February 3, 2000

Mr. R. P. Powers
Senior Vice President
Nuclear Generation Group
American Electric Power Company
500 Circle Drive
Buchanan, MI 49107-1395

SUBJECT: NRC RADIATION PROTECTION INSPECTION REPORT 50-315/99036(DRS); 50-316/99036(DRS)

Dear Mr. Powers:

On January 14, 2000, the NRC completed a routine inspection at your D. C. Cook, Units 1 and 2 reactor facilities. The enclosed report summarizes the results of that inspection. No violations of NRC requirements were identified.

The inspection was an examination of activities conducted under your license as they relate to radiation safety and to compliance with the Commission's rules and regulations and with the conditions of your license. Specifically, the inspection primarily reviewed the occupational radiation protection program during the Unit 1 steam generator replacement project (SGRP) and focused on radiological planning including as-low-as-is-reasonably-achievable (ALARA) planning, the effectiveness of the radiation protection organization, staffing and training to support the project, and dose management and control practices. Within these areas, the inspection consisted of selective examinations of procedures and representative records, observations, and interviews of station and contractor personnel.

We concluded that overall radiological planning and preparation for the SGRP was adequate. In particular, the radiation protection (RP) organization generally was integrated adequately into project planning, ALARA dose savings initiatives were deployed prior to work initiation and the RP staff was supplemented with a mix of experienced and trained contractors. However, the decision to accelerate project initiation contributed to early planning problems which reduced the effectiveness of the ALARA program, and resulted in some increased dose expenditure. Also, ALARA plans developed for the SGRP were not always comprehensive and consistent, and ALARA package documentation deficiencies were identified.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

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

Sincerely,

/RA/

John A. Grobe, Director
Division of Reactor Safety

Docket Nos. 50-315; 50-316
License Nos. DPR-58; DPR-74

Enclosure: Inspection Report 50-315/99036(DRS);
50-316/99036(DRS)

cc w/encl: A. C. Bakken III, Site Vice President
J. Pollock, Plant Manager
M. Rencheck, Vice President, Nuclear Engineering
R. Whale, Michigan Public Service Commission
Michigan Department of Environmental Quality
Emergency Management Division
MI Department of State Police
D. Lochbaum, Union of Concerned Scientists

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-315; 50-316
License Nos:	DPR-58; DPR-74
Report No:	50-315/99036(DRS); 50-316/99036(DRS)
Licensee:	American Electric Power Company
Facility:	Donald C. Cook Nuclear Generating Plant
Location:	1 Cook Place Bridgman, MI 49106
Dates:	December 15-17 & 20-22, 1999 and January 6-7 & 13-14, 2000
Inspector:	W. Slawinski, Senior Radiation Specialist
Approved by:	Steven K. Orth, Acting Chief, Plant Support Branch Division of Reactor Safety

EXECUTIVE SUMMARY

D. C. Cook, Units 1 and 2
NRC Inspection Report 50-315/99036(DRS); 50-316/99036(DRS)

This routine, announced inspection evaluated the licensee's occupational radiation protection program during the Unit 1 steam generator replacement project (SGRP) and focused on radiological planning including as-low-as-is-reasonably-achievable (ALARA) planning, the effectiveness of the radiation protection organization, staffing, qualifications and training to support the project, and dose management and control practices. No violations of NRC requirements were identified. The following conclusions were made in the areas assessed:

Plant Support

- The radiation protection (RP) organization was adequately integrated in steam generator replacement project planning processes, and an effective interface with the principal contractor and subcontractor work force existed (Section R1.1).

- Steam generator replacement project schedule acceleration contributed to some early planning problems which reduced the effectiveness of the ALARA program and resulted in increased dose expenditure (Section R1.1).

- The ALARA program for the steam generator replacement project was implemented adequately, as ALARA plans were developed consistent with procedure, and dose saving initiatives and engineering controls were established commensurate with the radiological hazards (Section R1.2).

