U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

Report No. 80-17 HEALTH PHYSICS APPRAISAL PROGRAM

Docket No. 50-206 License No. DPR-13 Safeguards Group ______

Licensee: Southern California Edison Company
P. O. Box 800
2244 Walnut Grove Avenue
Rosemead, California 91770

Facility Name: San Onofre Nuclear Generating Station-Unit 1

Inspection at: Camp Pendleton and Rosemead, California

Inspection conducted: May 19-30, 1980

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Inspection Summary:

Inspection on May 19-30, 1980 (Report No. 50-206/80-17)

Areas Inspected: Special, announced appraisal of health physics program, including organization and management, qualifications and training, quality assurance, procedures, external and internal exposure controls, surveys and access controls, instrumentation, ALARA, radioactive waste, facilities and equipment and accident response capabilities. The inspection involved 350 inspector-hours onsite by four NRC inspectors.

Results: Several significant weaknesses in the health physics program were identified. These weaknesses are in the areas of staffing (section 2.5), training (3.3), portable radiation protection instruments (section 4.4), radioactive waste management (section 5.6), ALARA (section 6.1), facilities (section 7.5) and emergency response capabilities (section 8.1). One apparent item of noncompliance was identified (deficiency - labeling radioactive waste containers - section 5).

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## 1.0 Health Physics Appraisal - Introduction

The Health Physics Appraisal Team's review of the San Onofre Nuclear Generating Station, Unit-1 radiation protection organization and practices was not structured or conducted as a compliance inspection, in that the scope of the review was broader than is normal in such inspections; reaching into the management of the program at both the site and corporate level. Further, the team was not constrained by existing Technical Specifications or regulatory requirements as a basis for their conclusions. In judging acceptability, the team used their collective professional judgement on numerous occasions to evaluate areas not covered by regulations.

In a number of areas, the team considered the present practices in need of corrective action but at the same time did not believe the existing conditions posed an immediate threat to the health and safety of the workers or the public at large. Conversely, the labeling of an area of interest as acceptable should not be inferred as meaning no further improvement is possible.

The Appraisal Team wishes to acknowledge the spirit of willing cooperation and frankness conveyed by all members of the SCE organization interviewed. One individual interviewed summarized this attitude succinctly by saying that he had looked forward to the Appraisal Team's visit and that the instructions given him in anticipation of the appraisal were to speak his mind without reservation. This cooperation was provided during a difficult period, in what was described as the largest outage Unit 1 had experienced in twelve years of operation.

The Appraisal Team appreciated the fact that their visit occurred during a difficult and extended outage. However, the housekeeping observed by the Team left much to be desired. Poor housekeeping tends to have a deleterious effect on radiation contamination control efforts and for this reason is of concern to the Appraisal Team.

During the appraisal, the Team received repeated comments and sensed in the attitudes of staff members a belief that corporate support for an effective health physics program vascillated from concerned interest to apparent disinterest. The periods of strong support were thought to correlate with the need to respond to personnel exposure occurrences. Based on its review, the Appraisal Team is aware of the published corporate support for an effective radiation safety program; however, the demonstrated corporate commitment should be such that no question exists in the minds of the staff.

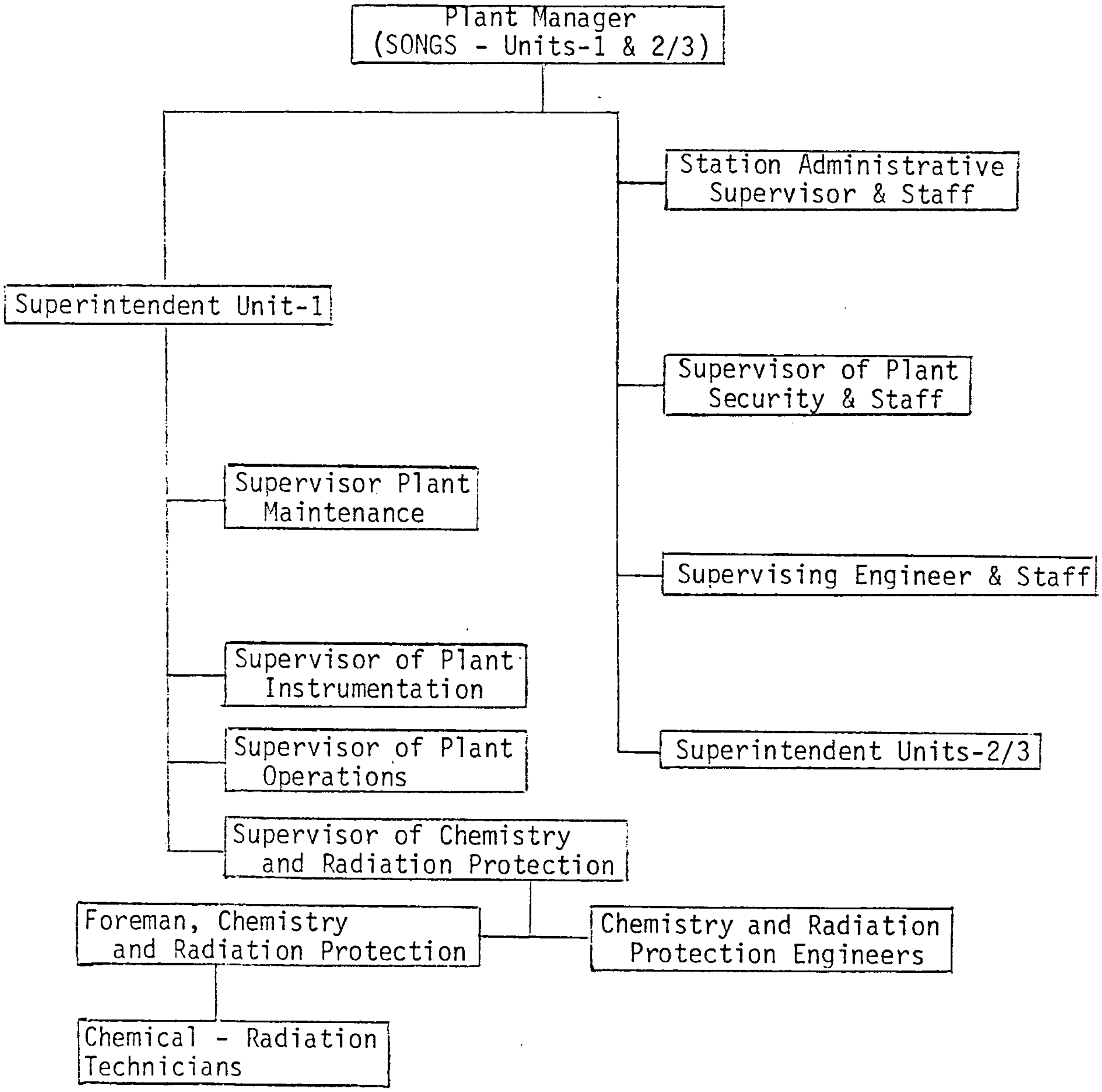
The Appraisal Team believes that the Unit-1 radiation protection program has operated effectively in the face of severe handicaps including inadequate facilities, some of which derive from the original design of the station, and probably the most important the lack of a sufficient radiation protection staff. The available staff was believed by the Team to be able and effective. The past history of generally successful radiation protection activities is believed by the Team to result largely from the dedication and efforts of this group.

