' conclusions and were planning to evaluate the issue.

c. Conclusions

The ALARA planning and controls for the removal of IRMs/SRMs were good, with improvement noted in worker participation and with the planning process. Although the root cause of a previous violation occurring during the Unit 2 refueling outage was effectively addressed, a recurrent problem was identified with the proper use of the station problem identification and resolution process.

R1.3 ECCS Suction Strainer Work

a. Inspection Scope

The inspectors reviewed the performance of the ECCS suction strainer replacement work. The inspection consisted of interviews with workers, a review of applicable documentation and observations of work. Because the work involved extensive diving operations and had a high probability of hot particle intrusion, the implementation of station procedure nos. LRP 2100-12 (rev. 3) "Radiation Protection Practices for Divers

used for Underwater Maintenance or Inspections" and LRP 1470-5 (rev. 5) "Hot Particle Control" were specifically reviewed.

b. Observations and Findings

The ECCS suction strainer replacement job involved the replacement of six suction strainers in the Unit 1 suppression pool. This replacement addressed strainer clogging issues discussed NRC Bulletin no. 96-03 and was the first such replacement for a Mark II type boiling water reactor. Including the strainer replacement, the job entailed desludging of the suppression pool walls and floor to reduce area dose rates. There were five divers (two in the pool at any one time) assigned to the activity and the job dose goal was 8.5 rem.

Desludging was performed using two diver-held vacuum hose units connected to an underwater pump with in-line filtration. This manual desludging was considered more effective than previous, similar work using robotics. Because of the high dose hazards associated with the filters, specific ALARA controls were established for the filter changeouts, such as changing the filters when contact dose rates exceeded 10 rem/hr (contact) on the filters prior to replacement. The old filters were stored in designated storage areas until dose rates exceeded a specified value. According to the RP staff, filters were changed out, depending on volume flow rate, between every six hours to weekly.

By November 6, 1997, 40% of the work was completed with about 3 rem expended. The inspectors observed that the provisions of LRP nos. 2100-12 and 1470-5 were appropriately implemented. Specifically, the inspectors observed the use of dosimetry multibadging, remote communication, cameras and teledosimetry, underwater dose monitoring, and the set up of a hot particle control zone within the larger contaminated area. These controls were developed during an August 1997, two day simulation involving two of the assigned divers. Typical diver dose rates ranged between 30 mrem/hr (stop work if $\geq$ 1.25 rem/hr) for the whole body and 3.9 rem/hr for the extremities (during the filter changeouts).

The inspectors observed good job coverage and ALARA controls by the RP technicians monitoring the job. In particular, after an intermittent problem occurred with communications between the divers' dosimeters and the remote computer readout at the dive station, the technicians entered the contingency plan for this occurrence, consisting of more frequently monitoring the divers' dosimetry readouts and pool location. Additionally, the technicians appropriately considered ALARA controls during the vacuum filter change out, by having the divers use rope to maneuver the filters and informing them of their proximity to the filters. Overall, the RP controls and planning for this job were considered good.

c. Conclusions

Effective ALARA controls were used during the ECCS strainer replacement with appropriate consideration given to controlling diving activities and hot particles.

R2 Status of RP&C Facilities and Equipment

R2.1 Respiratory Protection Program

a. Inspection Scope

The inspectors reviewed the radiological respiratory control program including respiratory user training, medical certification and fit testing, and the selection, use and maintenance of respiratory protection equipment. The inspection focused on air purifying respiratory protection equipment issued for routine radiological concerns and excluded self-contained breathing apparatuses (SCBAs) used for emergencies. The following procedures were reviewed:

- LRP 5500-1 (rev. 3), "Radiological Respiratory Control Program;"
- LRP 1310-1 (rev. 8), "Maintenance and Care of Respiratory Protective Equipment;"
- LRP 1310-11 (rev. 5), "Respiratory Protective Equipment Quality Inspections;" and
- LRP 1310-19 (rev. 2), "Operation of the Model 8010 TSI Porta count Respiratory Fit Tester."

b. Observations and Findings

Respiratory protection training lesson plans were of sufficient depth and scope to provide workers the necessary information to safely use this equipment. Material provided to the students included policy statements on the use of process or other engineering controls and the routine/non-routine use of respirators. However, the inspectors identified a deficiency with the respiratory training in that the trainees were not fully advised when they may seek relief during respirator use. The licensee planned to revise the lesson plans to address this deficiency.

Quantitative fit testing was performed by the radiation protection staff using a commercially available fit testing device and testing was conducted consistent with industry practice. Soft or gas permeable contact lenses were allowed with respiratory protection equipment, provided the user documented as part of the fit test procedure that they had successfully worn the lenses for at least 30-days. Those fit test records reviewed by the inspectors documented that the workers had successfully completed the required training, that initial physician certification was on file and as applicable, that they had successfully worn soft or gas permeable contact lenses for 30 days.