- ALARA plans were not consistently thorough, lessons learned information was not always used and documentation problems were identified with some ALARA packages. RP management agreed that individual worker doses needed to be more closely monitored and evaluated, and planned to more aggressively manage worker dose as the steam generator replacement project continued (Section R1.2).

- Radiation protection staff oversight and control of radiological work was generally effective thus far in the steam generator replacement project, although RP management recognized the need to heighten staff focus and awareness of radiological work activities (Section R1.3).

- Source term reduction strategies were planned and thus far implemented effectively for the steam generator replacement project, and adequate work control mechanisms were established to ensure dose savings initiatives were completed timely (Section R1.4).

- The containment access facility constructed to support the steam generator replacement project provided a centralized point of radiological information and RP oversight, and promoted project teamwork; however, facility consolidation produced some human factors problems that detracted from effective information exchange (Section R2.1).

- Radiation worker performance was generally adequate and consistent thus far in the steam generator replacement project. Problems with loitering and dosimetry usage were being addressed by the RP staff (Section R4.1).

- Radiological postings were adequately maintained and accurately reflected radiological conditions, and high and extreme high radiation areas were controlled consistent with requirements. Appropriate contamination control practices were observed at work sites and dose savings initiatives were as prescribed by ALARA plans. Isolated labeling and equipment control deficiencies noted by the inspector and brought to the licensee's attention were quickly rectified and did not reoccur (Section R4.2).

- Qualification, selection and training of contract RP staff was consistent with industry standards and licensee procedures, and the size and experience of the supplemental RP staff was adequate to support the steam generator replacement project (Section R5.1).

- The organizational scheme established for the steam generator replacement project and the mix of experienced contractor personnel contributed to the effectiveness of the RP program for the project (Section R6.1).

Report Details

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Radiological Planning

a. Inspection Scope (83750, 83729)

The inspector reviewed the radiological planning and dose goal development for the steam generator replacement project (SGRP) and assessed the radiological impact of the project's accelerated start date. Project work planning practices and coordination, scheduling information and dose projections were reviewed; the radiological planning for selected jobs was evaluated; project planning, including as-low-as-is-reasonably-achievable (ALARA) staffs were interviewed; and a variety of work control meetings and processes were observed.

b. Observations and Findings

A work plan and inspection record (WPIR) process governed SGRP work activities and was used by the principal contractor (Bechtel) to schedule work, ensure that work was properly sequenced and that it was conducted consistent with licensee and contractor procedures. A two-person Bechtel ALARA team was integrated into the station SGRP radiation protection (RP) organization. The team worked together with project RP and ALARA staffs to ensure that radiological impediments for a given job were recognized and addressed, and that alternatives to reduce source term and other dose reduction initiatives were evaluated before work was authorized to commence. Dose savings initiatives, radiological contingencies and hold points, and radioactive material handling aspects of work were incorporated into WPIRs. Also, work plan task and ALARA pre-job reviews were completed for all radiological work, and pre-job work plan and ALARA briefings were held as a prerequisite to performing work.

The inspector selectively reviewed WPIRs and discussed work plan controls with station and contractor staff and confirmed that ALARA initiatives, radiological controls and holds were incorporated into the work plans as designed. The inspector also verified that plans for source term reduction were incorporated into WPIRs or were controlled by other administrative processes, and that these plans were effectively communicated amongst and between work groups.

The dose estimate and approved dose goal for the SGRP was approximately 172 rem and 160 rem respectively, which included all contractor and sub-contractor exposure and licensee project related dose. The dose goal was somewhat less than recent average industry dose expenditure for similar projects, and was significantly less than the dose expended by the licensee for replacement of the Unit 2 steam generators that took place approximately 10 years earlier. Job dose estimates were based on projected man hour expenditures provided by contractor craft that would perform the work and historical or actual station dose rate data, and/or were developed from industry

averages for recently completed similar scope work. Dose goals were reasonably established and attainable given the experience of the principal contractor and the low station source term resulting from an extended (over two year) shutdown. ALARA incentives in the form of financial compensation were incorporated into the principal vendors contract for performance relative to the dose goals established.