The Appraisal Team participated in and observed training, toured the facility both collectively and individually, interviewed management and bargaining unit personnel, examined facilities and equipment, reviewed procedures and records, and observed work practices. It is believed that the team achieved a good understanding of the strengths and weaknesses of the existing program. The Team believes that the resulting conclusions can be beneficial in developing a stronger and more effective health physics and radiation protection program.

## 2.0 Radiation Protection Organization and Management

### 2.1 Radiation Protection Organization - Onsite

The San Onofre Nuclear Generating Station (SONGS) Unit-1 radiation protection organization is as described in Figure 6.2.2.2, Facility Organization, of the Technical Specifications and is as shown in Figure 1. Responsibilities and authorities of the radiation protection organization are clearly defined both by organizational title and formal job descriptions. The job descriptions include the Administrative Professional Supervisory (APS), Exempt and Job Specification categories. The APS classification includes Chemistry-Radiation Protection Engineers (CRPE) 1, 2 and 3 and Chemical Foreman. The CRPE 1, Supervisor of Chemistry and Radiation Protection, Supervisor (CRP), is responsible for the supervision of CRPE 2 and 3 personnel and the Chemical Foreman and for the conduct of the chemistry, radiochemistry and radiation protection programs at Unit-1. The incumbent has been responsible for these specific areas since the plant began operations about 12 years ago. The Supervisor CRP is a member of the Onsite Review Committee. The CRPE 2 and 3 positions provide technical expertise in support of the stations' chemistry-radiation protection needs. The Chemical Foreman, usually identified as the Chemical-Radiation Protection (CRP) Foreman, is responsible for the supervision and training of the Chemical-Radiation Technicians (CRT) staff. The exempt category includes Engineering Aide personnel who support the APS staff in the Chemical-Radiation Protection area. The job descriptions previously identified specify the job title, location, general purpose, duties and responsibilities, contacts and personnel specifications. The CRT position is covered by a Job Specification which includes "indicative" duties and qualifications. Interviews established




San Onofre Nuclear Generating Station Organization

FIGURE 1

that the job descriptions are understood by the assigned individuals.

The Supervisor CRP prepares and distributes specific assignments to the CRPEs and Foreman. These assignments were formerly prepared on a monthly basis; however in the recent past, assignments have been revised and reissued only when changes became necessary. The assignments usually include continuing topical or functional area assignments and certain specific discrete tasks, e.g. radwaste shipments and preparation of a response to a specific IE Bulletin.

The CRP Foreman has prepared seven position assignment lists which designate the area and specific responsibilities for the seven CRTs during normal operations. The assigned positions are #1, Turbine Plant Lab.; #2, Reactor Plant Lab.; #3, Health Physics Office; #4 Counting Lab and Ge(Li) System; #5, Sample Collection and Counting; #6, Special Assignments (Spent Fuel, Solid Waste or Resin shipments) and assistance in Health Physics Office; and #7, Instrument Calibration and relief for the other six positions. At the time of the Appraisal the licensee was involved in a major refueling outage. The CRT staff and Foreman position had been augmented with major support principally by Unit-2/3 personnel.

With respect to keeping exposures as low as reasonably achievable (ALARA), the only authority assigned to the radiation protection staff consisted of a general statement in the CRPE 1 Job Description to the effect that the individual was responsible for direction of the program to maintain personnel radiation exposures as described by NRC Regulatory Guidance and Federal Regulation. No other specific delegation of authority to take actions necessary to prevent excessive exposures was identified. However the radiation protection staff uniformly believe it to be both their duty and responsibility to take any action necessary to prevent excessive exposures or violations of Southern California Edison Company (SCE) safety rules. A general belief existed that it was proper to take action to prevent excessive exposures first and address any concerns about authority for the action at a later time.

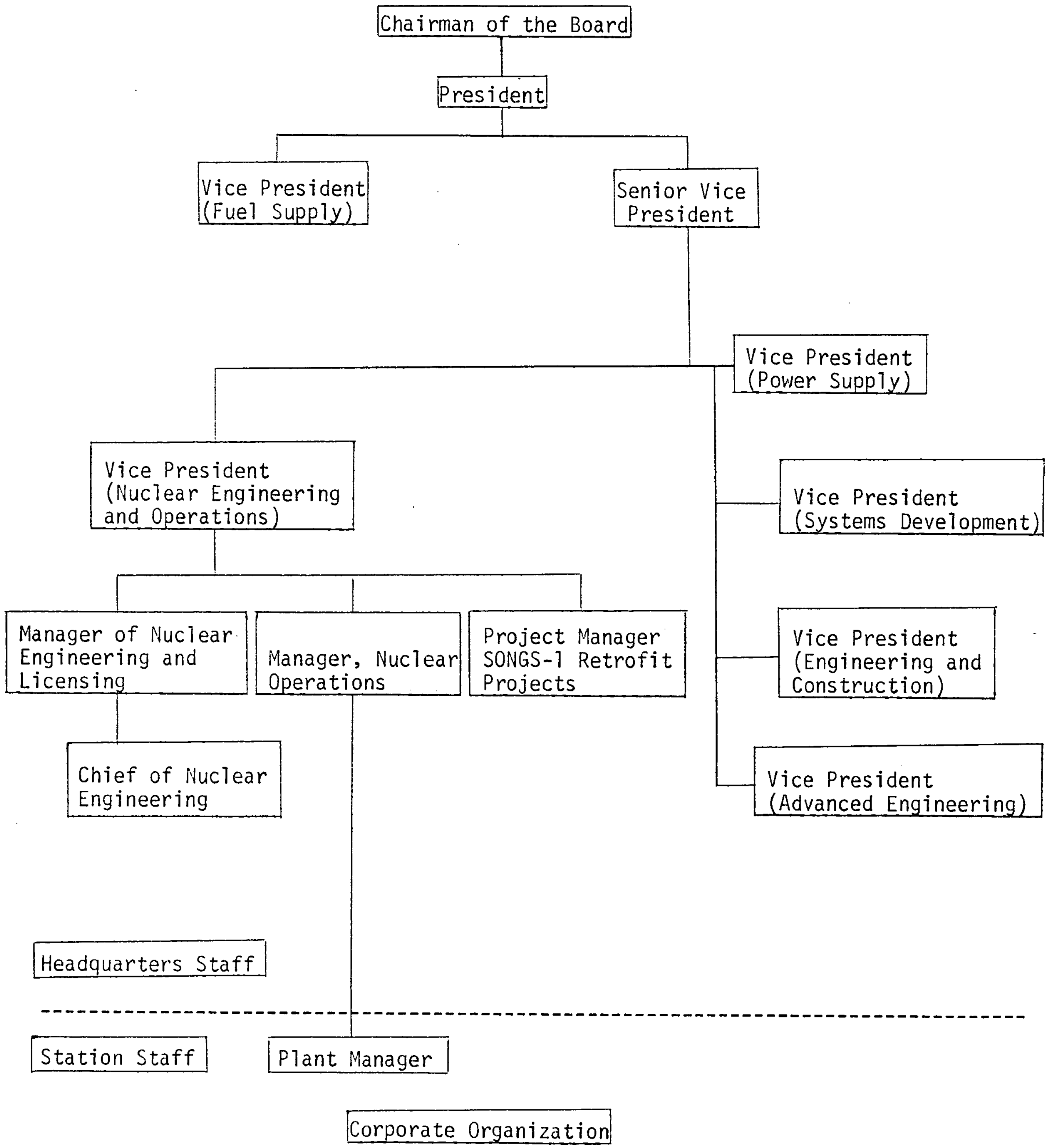
The station radiation protection organization is appropriately positioned in the station organizational structure. The Supervisor CRP participates in station meetings and has direct access to the plant superintendent. The radiation protection organization appears to be functionally organized for the most efficient and effective use of its personnel and resources. Assignment of duties and responsibilities is clear; however, the authority delegated to the radiation protection staff in matters of radiological safety needs further clarification or added emphasis.