The inspectors discussed respirator issuance, tracking, cleaning and quality control with RP personnel. Adequate mechanisms were in place to ensure that prior to respirator issuance workers had completed the required training, medical certification and fit testing.

The licensee completed a semi-annual quality surveillance of respiratory protection equipment stored in the Turbine Building, Technical and Operational Support Centers,

and General Site Emergency Program boxes on October 6, 1997. This check, which identified no problems, was required by procedure no. LRP 1310-11 to ensure the integrity of respirator face pieces, valves, seals, and the condition of lenses, straps, clamps and connections. However, the inspectors found several full face respirators in poor condition including one with a deteriorated valve gasket and another with a worn facial seal surface in the Turbine Building storage area. The licensee planned to repair/replace the affected respirators and to reinspect the storage areas.

During a review of procedures, the inspectors identified some minor problems and inconsistencies. For example, LRP 5500-1 did not provide clear direction for the frequency of medical re-evaluations for respirator users. This procedure also contained incorrect instructions or needed additional guidance for performing respiratory ALARA reviews. For example, steps F.2 (c,d and h) incorrectly referenced its attached flow chart. Also of note, step F.2(g) required that process and/or other engineering controls be evaluated prior to issuing respirators, but did not specify how these evaluations were to be performed or documented. For example, several of those jobs discussed in section R1.1 were evaluated for process and/or engineering controls, but the evaluation was not documented. The licensee acknowledged the procedural inconsistencies and was planning to revise the procedure.

c. Conclusions

Implementation of the license's radiological respiratory control program was acceptable. Deficiencies in the respiratory protection training program were identified along with problems in the quality of the semi-annual surveillance checks of stored respirators. Some examples of procedural deficiencies and the need for additional procedural guidance were also identified.

R2.2 Personnel and Small Article Contamination Monitoring Equipment

a. Inspection Scope

The inspectors reviewed the operability of the whole body contamination monitors located at the egress from the radiologically protected area (RPA) and at the main access facility (gatehouse). The review included a walkdown of the whole body monitors, observations of use, and a review of calibration procedures, monitor operability history and surveillance test results for 1997. The inspection also reviewed the operability of the small article monitors (SAMs) used for surveying small articles and tools leaving the RPA. Specific procedures reviewed, included:

- LRP 5822-10 (rev. 0), "Calibration of PM-7s;"
- LRP 5822-41 (rev. 1), "PCM-2 Calibration;" and
- LRP 5822-7 (rev. 2), "Calibration of IPMs."

b. Observations and Findings

The whole body monitors (RPA and gatehouse) and SAMs were calibrated at six month intervals using cobalt-60 sources traceable to the National Institute of Standards and Testing (NIST). Detector efficiency for cobalt-60 response ranged from 10-20 percent for the RPA monitors and 17-20 percent for the SAMs. Alarm setpoints were 5,000 disintegrations per minute (dpm) for both the RPA monitors and the SAMs, and 50 nanoCuries for the gatehouse monitors. Alarm functional checks were performed three times a week for the RPA monitors using a technetium-99 source ranging in activity from 7500-10,000 dpm, and daily for the SAMs using a 5,000 dpm smear of mixed isotopes. Functional checks were also performed daily for the gatehouse monitors, but using a 125 nanoCurie cobalt-60 source. This was discussed with the RP staff, who agreed that using a source of similar activity to the gatehouse monitor alarm setpoint would be a more appropriate functional check.

The inspectors verified that the detector efficiency and alarm set point calculations were accurate for the most recent calibration of selected whole body contamination monitors and SAMs. The respective calibration and surveillance test methodologies were technically sound and appropriately implemented. At inspector request, the licensee demonstrated the alarm check procedure for one of the RPA whole body contamination monitors. The check employed use of a nominal 7900 dpm technetium-99 source, and activated foot, hand and chest array detector alarms as required.

Because the gatehouse monitors were located in an area not routinely occupied by plant security personnel, a camera having audio capability, continuously monitored this location. The camera signal was sent to a television screen located at the main RP desk in the Service Building. All personnel were required to use the gatehouse monitors prior to leaving the plant, and RP personnel periodically verified that this was occurring via the remote camera. However, RP personnel were not required to continuously monitor the television nor were security guards, stationed inside the gatehouse, required to respond to a monitor alarm. As stated in station procedures and as directed by labels affixed to the gatehouse monitors, workers receiving an alarm were required to remain in the area and contact RP for assistance. Based on selected RP and security staff interviews and observations of portal monitor usage, the inspectors determined that worker compliance with these requirements was good.

c. Conclusions

Implementation of the calibration and routine surveillance programs for the whole body contamination and small article monitors were good. Monitor alarms were set at appropriate levels and acceptable instrument sensitivity and alarm operability was demonstrated. Worker compliance with monitor use requirements was good.