Radiologically significant project activities and associated dose estimates included insulation removal (37.6 rem), scaffolding work (18.5 rem), reactor coolant system and channel head piping removal and weld-up (18.7 rem), and steam dome severance, rig-out/in and removal of upper lateral restraint (ULR) gallery steel (8.1 rem). The ALARA group routinely tracked project, individual task and worker dose expenditure, and in-progress job reviews were initiated when task dose reached a specified percentage of the dose estimate. As of January 27, 2000, the total project dose expended was approximately 71 rem, which tracked close to the estimated dose for that point in the project.

The SGRP was originally scheduled to commence during the next Unit 1 refuel outage anticipated in 2001; however, the schedule was accelerated and dose significant work commenced in the fall of 1999. Although the overall project dose estimate was consistent with recent industry averages and radiological planning for most jobs was generally good, early planning problems attributable, in part, to the accelerated schedule increased the dose expended for some jobs and had potential dose ramifications for others. For example, the original dose estimate for insulation (asbestos and non-asbestos) abatement was 7.2 rem before work commenced, but was revised twice during the course of the work up to 37.6 rem when the ALARA staff recognized that original projections would be exceeded early in the abatement project. Asbestos abatement was the first major contracted work activity for the SGRP and commenced in September 1999, less than one week after abatement contractor management and job supervision arrived onsite and began planning the job. Similarly, contractor ALARA staff including the Bechtel ALARA team arrived onsite only a few weeks prior to abatement work, which reportedly was several months later than their arrival at other industry sites to complete similar scope preparatory work. As a result, several asbestos abatement planning problems occurred and included:

- Manpower requirements were grossly miscalculated.
- Work scope was not fully recognized.
- Work crews experienced in both nuclear plants and with abatement projects were unavailable and work crew staffing shortages occurred.
- Asbestos containment tenting and its associated high efficiency particulate air (HEPA) ventilation system were not initially designed and constructed properly.
- Scaffolding erected to support the work for two of the four steam generator loops was not designed for abatement efficiency.
- Remote visual monitoring systems were not fully installed and operational to allow increased supervisory oversight.
- An available industry lessons learned data base was not obtained prior to ALARA plan development.

These planning problems were rectified and work crews became more proficient as the job progressed, which translated to a dose savings of about 6.5 rem for the abatement of the remaining two (of four) steam generator loops.

Schedule acceleration also impacted the planning of other work such as the removal of the upper lateral restraints (ULRs), because the job could not be walked-down while abatement work was ongoing. As a result, the work scope for the ULR removal was not clearly understood. While the radiological impact of this specific planning problem was not quantified and likely was not significant, it could have generated rework or affected the scope of other completed or planned work.

c. Conclusions

The RP organization was adequately integrated in most SGRP planning processes and an effective interface with the principal contractor and subcontractor work force existed. However, SGRP schedule acceleration contributed to early planning problems which reduced the effectiveness of the ALARA program.

R1.2 ALARA Planning and Program Implementation

a. Inspection Scope (83750, 83729)

The inspector evaluated the effectiveness of the licensee's radiological engineering controls and work practices, and efforts to reduce dose and implement the ALARA program for the SGRP. The inspector interviewed radiation workers (radworkers) and members of the station RP and contractor ALARA staffs; reviewed ALARA plans and associated total effective dose equivalent (TEDE) ALARA evaluations, radiation work permits (RWPs) and procedures; attended ALARA committee and subcommittee meetings and observed ongoing SGRP work.

b. Observations and Findings

Radiation work permit packages, ALARA plans and dose estimate and expenditure information for the following SGRP work activities were selectively reviewed:

- RWP #991106 "Insulation removal"
- RWP #991114 "Rigging support: Install/remove allied marine crane, reactor cavity deck, material handling system, temporary lift device, polar crane preventative maintenance"
- RWP #991118 "Temporary lead shielding: Installation and removal (excluding pie plate and tripod shielding)"
- RWP #991120 "Scaffold installation and removal in containment"
- RWP #991129 "Set up, removal, and installation of feedwater, blowdown and instrumentation piping"
- RWP #991130 "Segmentation and removal of concrete from Unit 1 steam generator enclosures (dog houses) and pouring of new concrete"
- RWP #991136 "Remove/install lower restraints"
- RWP #991135 "Steam generator cutout/weld in RCS"