2.2 Radiation Protection Organization - Offsite

In a letter dated December 31, 1979, the licensee submitted proposed amendment No. 87 to docket number 50-206 which consisted of Proposed Change No. 85 to the Technical Specifications. The change identified a corporate reorganization which established the position of Vice President, Nuclear Engineering and Operations and a supporting staff as a separate entity. The revised organization is shown in Figure 2. Discussions with station and corporate office personnel established that no corporate level radiation protection organization exists as a separate entity. Specific individuals in the corporate office have varying levels of training and experience in health physics but are not necessarily members of the same group at the corporate level. The licensee has been attempting to expand this capability as evidenced by the presence of a member of the nuclear engineering staff on a year's assignment to the Unit-1 radiation protection staff as a CRPE. In addition, a former CRPE from Unit-1, who had transferred to environmental duties at the corporate office, returned to Unit-1 during the outage as a backshift CRP Foreman. At the time of the Appraisal early planning of possible staffing changes at the corporate and operating levels was underway. The planning was insufficiently advanced for any firm definition of the plans, however a corporate level health physics function was to be considered.

2.3 Scope of Responsibilities and Staffing

The responsibilities assigned the Unit-1 radiation protection organization are appropriate and include personnel monitoring, surveys, Radiation Exposure Permit (REP) issuance, job coverage, ALARA review, chemistry, sample counting, respiratory protection, instrument calibration, training and program management. For assignment to these areas of principal responsibility the Supervisor CRP has a staff of two CRPEs, one Engineering Aide and the CRP Foreman. In July 1979, one engineer from the Corporate engineering staff was given a one year assignement as a CRPE to the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Station Staff
Plant Manager
Corporate Organization

FIGURE 2

Unit-1 radiation protection group for training purposes.

The small Unit-1 radiation protection staff and the relative inexperience of a number of the CRPE staff poses special problems during periods of absence of the Supervisor CRP. At present some assistance can be provided by the Unit-2/3 staff, however this source of support will probably be less available in the future as these units enter the preoperational phase.

The programmatic assignments of the Unit-1 staff and certain members of the Unit-2/3 staff applicable to Unit-1 activities are shown on the attached matrix (Figure 3).

| | Unit 1 Supervisor CRP | Unit 1 CRPE | Unit 1 CRPE | Unit 1 CRPE | Unit 1 - Foreman CRP | Unit 2/3 - Supervisor CRP | Unit 2/3 - CRPE | Supervisors Plant Instrumentation | Footnotes |
|---|---|---|---|---|---|---|---|---|---|
| Personnel Monitoring | | | | | | | | | |
| External | | X | | | | | | | |
| Internal - Bioassay | | | | X | | | | | |
| REP issuance | | | | | X | | | | |
| Counting Room | | | | | X | | | | |
| Instrument Maintenance and Calibration | | | | | X | | | X | (1) |
| Chemistry | | | | | X | | | | |
| Program Management | X | | | | | | | | (2) |
| Surveys | | | | | X | | | | |
| Job Coverage | | | | | X | | | | |
| ALARA Review | | | | | X | | | | |
| Respiratory Protection | | | | | X | | X | | (3) |
| Training | | | X | | X | X | | | (4) |
| Related Areas | | | | | | | | | (5) |
| Environmental Monitoring | | | X | | | | | | |
| NPDES Program | | | X | | | | | | (6) |
| Off-site TLD program | | | X | | | | | | |
| Radiological Releases | | | | X | | | | | |
| Radioactive Waste Shipments | | | | X | | | | | |
| TMI - related items | | | | X | | | | | |
| Emergency Planning | | X | | | | | | | |

FIGURE 3

## Figure 3 Footnotes

1. Maintenance is performed by the Plant Instrumentation group which also performs the electronic portions and check source calibrations of the process and effluent monitors. CRTs calibrate portable survey instruments.

2. The Unit-1 Supervisor CRP in addition to management responsibilities is the principal technical resource onsite in the area of chemistry and has more experience with the overall radiation protection program than anyone in the SCE organization. While some members of the CRPE staff may have more detailed and specific knowledge of certain aspects of the program, he has an excellent overall grasp of the total program.

3. During the refueling outage, which was underway during the Appraisal, a member of the Unit-2/3 CRPE staff was assigned the responsibility for the supplied air respiratory protection program associated with the steam generator work, its implementation and related training. This program was apparently well conceived in both design and implementation, however the support provided by Unit-2/3 in this area was for this specific project and was not a continuing commitment to the Unit-1 respiratory protection program.

4. The Unit-1 CRTs most recently arrived onsite, approximately 1½ years ago, were trained by the Unit-2/3 Supervisor CRP. This training resource will not necessarily be available in the future. A recently hired (7 months) Unit-1 CRPE has been assigned the responsibility for training in Radiation Protection. During the outage this individual's time was fully committed to various training activities. The CRT retraining program is essentially the responsibility of the CRP Foreman with occasional outside assistance from the CRPE staff.

5. Related Areas The items included in this category are specific assignments delegated to the CRPE staff which lie outside the general scope of responsibilities.