R4 Staff Knowledge and Performance in RP&C

R4.1 Plant Walkdown and Observations of Work

The inspector performed a walkdown of the Units 1 and 2 Turbine and Reactor Buildings and observed the implementation of radiological controls and radworker performance. There were no significant problems observed with radiological controls (i.e., postings, labelings, etc), radiological housekeeping or radworker practices. Workers generally used good contamination control practices (such as securing hoses and other items crossing a contaminated area boundary) and were knowledgeable of RWP and ALARA plan requirements. However, while observing routine station laborer activities, an inspector noted a weakness with a workers contamination control practices. Specifically, after mopping in the general area (i.e., potentially contaminated) floor of the Unit 2 reactor building, a laborer, who was not wearing gloves, grasped the bottom of the mop and removed it from the handle prior to storage. The inspector was concerned that this practice presented an industrial and radiological hazard to the laborer given the potential concentration of cleaning solvents and radioactive material on the mop. Licensee RP representatives agreed with the inspector's observation and planned to counsel the station laborer group.

R8 Miscellaneous RP&C Issues

The following items identified in previous inspection reports were reviewed by the inspectors:

(Open) 50-373/374-96014-01: Violation for failure to perform an adequate survey prior to performing IRM/SRM removal. As discussed in section R1.2, the licensee addressed the root cause of the violation but had a recurrent issue with use of the station problem identification and resolution process. This item will remain open pending further licensee review and corrective actions.

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on November 7, 1997. The licensee acknowledged the findings presented and did not identify any of the documents listed as proprietary. A partial listing of those attending the exit included:

N. Hightower, Radiation Protection Manager
C. Kelly, Lead Health Physicist--Operations
S. Kovall, Lead Health Physicist--Technical
J. Schuster, Lead Chemist
S. Smith, Acting Plant Manager
W. Subalusky, Site Vice-President

INSPECTION PROCEDURE USED

IP 83750 OCCUPATIONAL RADIATION EXPOSURE

ITEMS OPENED, CLOSED OR DISCUSSED

THERE WERE NO ITEMS OPENED OR CLOSED IN THIS REPORT

Discussed

50-373/374-96014-01	VIO	Failure to make an adequate survey prior to removing SRMs/IRMs (section R8)

LIST OF ACRONYMS USED

ALARA	As-Low-As-Reasonably-Achievable
RWP	Radiation Work Permit
rev.	revision
mrem/hr	millirem per hour
RP&C	Radiation Protection and Chemistry
dpm	disintegrations per minute
RHR	Residual Heat Removal System
ECCS	Emergency Core Cooling System
MOV	Motor Operated Valve
SRV	Safety Relief Valve
SRM/IRM	Source (Intermediate) Range Monitor
RWCU	Reactor Water Cleanup System
VIO	Violation

LIST OF DOCUMENTS REVIEWED

Radiation Work Permit (RWP) Nos:

NOTE: THE ALARA PLANS, RP LOGBOOK ENTRIES, ETC ASSOCIATED WITH THE SPECIFIC RWP WERE ALSO REVIEWED

971052 (rev. 0)	U-1 Suppression Pool - Remove and Install New ECCS Suction Strainers
970302 (rev. 2)	Disassemble/Reassemble Valve, Upgrade/ Replace Reducers Downstream of Valve and Associated Work
971051 (rev. 0)	Remove/Replace Various SRVs; Includes Support Work
971044 (rev. 0)	SRM/IRM Cable Replacement Modification and Testing (undervessel)
970145 (rev. 1)	Nuclear Instrumentation Cable Modification (non-undervessel)
970307 (rev. 1)	Disassemble and Rebuild RHR 1E12F003 A/B Valves
971017 (rev. 1)	Unit 1 Drywell MOV Work
971018 (rev. 1)	Unit 1 Reactor Building MOV Work
971005 (rev. 1)	Unit 1 Drywell Chiller Flowrate Modification
971056 (revs. 0 &1)	IRMs, SRMs, Low Power Range Monitors (LPRMs), and Neutron Monitoring Work Undervessel

Problem Identification Forms (PIFs) nos:

L1997-06787	Rework Dose from Questionable Connector Assembly for SRM and IRM Preamplifier Input Cables
L1997-06721	Additional Dose from Routine Maintenance on MOV 1E12-F087B

December 20, 1996, letter from W. Subalusky to NRC Region III regarding station response to Violation no. 50-373/374-96014-01

August 21, 1997, minutes of Station ALARA Committee Meeting

Station Procedure no. LFP 600-4 (rev. 4) "Traversing Incore Probe (TIP) Removal/Disposal"