Inspector review of ALARA plans and RWP packages disclosed that the plans were completed in accordance with station procedures and contained essential ALARA elements such as exposure reduction, and contamination and airborne control information. The inspector verified that ALARA plans for those jobs listed above with estimated exposures at or greater than 1.5 rem and 7.5 rem, were reviewed and approved by the ALARA Sub-Committee and Plant ALARA Review Committee respectively, as required by station procedure. However, lessons learned were not always included in the ALARA plans and plans did not consistently provide sufficient detail and specify the desired radiological job controls. For example, some plans indicated that engineering controls should be used to control potential airborne radioactivity or documented a previous problem with a particular work evolution, but did not specify the radiological controls that were to be used.

The inspector identified that the station ALARA procedure lacked guidance regarding the content of ALARA plans, and other deficiencies in the station ALARA procedure were noted which the licensee had also recognized and was in the process of correcting (Section R7). Also, several ALARA packages reviewed by the inspector lacked documentation of ALARA plan supervisory and/or ALARA subcommittee or committee approval, along with other more minor documentation deficiencies. The ALARA staff realized that some original files were misplaced, and attributed the problems to poor administrative control. The RP staff was in the process of reviewing all SGRP RWP packages to identify the full scope of the documentation problem and planned to issue a condition report (CR) to address the issue.

The inspector observed that dose savings methods were deployed for selected jobs as specified in the ALARA plan or work package, and that appropriate engineering controls were used or were being established consistent with the radiological job hazards. The inspector noted that the Bechtel ALARA team provided effective ALARA insights for the project, and a hands-on approach ensured that ALARA initiatives used at other SGRP industry sites were properly implemented. In particular, an extensive closed circuit television (CCTV) network was established to monitor the majority of work activities in containment and was being used routinely and effectively by work crews, job supervisors and quality control staff. The inspector also noted that ALARA staff in-progress reviews, triggered at a minimum of 50 percent and again at 80 percent of the job dose estimate, were effectively used as ALARA tools to identify and correct potential problems before they escalated.

The ALARA staff generated daily dose reports and monitored job dose performance relative to daily and project goals. Individual worker dose reports were generated and posted regularly for review by job supervisors and workers; however, the SGRP RP staff did not routinely evaluate individual doses for potential irregularities. Although no worker involved in the project thus far received a dose approaching the licensee's administrative limit, the inspector noted that exposure to some workers that were involved in similar work activities varied significantly. RP management agreed that more aggressive dose management would be beneficial to the ALARA program and planned to more frequently review and evaluate individual worker dose as the SGRP continued.

c. Conclusions

The ALARA program for the SGRP was implemented adequately, as ALARA plans were developed consistent with procedure, and dose saving initiatives and engineering controls were established commensurate with the radiological hazards. However, ALARA plans were not consistently thorough, lessons learned information was not always delineated in plans, and documentation problems were identified with some ALARA packages. The licensee agreed that individual worker doses needed to be more closely monitored and evaluated, and planned to more aggressively manage dose as the project continued.

R1.3 Control and Oversight of Radiological Work

a. Inspection Scope (83750, 83729)

The inspector observed and evaluated the RP staff's control and oversight of radiological work in the Unit 1 containment building, and attended RP shift turnover meetings and job briefings.

b. Observations and Findings

Radiological work oversight and job coverage was generally effective, as evidenced by proper implementation of ALARA initiatives, adequate control of high radiation areas, contaminated areas and of equipment, and lack of any significant radiological work related problems. Radiation protection technicians (RPTs) were generally observed controlling jobs properly and RP control points were used effectively in upper and lower containment to better communicate with work crews. Also, greeters were stationed in the containment access facility at the ingress to the radiologically protected area (RPA) and routinely questioned workers about their RWP, dosimetry alarm setpoints and protective clothing requirements.