6. NPDES National Pollution Discharge Elimination System.

During the refueling outage, in progress at the time of the Appraisal, the Unit-1 staff had been augmented with 7 CRTs and, two CRP foremen from Unit-2/3 and one CRPE from corporate headquarters who worked as a CRP Foreman. Without this assistance during the outage, it was obvious to the Appraisal Team, that the existing Unit-1 staff would have been unable to cope with the stresses imposed by as many as 1100 persons entering the Controlled Access Area during a 24 hour period. It is noted that current plans call for the operation of Unit-1 and Units-2/3 as separate facilities. Unit-2 is entering the preoperational phase during which the work load on the Unit-2/3 radiation protection staff can be expected to increase significantly. Thus Unit-2/3 support for Unit-1 activities may be less available in the future.

The licensee, as a matter of policy, does not use contract radiation protection technicians.

The Unit-1 CRP Foreman, in addition to his supervisory responsibilities for 7 CRTs and technical oversight of daily activities, is responsible for the generation of a variety of reports derived from information developed by the technician staff and also for the daily review and signoff of all chemistry and radiation protection data sheets and surveys. The CRTs' stated that the Foreman was overworked and was not able to devote the necessary time to supervisory functions. It was observed during the Appraisal that the Foreman's office was the principal location for coordination with other working groups, much of it occuring at the last minute. The Foreman was also responsible for maintaining radiation protection related supplies such as protective clothing. In spite of the addition of 3 foremen to the Unit-1 staff, the radiation protection activities during the outage could well have been deficient had it not been for a dedicated and knowledgeable staff of CRTs.

To provide some idea of the scope of the Foreman's responsibilities the most recent (September 1979) assignment by the Supervisor CRP included:

1. Supervise CRTs
2. Monitor and initial all CRT data sheets
3. Inventory and order supplies
4. Prepare monthly chemical letter
5. Revise designated procedures
6. Respiratory protection program - (later modified by assistance) from Unit-2/3 CRPE)
7. CRT retraining program.
8. Electrical generator hydrogen sampling

9. Diesel generator coolant sampling and analysis
10. Review and revise all applicable PSSO forms

The Unit-1 CRP Foreman is respected by his subordinates and supervisor for his supervisory skill and technical ability and by members of other station departments for his ability to interface well with them at the operating level.

The seven (7) Unit-1 CRTs view themselves as a team responsible for the protection of the health and safety of SCE co-workers, contractors and the public. A spirit of cooperation exists in the staff which is fostered by the older members of the CRT staff. A new CRT joining the staff is subject to peer pressure and active indoctrination by older CRTs in the existing CRT work ethic. CRTs if unoccupied by other duties respond to requests for guidance and assistance from other CRTs who find themselves in need of such guidance or assistance. This cooperation among the CRTs functions well, apparently without the need for intervention by the Foreman. Historically the CRT staff has worked a five day week. Shortly before the arrival of the Appraisal Team onsite the Unit-1 staff had been informed of the necessity to begin a 7 day three shift schedule at the end of the present outage. The back and weekend shifts are to consist of one CRT. The move to shift coverage is required to respond to the requirement for an enhanced emergency response capability. The CRTs however view this as a breaking up of the team and are generally concerned by the potential lack of any CRT backup capability during back and weekend shifts.

During the Appraisal, data concerning overtime worked by the CRPEs, Engineering Aide, CRP Foreman and CRTs, for an outage period (January 28 - February 10, 1980) and a non outage period (February 11 - March 23, 1980), were examined.

| Employee group and (number in group) | Average Overtime (hours/person/week) and (Percent Overtime - based on 40 hour week) | |
|---|---|---|
| | Outage | Nonoutage |
| CRPE (3) and Engineering Aide (1) | 37 (93%) | 8 (20%) |
| Foreman CRP (1) | 36 (90%) | 6 (15%) |
| CRT (7) | 35 (88%) | 9 (23%) |

(values rounded to even hours)

As a result of the move to shift work, with the existing staff, it appears possible that a drop in performance by the CRT staff could be expected as a result of a loss of morale and a reduction in the continuing reinforcement of the CRT team concept. The reduction in the number of CRTs available on day shift will almost certainly reduce the ability of the CRP Foreman and the day shift CRTs to be as effective in responding to the needs of the day shift operations and maintenance groups. At the time of the Appraisal, the Supervisor CRP had recommended the additions of CRT's, CRPE's and engineering aids to the staff. No decision had been made with respect to the recommended staff increase when it was discussed with licensee management.

The ability of the radiation protection staff to function at maximum efficiency is limited by the availability of administrative support. While all those questioned agreed that vital reports or other documents could be processed promptly, a common comment was that processing of non priority work required extended periods of time. In addition, certain tasks which could be performed by administrative support personnel were of necessity performed by professional and technical level personnel.

## 2.4 Management Oversight

This topic heading incorporates an evaluation of both management adequacy and manager effectiveness. The information used in these evaluations were obtained principally from station personnel both within and outside the radiation protection organization. Some discussion in these areas was also held with corporate office personnel. In the area of management the Appraisal Team examined the planning, organizing, directing, coordinating and controlling functions as they impacted on the radiation protection organization.

### 2.4.1 Management Adequacy

The Team identified planning and coordination of radiation protection activities as problems requiring management attention. During normal operations these problem areas are minimized because of the presence of an experienced staff. The station staff indicated that some lack of planning and coordination existed between the station engineering and radiation protection group. Normal operations appeared to present no problems so far as the radiation protection, operations and maintenance groups were concerned. Much of the detailed coordination and planning activities occur at the working (foreman) level.

Although daily morning and afternoon meetings are attended by station and contractor personnel including the Supervisor CRP and CRP Foreman, and critical path charts are used to schedule and follow work in progress, forcasting of work involving the radiation protection group appears to break down during outages. The principal problems seem to be associated with contractor personnel. The lack of adequate preplanning and coordination frequently forces the radiation protection group into a reactive rather than a planned response to ongoing work. Forcasting was weak in the logistics area because the early outage planning indicated a significantly smaller outage than subsequently developed. This was evidenced by a significant underestimation of the need for such items as protective clothing.

The radiation protection staff had initially planned for approximately 200 people as a result of the one contractor's scheduled work. Instead the work force grew to 400-500 people. It was alleged that it was the contractor's practice to increase the number of workmen as delays in completion of the work occurred. The resulting unexpected impact on the radiation protection group significantly reduced the value of the outage planning in the areas of logistics and manpower allocation.