RP shift turnover meetings were conducted by the RP supervisory staff twice each day to convey the status of radiological work and establish staff priorities for work control. Job activity status and problems were discussed during the meetings, and turnover issues and specific responsibilities were clearly defined for the next shift.

The inspector questioned several workers during containment walkdowns and confirmed that the individuals were aware of work area radiological conditions, dosimetry placement and other RWP requirements. However, the inspector observed one worker involved in reactor coolant system (RCS) pipe cutting without the face shield specified by the RWP to be worn upon system breech, despite RPT attendance in the immediate area. Although system breech did not take place while the worker was present, other workers involved in the job wore face shields as they completed preparations for pipe severance. The licensee immediately corrected the situation and counseled the RPT involved. RP management acknowledged that the project's most challenging radiological work was about to commence and that the RP staff needed to heighten its focus, and was contemplating actions to address this need.

c. Conclusions

Radiation protection staff oversight and control of radiological work was generally effective thus far in the project, although RP management recognized the need to heighten staff focus and awareness of radiological work activities.

R1.4 Source Term Reduction

a. Inspection Scope (83750, 83729)

The inspector reviewed the initiatives taken and planned to reduce SGRP work area dose rates, and the work control mechanisms used to ensure source term reduction plans were implemented appropriately.

b. Observations and Findings

Steam generator work area dose rates were reduced for the project through use of external shielding, steam generator water level control and planned decontamination of RCS pipe end legs.

Approximately 70,000 pounds of temporary lead shielding was installed for the project, somewhat less than the quantity installed at other recent SGRP industry sites. According to the ALARA staff, work area dose rates without shielding were similar to those at other sites after shielding was installed because over two years elapsed since the unit last operated, and significant radioactive decay occurred. Shielding packages included shadow shielding hung on pressurizer and steam generator platforms, and shielding around resistance temperature detector (RTD) lines, RCS elbows and crossover legs, much of which the inspector verified and found to be adequately installed. Schedule acceleration did not adversely affect shield installation as RCS, RTD and generator platform shield packages were completed prior to work in these lower steam generator elevations.

Operations and RP staffs communicated effectively to ensure proper water level was maintained in the generators and RCS crossover legs, as work progressed. Water floodup reduced area dose rates approximately 50 percent, and also maintained crud potentially present in crossover piping in suspension to preclude plugging of crossover drains. No chemical or mechanical decontamination such as hydrolazing was performed because it was not deemed necessary based on a cost to benefit analysis. According to the ALARA staff, no significant dose producing crud traps existed which warranted localized flushing or hydrolazing.

Pipe end decontamination for the RCS legs was planned after the generators were removed, using a proven effective vendor (sponge blast) process. This process, along with RCS pie plate and tripod shielding, were expected to produce dose rate reduction factors of about 100, based on results recently achieved at other stations.

c. Conclusions

Source term reduction strategies were planned and thus far implemented effectively, and adequate work control mechanisms were established to ensure dose savings initiatives were completed timely to accommodate ongoing work.

R2 Status of RP&C Facilities and Equipment

R2.1 Containment Access Facility

a. Inspection Scope (83750, 83729)

The inspector reviewed the changes to facilities and equipment to support the SGRP, and evaluated the impact of the changes on the effectiveness of the RP program.

b. Observations and Findings

The licensee constructed a containment access facility (CAF) for the SGRP, to provide a main control point for access and egress for project related activities inside and outside containment. The consolidated CAF included the main RP control station where RWPs and surveys were reviewed, an electronic dosimetry sign-in station, dress out area, CCTV control and remote monitoring terminals, personnel contamination monitors (PCMs) and SGRP RP offices. Facility consolidation promoted project team work and enhanced RP oversight since radiological information, RP supervision, greeters, PCMs and other key radiological support facilities all existed in a common area and were located adjacent to the main RP control station. The primary CCTV system terminals were installed in a dedicated room within the CAF, and other monitors were positioned in variety of CAF locations to allow workers to remotely view work areas during job briefings.

However, the licensee agreed that the consolidated facility produced some human factors problems such as high noise levels, cramped working space and, at times, significant traffic flow, which detracted from the effective exchange of information.

c. Conclusions

The CAF constructed to support the SGRP provided a centralized point of radiological information and RP oversight, and promoted project teamwork; however, facility consolidation produced some human factors problems that detracted from effective information exchange.

R4 Staff Knowledge and Performance in RP&C

R4.1 Evaluation of Radiation Worker (Radworker) Performance

a. Inspection Scope (83750, 83729)

The inspector evaluated radworker performance during the SGRP through observation of work practices, discussions with job supervisors, workers and RP staff, participation in RP shift turnover meetings and review of personnel contamination event (PCE) reports.

b. Observations and Findings

The inspector observed work practices in containment during early stages of the SGRP before the steam domes were removed, and found that radworker performance was generally adequate and consistent. Workers properly removed protective clothing or were otherwise coached by RP staff stationed at the lower containment area egress, and workers demonstrated proper knowledge of electronic dosimetry alarm setpoints and awareness of radiological work conditions when questioned by the inspector. However, the inspector observed several instances of unproductive workers gathered near the upper containment control point in the trackway region, even though RP staff continually manned the area. While the loitering took place in areas of low dose, it was a poor ALARA practice. RP management planned to address this issue with RP and contractor staffs, and was also evaluating options to curtail escalating instances of lost worker dosimetry.

c. Conclusions

Radworker performance was generally adequate and consistent thus far in the SGRP. Problems with loitering and dosimetry usage were being addressed by the RP staff.

R4.2 Plant Walkdowns and Other Observations

a. Inspection Scope (83750, 83729)

The inspector conducted walkdowns, primarily of the Unit 1 containment building, and reviewed radiological posting, labeling, housekeeping and overall radiological work practices and conditions.

b. Observations and Findings

Radiological postings were properly maintained, and selected radiation and high radiation areas were posted to accurately reflect area radiological conditions. The inspector also verified that selected high and extreme high radiation areas were controlled consistent with regulatory requirements.

Appropriate contamination control practices were established at those job sites observed by the inspector, and ALARA controls for selected jobs were as prescribed by

the ALARA plan and RWP, except as previously discussed in Section R1.3. Radiological housekeeping was adequate as hoses and other items that crossed contamination area boundaries were noted to be secured properly. Contaminated items were bagged, surveyed by the RP staff and labeled and tagged appropriately, with one isolated exception which was brought to the RP staff's attention and rectified. Tools and other materials used in the RPA were controlled consistent with station procedure; however, the inspector found a face shield and welding helmet in a contaminated work area of containment during the early stages of the inspection. The licensee increased RP staff and worker awareness of this problem, which did not reoccur during the inspection.

c. Conclusions

Radiological postings were adequately maintained and accurately reflected radiological conditions, and high and extreme high radiation areas were controlled consistent with requirements. Appropriate contamination control practices were observed at work sites and dose savings initiatives were as prescribed by ALARA plans. Isolated labeling and equipment control deficiencies noted by the inspector and brought to the licensee's attention were promptly rectified and did not reoccur.

R5 Staff Training and Qualifications in RP&C

R5.1 Project Staffing, Training and Qualifications for the RP Organization

a. Inspection Scope (83750, 83729)

The inspector reviewed the SGRP staffing plan, the qualification and selection criteria, and training of contract RP staff. The inspector interviewed contractor and licensee radiation protection staff involved in personnel selection and training coordination, and reviewed resumes and training files of selected contract radiation protection technicians (CRPTs).

b. Observations and Findings

To support the SGRP, the licensee supplemented the in-house RP staff with 62 CRPTs including 44 senior RPTs. Additionally, five contract ALARA staff, a total of eight RP supervisors and decontamination supervisors and about 25 decontamination staff were brought in for the project. Approximately half of the senior RPTs, RP Supervisors and ALARA staff had recent SGRP experience at other utility sites.