SCE has formal employee appraisal programs which function for both the APS and bargaining unit personnel. These programs are not held in particularly high esteem. One instance was reported in which two APS employees were both highly rated during the same appraisal period. The appraisals were returned to the appraiser with the admonition that only one employee could be rated highly because only one salary increase could be permitted in the group involved. With respect to the correction of substandard performance, the APS staff serves at the pleasure of the company and continued poor performance can result in the discharge of the poor performer. High performance can be rewarded with salary increases and promotions. In the case of bargaining unit employees (CRTs), after an initial six months probationary period and an increase to journeyman pay scale, pay increases are limited to union negotiated adjustments applicable to the group as a whole. Correction of substandard performance by CRTs appears not to have been a problem, however possible corrective actions are limited by the usual bargaining unit conditions.

## 2.4.2 Quality Assurance

The Quality Assurance (QA) program consists of an onsite QA group of eight individuals. The onsite QA organization reports to the Corporate Manager, QA. The primary function of the QA organization with respect to the CRP group is the verification of compliance with existing procedures and regulatory requirements. QA audits are formal, conducted in accordance with a plan and require and assure corrective action in deficient areas. The Quality Assurance program adequately monitors compliance with regulatory, Technical Specification and Unit-1 procedures in the area of radiation protection at the station.

As presently organized and chartered QA has no responsibility for quality assurance audits of consulting laboratories or service companies in the following areas:

a) Personnel Monitoring Film Badge Service
b) Uranalysis Sample Tritium Assay
c) Whole Body Counts
d) Monthly composite radioactive liquid release sample analysis
e) Nuclear Laundry
f) Respiratory Mask cleaning.

This results from the view that radiation protection generally is not included under the umbrella of systems and components important to safety as described in 10 CFR 50. In addition 10 CFR 20 imposes no requirement for the implementation of a quality assurance program with respect to radiation protection activities.

Shortly after the announcement of the Health Physics Appraisal program to all operating power reactor licensees (V. Stello, Jr., Director, OIE, January 22, 1980) a special audit of the SONGS Unit-1 radiation protection program was conducted by SCE, QA, in response to a request from the Manager, Nuclear Operations. The audit (ENV-SCE-3-80), addressed areas not normally included in the routine audit program. The cover letter to the special audit report stated that "The audit plan was developed to be consistent with the expected effort by the NRC special appraisal team---." The special audit identified problem areas that were in part in substantial agreement with certain of the Appraisal Team's findings, specifically, "---1) a need for documents controlling lines/ levels of authority, especially during a radiological emergency, 2) training of station and contractor personnel on 10 CFR 19.12, 3) revision of station order S-A-126 to include all applicable training,---."

SCE's Quality Assurance (QA) organization conducts regular audits of the radiation protection group's activities. The routine audits are oriented toward compliance with regulatory and procedural requirements. The audits are performed by persons with no particular expertise in the field of health physics or radiation protection. It is the QA organization's intent that such audits be conducted by the regular audit staff and that specialists not be included as part of the audit team. The failure to include a health physics oversight function in the audit program limits audits to an objective, compliance oriented viewpoint with little or no evaluation of program or procedure quality or effectiveness. A subjective audit aspect requiring health physics evaluation would appear to be beneficial.

The routine audit program functions effectively in identifying and correcting specific items associated with possible noncompliance with Technical Specification, regulatory or procedural requirements. The routine audit program does not attempt to evaluate the effectiveness of the onsite radiation protection program in the discharge of its assigned responsibilities. The special audit (ENV-SCE-3-80) was significantly more effective in the overall evaluation of the radiation protection program.

### 2.4.3 Manager Effectiveness

That portion of the Management Oversight section dealing with manager effectiveness addressed establishing goals, motivation, communications, maintaining cooperation, innovation, decision making and subordinate development. The present Supervisor CRP, as previously noted, has been at Unit-1 since it began operations. Initially reporting through the station engineering staff and responsible for radiation protection and chemistry he had a staff of two CRTs. As a result, he is intimately familiar with the plant and its past operating history. The Supervisor CRP is viewed by some as particularly effective in developing subordinates. It was stated to the Appraisal Team that there have been more promotions from the radiation protection group than any other station group, with the exception of operations, which has a staff a factor of three larger and a greater internal promotional potential. The radiation protection staff has a low turnover generally limited to promotions or to positions of increased responsibility or new challenges.
While the Supervisor CRP is not seen either by his subordinates or superiors as being strongly motivative, he has developed a

strongly motivated staff. Generally the strong motivation is seen by subordinates to be derived from personal pride in job performance. It is the Appraisal Team's belief that while part of the radiation protection groups high level of motivation may be attributed to good personnel selection practices, some of the credit is due the Supervisor CRP.

The Supervisor CRP stated, with respect to establishing goals for subordinates, that he wished to create a staff capable of dealing with the radiation protection group's assigned tasks and with the increased regulatory pressure. It is in the area of communications and subordinate development where problems may exist. The Supervisor CRP uses a philosophy of subordinate development for the CRPE based on learn-by-doing. He makes assignments on both long and short term bases and permits the assignee to accomplish the goals with a minimum of guidance. It is his belief that this method results in the most rapid development of a capable staff. Unfortunately this approach was neither obvious nor explained to personnel who were the subjects of this training technique. A number of the individuals involved felt that their supervisor was disinterested and unconcerned with their progress on assigned tasks. When the possible use of a sink or swim training technique was mentioned by the Appraisal Team, it was seen as a new idea not previously considered. It was apparent that a dichotomy exists in the perception of internal communications. Individuals at all levels in the radiation protection organization who have been with the group for several years, see the Supervisor CRP as approachable with respect to communication on any subject. More recent additions to the staff do not have this perception and see the Supervisor CRP as uncommunicative. It should be noted that the present and previous CRP Foreman stated that communication with their supervisor was supportive and occurred on a daily basis. A comment received from several sources indicated that more frequent staff meetings or some other method of improved communications would be beneficial.

The Supervisor CRP is seen by his staff and peers as receptive to new ideas; however, because of apparent previous resistance to change by upper management, he is not as forceful in pursuing innovative ideas as he might be. A general feeling was found at the station that SCE tends to be a conservative organization and that if a technique worked in the past there is little reason for change.

Decisions concerning the radiation protection group's activities are made promptly in the areas where the Supervisor CRP has authority. While a general consensus of all personnel is not sought, he discusses matters under consideration with involved individuals before making a decision. Several indications were found that decisions, which were appropriate to the Supervisor CRP, were preempted by higher levels of management. In this context it appeared that occasional conflicts in direction resulted when direct instructions or assignments were given members of the radiation protection group which bypassed the Unit-1 Superintendent.

In the past, funds for professional and technical development of radiation protection group personnel have been limited. This situation appears to be easing under the new organization. As perceived by a significant number of individuals interviewed, this limitation on training funds was previously not uniformly applied to all station groups. When this impression was coupled by staff members, with the security program and its large staff, a significant number of the individuals interviewed did not perceive a strong management commitment to radiological safety.