Industry standardized qualification criteria was established for CRPTs, consistent with licensee technical specifications. Qualification requirements for senior RPTs included at least three years of working experience in RP as a technician, and a minimum score of 80 percent on the standardized Northeast Utilities Health Physics Exam.

As part of the on-the-job training (OJT) process, CRPTs reviewed specified plant administrative procedures and completed a qualification/verification process as validation of radiological work skills. The validation process was instituted after many of

the CRPTs were already working onsite, and was partly in response to a condition report (CR) issued by the performance assurance group that questioned adherence of CRPT training to station criteria. The CR remained open pending final resolution by the RP group. As part of the validation process, CRPTs were tested on RP job coverage procedures and demonstrated proficiency in simulated job coverage scenarios. The inspector verified through resume review and review of training documents that CRPTs were qualified and adequately trained to function effectively and to satisfy job responsibilities.

Extensive mock-up training was developed for the SGRP and included mock-ups for both process and/or worker qualification for a variety of radiologically significant activities such as RCS pipe severance, pipe end decontamination and RCS internal pipe shielding. Mock-up work activities and personnel that performed them were qualified under site specific conditions that included simulated radiological conditions and use of protective equipment to authenticate the work environment. Documented "Activity Plans" were developed for most mock-ups to ensure that proper manpower, equipment and services were available and to document RP expectations for the activity. However, due to a contractor oversight, the mockup activity plan for the steam generator girth cut was not developed before the mock-up training actually took place. According to the ALARA staff, the lack of a documented plan did not adversely impact the mock-up training or the actual successful performance of the job. The inspector reviewed several mock-up activity plans, reviewed records of personnel and process mock-up training results and observed a mock-up demonstration. Based on this review, the inspector concluded that the mock-up training significantly enhanced job performance and the overall process was implemented as intended.

c. Conclusions

Qualification, selection and training of contract RP staff was consistent with industry standards and licensee procedures, and the size and experience of the supplemental RP staff was adequate to support the project.

R6 RP&C Organization and Administration

R6.1 Project RP Organization

a. Inspection Scope (83750, 83729)

The inspector reviewed the SGRP RP organization and evaluated its effectiveness in controlling radiological work and implementing the RP program for the project.

b. Observations and Findings

The licensee established a dedicated RP organization for the SGRP that included a mix of licensee and SGRP experienced contractor personnel to offset licensee staff inexperience in such projects. The SGRP RP organization was headed by a radiation protection manager (RPM) designated by the licensee, and consisted of a contract ALARA group, a licensee containment operations group and a radwaste/

decontamination group. An RP contractor site coordinator and the Bechtel ALARA team also reported to the SGRP RPM, who in turn reported to the station RPM. The organizational scheme and the placement of the entire SGRP RP staff within the CAF promoted teamwork and communications.

The inspector observed several work activities, attended planning meetings, pre-job briefings and RP shift turnover meetings and evaluated work force control practices and RP staff communications. Based on this, the inspector concluded the RP organization was generally effective in implementing the established RP program. Good coordination and communication with work groups, job supervisors and the RP staff was noted. However, the SGRP RPM was the third appointed since initial project planning began earlier in 1999, and the lack of continuity may have impacted some of the planning activities.

c. Conclusions

The RP organizational scheme established for the SGRP and mix of experienced contractor personnel contributed to the effectiveness of the RP program for the project.

R7 Quality Assurance in RP& C Activities

R7.1 ALARA Program Assessments

Results of a recently completed ALARA program self-assessment and an ongoing root cause analysis of ALARA program deficiencies were reviewed by the inspector and discussed with station ALARA and RP supervisory staffs. The assessments concluded that the licensee implemented the ALARA program adequately and that the program met regulatory requirements and station procedures.

The assessments also identified that prior ineffective work control plagued the ALARA program and that licensee management failed to adequately support and promote the program. For example, the assessments found that work was routinely added to the schedule without sufficient time for proper ALARA planning. Also, station departments were not held accountable for dose or demonstrated proper ownership for the ALARA program. ALARA program implementation and procedural deficiencies were also identified by the assessments.

The inspector verified that CRs were generated to track resolution of identified problems with the station ALARA program.

V. Management Meetings

XI Exit Meeting Summary

The inspector presented the inspection results to members of licensee and contractor management and staff at the conclusion of the site inspection on January 14, 2000. The licensee acknowledged the inspection findings and identified no proprietary information.

PARTIAL LIST OF PERSONS CONTACTED

J. Bundick, Performance Assurance Auditor
J. Cassidy, SGRP Radiation Protection Manager
R. Cook, Regulatory Affairs, Compliance Engineer
L. Dean, SGRP ALARA Lead
S. Dean, SGRP Radwaste/Decon Supervisor
R. Gaston, Regulatory Affairs, Compliance Manager
G. Gazda, Bechtel ALARA
J. Harris, SGRP Radiological Operations Supervisor
J. Kobyra, SGRP Director
T. O'Leary, RadChem and Environmental Manager
F. Reynolds, Bartlett Site Coordinator
B. Sears, Performance Assurance SGRP Lead
D. Wood, Radiation Protection Superintendent/Station Radiation Protection Manager

INSPECTION PROCEDURES USED

IP 83750: Occupational Radiation Exposure
IP 83729: Occupational Radiation Exposure During Extended Outages

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ALARA	As-Low-As-Is-Reasonably-Achievable
CCTV	Closed Circuit Television
CR	Condition Report
CRPT	Contract Radiation Protection Technician
HEPA	High Efficiency Particulate Air
OJT	On-The-Job Training
PA	Performance Assurance
PCE	Personnel Contamination Event
Radworker	Radiation Worker
RP	Radiation Protection
RPA	Radiologically Protected Area
RP&C	Radiological Protection and Chemistry
RPT	Radiation Protection Technician
RWP	Radiation Work Permit
SGRP	Steam Generator Replacement Project
TEDE	Total Effective Dose Equivalent
ULR	Upper Lateral Restraint
WPIR	Work Plan and Inspection Record

PARTIAL LIST OF DOCUMENTS REVIEWED

Station Procedures

PMP 6010 ALA.001 (Rev. 10), ALARA Program-Review of Plant Work Activities
12 THP 6010 RPP.014 (Rev. 3), Total Effective Dose Equivalent Evaluation
PMP 6010 RPP.006 (Rev. 7), Radiation Work Permit Program
12 THP 6010 RPP.006 (Rev. 16), Radiation Work Permit Processing
12 THP 6010 RPP.001 (Rev. 5), Personnel Selection, Training and Qualifications
PMI-2070 (Rev. 14), Training and Qualifications
PMI-5080 (Rev. 7), Administration of Contractors

RWPs and ALARA Plans

RWP# 991106 (Rev. 6), SGRP Insulation Work
RWP# 991135 (Rev. 0), SGRP Steam Generator Cut-out/Weld-in (RCS)
RWP# 991118 (Rev. 3), SGRP Temporary Shielding in Unit 1 Containment
RWP# 991114 (Rev. 1), SGRP Rigging Support, Marine Cranes, Cavity Decking, Runway
RWP# 991120 (Rev. 0), SGRP Erect, Dismantle and Modify Scaffold in Unit 1 Containment
RWP# 991130 (Rev. 5), SGRP Concrete Removal
RWP# 991136 (Rev. 1), SGRP Remove/Install Lower Restraints
RWP# 991129 (Rev. 1), SGRP Feedwater/Small Bore Piping

Other Documents

ALARA Program Self-Assessment (PMP 7034.SAP.001)
Root Cause Investigation For Condition Report 99-19148 Concerning the D. C. Cook ALARA Program (9/20/99)
Mock-up Training and Activity Plans for SGRP
RP Calculation # 96-07 TEDE Evaluation Conversion Factors
Request for Proposal #1013 for Plant Radiation Protection Services Support at D. C. Cook Nuclear Plant
Bartlett Nuclear Lesson Plans for Radiation Protection Technicians