## 2.5 Conclusions - Radiation Protection and Management

Based on the above findings, improvements in the following areas are required to achieve an acceptable program.

(1) The Appraisal Team believes that the present staffing level is inadequate to provide necessary coverage in technician, foreman level supervision and technical support during routine operations. This limitation is further compounded by the move to shift operations and the possible need to respond to emergency conditions.

(2) A corporate level radiation protection or health physics organization is seen as a vital part of a corporate commitment to radiation protection. Such an organization should be available to provide planning, technical support and an audit function for the onsite radiation protection group. A corporate level group would also serve as added support in the event of an emergency.

The following matters should be considered for improvement of the program.

(1) Planning and coordination during outages should be improved to permit a planned rather than reactive response to the increased work load.

(2) Communications within the radiation protection group should be improved to provide a better understanding of the goals, priorities and advanced planning affecting the group.

(3) The apparent improvement in the area of professional and technical development should be continued and supported.

(4) The authority delegated by station and corporate management to the radiation protection group should be more clearly defined or the existing delegation emphasized.

(5) Consideration should be given to providing a qualified replacement for the Supervisor CRP during periods of that individual's absence.

(6) The use of consulting laboratories and service organizations in support of the radiation protection functions should require quality assurance audits of the furnished services. The audit team or individual should include an individual qualified in the field of Health Physics.

## 3.0 Personnel Selection, Qualification and Training

### 3.1 Personnel Selection and Qualification

The qualifications of the Unit-1 Chemistry and Radiation Protection group staff were examined. It was established that: (1) The Supervisor CRP meets the qualification criteria for Radiation Protection Manager (RPM) of Regulatory Guide 1.8; (2) The three CRPEs, two permanently assigned to Unit-1 and one on temporary assignment, meet the educational criteria for RPM, but not the experience requirement; (3) The CRP Foreman was promoted to a supervisory position from the CRT bargaining unit upon the transfer of the previous CRP Foreman to Unit-2/3. The CRP Foreman meets the requirements of section 4.4.4 of ANSI 18.1-1971; (4) Four of the seven CRTs currently meet the qualification criteria of Section 4.5.2 of ANSI

N18.1-1971. The remaining CRTs will meet the criteria after additional experience. In addition, the acting swing shift CRP Foreman, a CRPE, also meets the education and experience requirements of Regulatory Guide 1.8 as an RPM.

The selection criteria applicable to the various professional and technical level positions in the radiation protection group are specified in the APS Job Descriptions. The Job Descriptions for engineers, Supervisor CRP and CRPE, identify both education and experience requirements. The Job Description for the Chemical-Foreman position specifies high school or equivalent education with additional knowledge of chemistry and physics and three to five year experience as a Chemical or Chemical-Radiation Technician. The Job Specifications for Technician, Chemical Radiation, notes that, "---knowledges, skills and abilities required---", are essentially those comparible to a high school education, supplemented with specialized study in nuclear physics and considerable experience as a Chemical Technician.

CRTs assigned to Unit-1 are selected from applicants from the SCE Chemical Technician staff through a bidding process. SCE's, Division Chemical, selects and trains Chemical Technicians. The Chemical Technician training program usually requires approximately 18 months and includes progression through the Lab Assistant and Chemical Technician ranks before a potential candidate is eligible to bid a position as a CRT. Formerly SCE's Division Chemical included, as a part of the Chemical Technician training, classroom training in basic radiation protection and nuclear physics however this specialized training is no longer provided. Selection as a CRT candidate requires a passing score on a technical qualification test.

## 3.2 Training Program

The licensee's training program includes initial training and retraining in radiation protection for specific work groups who will require access to the Controlled Access Area. Problems were identified with respect to the radiological training provided certain specific work groups. It is the Appraisal Team's opinion that significant improvement is needed in the licensee's radiation protection training program. While not an exact comparator, the difference between the new hire security training program and the informal radiation protection training program gives the impression of a lack of support in the area of radiation protection training.

### 3.2.1 CRP Personnel Training

New CRTs have had a minimum of 18 months of on-the-job training as chemical lab technicians and have studied (on their own) a SCE prepared manual and passed a test covering basic concepts of radiochemistry and health physics. Once a candidate has passed the qualification test and is assigned to Unit-1, some further on-the-job training follows with the opportunity for specialized training at the biweekly staff training meetings which include topics such as QA, reactor systems, radwaste, ventilation, and procedures. While Revision 9, Section 5.9.3.1 of the FSAR and Station Order S-A-126 implies that far more extensive training is provided for CRTs, the described formal programs of two six-week classroom sessions on radiation protection and plant systems currently did not exist at Unit-1. At the time of the Appraisal no new or untrained CRTs were members of the Unit-1 staff. The formal classroom training in radiation protection and radiochemistry, formerly provided as a part of the chemical technician training at SCE's Division Chemical facility, had been discontinued. No replacement for that formalized training program at Unit-1 had been developed at the time of the Appraisal.

A formal radiation protection training program is in existence for Unit-2/3 CRTs. The Unit-2/3 training program for CRTs includes lesson plans, examinations and on-the-job training. Following the deletion of radiation protection-radiochemistry training from the Division Chemical training program, the Unit-2/3 CRT training program was implemented to train several CRTs presently on the Unit-1 staff. The need for replacements was occasioned by the planned transfer of trained Unit-1 CRTs to the Unit-2/3 staff. The Unit-1 CRTs were trained by the present Supervisor CRP, Unit-2/3, who was a CRPE on the Unit-1 staff. The training included two week lecture periods alternated with two week on-the-job training under the guidance of experienced CRTs and the CRP Foreman. According to licensee personnel, additional planned training/retraining includes: biweekly safety meetings and an annual part-day review of radiation protection fundamentals, given by the health physics staff, and a requalification exam for unescorted access to the Controlled Access Area.

Records documenting CRT training were incomplete or not available at SONGS. Lesson plans, schedules and copies of examinations and scores were not available except for those CRTs trained under the Unit-2/3 training program. The CRP Foreman, to whom the responsibility for CRT retraining had been delegated, had records of attendance and topics discussed at biweekly safety meetings. The topics included some systems training. The Engineering Data Management Center (EDM) had copies of the exam answer sheets for the annual employee requalification for unescorted access to Controlled Access Areas. The biweekly safety meetings were discontinued during the outage.

No organized station course for plant systems is currently provided to CRPEs or CRTs, however, some systems training occurs during the biweekly CRT safety meetings. Because of the lack of organization and preplanning this method of training fails to assure that all topics are adequately covered, appropriate retraining occurs, and that system changes are discussed on a timely basis. In this regard, it is not clear that system changes which could affect the practical performance of duties and ALARA are always upgraded in the affected station procedures. A Change Notice system exists, but whether it is totally responsive to those requirements is not known. The fact that there are no formal lesson plans or schedules, no apparent instructor assignments, and no exams on plant systems beyond those previously identified emphasizes the need for improvement in the training/retraining activities for Unit-1 CRP group personnel by the licensee.

Apparently no special training has been conducted regarding reaction of the CRTs or CRPEs to special health physics problems associated with a TMI-type accident. One of the reasons for lack of training within the CRP group appears to be the low ratio of staffing (on both professional and technician levels) to workload. In addition to the CRTs, the CRPEs have had little training other than occasional attendance at the technician biweekly safety meetings (often as instructors). The CRPEs were concerned about the lack of opportunity to attend outside training courses. In the past, the opportunity for professional staff members to attend professional meetings or specialized short health physics or radiation protection training courses has been almost nonexistent. It appears that there has been some improvement in this area in that three short courses were recently approved for attendance by the CRPEs. The Supervisor CRP should also be provided the opportunity to participate in professional training courses and meetings.

### 3.2.2 Qualified Escort Training

The licensee's decision to use only SCE CRTs during high work load periods, e.g. outages, when coupled with the limited staff and the level of training (three days) required for unescorted access to Controlled Access Areas caused the licensee to implement the Qualified Escort program. Under this program, temporary security personnel (Wells Fargo) are provided sufficient training to permit them to act as escorts for non SCE personnel, usually craft workers, who require access to the Controlled Access Area of the station. These escorts may escort up to ten persons assigned to tasks in the same physical location. The escorts are provided to assure that the workers adhere to the terms of the Radiation Exposure Permit (REP) and station radiation protection procedures and practices. Escorts are also used to monitor step off pads and frisking for personnel contamination.

The escort radiation protection training program is conducted by one CRPE on an as needed basis. The training is designed to promote safe and efficient work practices in radiation and contamination areas and to thereby qualify personnel for unescorted access to all Controlled Access Areas of the station. A person with such qualifications is designated as a Qualified escort for a period of one year. In addition to the qualified escorts necessary for the large influx of contractor staff during this refueling outage, this training is also provided to all personnel (SCE or contractor) who require unescorted access to the Controlled Access Area. The typical class is three days long and includes a tour of the Controlled Access Area and containment sphere, depending on reactor operating conditions. The Appraisal Team witnessed a portion of one of these training sessions which was provided to 12 Wells Fargo escorts and two SCE engineers. Although no formal lesson plans exist, a 45-page handout entitled

"Radiation Protection Training Manual" (Revision 2, Feb. 1976) is given to each participant. The training includes material on atomic structure; radiation exposure effects, risks, standards; control and monitoring, emergency situations; the use of friskers, dosimeters, and step-off pads; and the use of safe and efficient work practices to keep occupational exposure ALARA and to minimize the generation of unnecessary low-level radioactive waste. Completion of a written examination (50 multiple choice questions) with a score of at least 70% is required to become a Qualified Escort. In discussions with the class instructor, if a person fails the exam, he is given another opportunity to take the exam - a different version - after discussion of his apparent misunderstandings with the instructor. An annual retraining course, one day or less in length, is required to maintain Qualified Escort status. The retraining is followed with a 25 question, requalification examination. A brief review of the exam questions by the Appraisal Team indicated that not all questions had choices involving correct answers, yet the students were requested to circle the best answer for each question.

Records of the Qualified Escort training/retraining program were stated, by the instructor, to be in the Radiation Protection Personnel Records files in the EDM vault. The Appraisal Team checked some of these files with the following findings: answer sheets with scores were included and current for each of the nine SCE and one Wells Fargo files checked; however, no test results were noted for the five Bechtel/Westinghouse personnel files checked. It was not possible to determine from the files whether these individuals required qualified escort training. Bechtel craft workers were routinely accompanied by Qualified Escorts. Westinghouse steam generator workers were accompanied by a CRT or a CRP Foreman during steam generator entries or inspection activities.

The Appraisal Team obtained a copy of a new booklet, "Employee's Guide to Radiation Protection". The booklet was developed as a result of a perceived need for better instruction of craft workers. Shortly before the Health Physics Appraisal, allegations were made concerning unsafe work practices at Unit-1. An investigation by NRC's Region V office (Report No. 50-206/80-13) was conducted. In response to the worker concerns, the station established a condensed radiation protection lecture and began issuance of the identified booklet for all new hires entering the plant. This guide is a useful addition to available training materials, but its utility may suffer because the graphic portions are not site specific and as a result may mislead the reader. Specific examples include: the portrayal of thick walled GMs for frisking rather than the pancake probes which are used, protective high-top boots rather than shoe covers (rubber or canvas), and step-off pads with different labels than those in use at Unit-1. At the conclusion of the Guide, a discussion about emergency signals fails to mention what sounds are to be expected, what the signals mean, or the desired response to such signals. The booklet was prepared primarly for distribution to those individuals who have not received the Qualified Escort training. Site specific training in frisking, anti-contamination clothing and use, step-off pad use, and response to emergency signals is a part of the Qualified Escort training program.

### 3.2.3 10 CFR 19.12 Training

The previously identified training programs do not in all cases adequately address those topics required by 10 CFR 19.12. The licensee allows some individuals (SCE personnel, contractors, and visitors) to enter the Controlled Access Area, under continuous escort, without receiving the Qualified Escort radiation protection training. Most of these people require immediate access to accomplish their assignments and hence do not have the time available to participate in the 3-day class. In these cases, reliance is placed on the qualified escort to provide the necessary guidance to satisfy the requirements of the regulation. Steps should be taken to assure that all individuals entering the Controlled Access Area receive formal, documented instruction in those areas specifically identified in 10 CFR 19.12.

### 3.2.4 Other Training

By virtue of their work, maintenance personnel (both SCE and contractor) are exposed to the more significant radiological hazards, more so than any other group of workers with the possible exception of CRP personnel.

These workers receive verbal job specific radiological safety guidance on-the-job from the CRTs or written guidance in the form of REPs. SCE Maintenance Division traveling personnel receive approximately a one-half day radiation protection training. Other workers receive training only in donning and removing protective clothing, because their job assignment is such that they will be escorted by either a CRT or other Qualified Escort. Personnel assigned to make steam generator entries receive approximately one hours training in the use of supplied air hoods. This training is given by the CRP staff (technicians and professionals). One of these sessions was observed by the Appraisal Team. The session was apparently well-received by the workers and was very practical, indicating the steps for donning and removing protective clothing and air supplied respiratory hoods.

Station personnel (principally the CRP group) who may have need to use supplied air hoods are given formal training as provided for in Procedure S-VII-1.37. An examination is administered at the conclusion of the training. The documentation of the respiratory hood training is included in the Radiation Protection Personnel Records files in the EDM.

One final area of training was discussed with the CRPE assigned responsibility for the emergency plan. In addition to the emergency plan itself, he has the responsibility for conducting training sessions (safety meetings) on various aspects of the Station Radiation Emergency Plan. This training has not been formalized with lesson plans and schedules. Annually a sitewide safety meeting is held for all station staff covering the Radiation Emergency Plan. The chairman of the Safety Committee maintains records of these annual safety meetings including attendees and topics discussed.

The CRPE assigned responsibility for emergency planning prepares scenario's for the quarterly drills, which include appropriate alarms - to which personnel are expected to respond as though an actual emergency existed. The response includes tests of communications systems, however no offsite participation or activity is included in these drills. Separate exercises involving the corporate staff and offsite agencies are conducted but were not examined as a part of the appraisal. Station staff members expressed concern that the quarterly drills involved only a limited number of the available station staff and usually occur at shift change. The concern expressed was that in an actual emergency station personnel would not necessarily respond appropriately because of the lack of past experience. During the drills referees observe the conduct of the drill (based on the written scenario). At the conclusion of the drill a critique is held, followed by a written evaluation with recommendations. It was pointed out to the Appraisal Team that some emergency response information is printed on the back of each photo identification badge and that the emergency evacuation alarm siren is sounded at least annually as a part of one of the drills. It was pointed out by the CRPE in charge that changes have been made in the Emergency Plan for which no training had been conducted. It was recognized by the Appraisal Team that the SONGS emergency plan is presently in a transitional state as a result of changes required by the response to the Three Mile Island accident.

### 3.3 Conclusions - Personnel Selection, Qualification and Training

Based on the above findings, improvements in the following areas are required to achieve an acceptable program:

(1) A specialized training, retraining and replacement training program in radiation protection, appropriate for each discipline, which satisfies the requirements of Sections 5.3 and 5.5 of ANSI N18.1-1971 should be established, implemented, maintained and documented for the station staff. The CRPE and CRT training/retraining program should be formalized, include systems training, assurance that procedural changes are promptly addressed and provide opportunities for professional/technical growth. In addition, all personnel having access to restricted areas should be instructed in those areas required by 10 CFR 19.12, Instructions to Workers and such instruction documented. The documentation should identify the level of training required and accomplished for each individual entering an area where radiological controls are in effect.

## 4.0 Exposure Controls

### 4.1 External Personnel Dosimetry

The licensee has established a Radiation Control Standard (Radiation Protection Procedure S-VII-1.17) which imposes more conservative limits on external dose, than are required by the regulations. For individuals with a permissable quarterly dose of 3 Rem as authorized by the 5(N-18) rule, an initial quarterly administrative limit of 0.900 Rem is established. This limit may be raised to 1.800 Rem by the "Radiation Protection Supervisor" (see section 9.0). This limit may again be raised to 2.250 Rem but only by approval of the Station Superintendent. In both cases approvals must be specifically requested and documented, however, in the case of an increase to 2.250 Rem, processed film badge data for a quarterly exposure in excess of 1.600 Rem must have been received. No provisions exist for approval of exposures in excess of the 2.250 Rem limit. The procedure also addresses the exposure of minors, women (Regulatory Guide 8.13) and maintaining exposures as low as practicable (ALARA).

The external dosimetry program uses a commercial film badge service for its primary monitoring system. To supplement this system an onsite TLD system, normally read out on a monthly basis, and pocket ionization chambers, read after each entry, are used. A computer is used to record all entries into the Controlled Access Area and maintain the radiation exposure records of SCE staff, contractor personnel and visitors. Computer consoles are located at the Controlled Access Area control points, REP issue station and the CRPE office. This computer based system was used during the outage and will be continued if sufficient personnel to operate the computer consoles are available. At the start of the outage, CRTs made all entries. However the CRTs lacked the skill to operate the computer consoles efficiently and significant delays were encountered. The delays were corrected by adding personnel with the skills necessary to operate the consoles. As each individual leaves the Controlled Access Area his unofficial monthly dose record is updated by the reading on his pocket dosimeter. When the results of the film badge are received, the value is compared with the TLD value and the sum of the monthly ionization chamber readings. Unless a serious discrepancy exists, the film badge information replaces the ionization chamber data for the month in the computer memory. Should a disparity exist, the situation is investigated, and a written basis prepared for assigning a monthly dose for the official record.

The system appeared to function well during the outage with 1100 additional people over and above the staff on site. Occasional problems result from computer failures; however, a manual records system is available and used during such periods. Computer failures are usually limited to a maximum of a few hours. When the computer becomes available, the manually collected data is entered promptly. The Appraisal Team found that a limited number of control film badges are supplied by the contractor. The licensee routinely ships control film badges with each shipment to the film badge contractor. Because of the small number of control badges the ratio of control to personnel badges can reach 1/1500, a ratio not acceptable for statistical purposes.

The external dosimetry system does not automatically account for gamma exposures to energies greater than 3 MeV or less than 80 keV. In the event that exposures to energies greater than 3 MeV are anticipated additional badges are issued which are specially processed for higher energies. In the case of low energy gamma exposures the value obtained from the beta window is used.

Radiation Protection Procedure S-VII-1.23, Dosimeter Calibration Check, requires the recalibration of dosimeters in use, monthly for high range and semiannually for low range. The measured exposure is required to be within -10 to +15 percent of the actual exposure. Twenty four hour leakage tests are performed with a maximum of 3 percent considered to be acceptable. Dosimeters are not subject to drop or shock tests.

## 4.2 Internal Dosimetry

### 4.2.1 Bioassay

The licensee uses a whole body counting (WBC) system furnished, serviced and calibrated by a contractor. The system is designed to be used by untrained individuals following procedures by rote and by responding to a series of questions using a teletypewriter. The WBC accumulates gross spectral data (256 channels) relative to body location as the subject is scanned. The spectral and personal data is transmitted to the contractors facility by telephone for analysis. Radiation Protection Procedure S-VII-1.42, Operation of Whole Body Counter, provides operating and result interpretation information, however the calculation of body burdens must be done by the contractor.

New personnel are counted upon arrival on site, prior to departure from the site, and as conditions warrant, usually in response to personal contamination occurrences. A 5% body burden level in any isotope is the trigger point for internal dose calculations using ANSI, MIRD or ICRP recommended methods.

The uranalysis program is designed for onsite sample collection concurrent with each whole body count or as conditions warrant. Analysis for the $^{3}H$ content is performed offsite by a private contractor. The Appraisal Team was informed that a sample collection to final report turn around time of 2 to 3 months was usual. A delay in the availability of such data for this length of time prevents the use of the data in any exposure control effort.

4.2.2 Respiratory Protection Program

A corporate commitment to a respiratory protection program is contained in Station Order S-E-209 (Appendix 4), May 8, 1980. The Supervisor CRP is identified as responsible for the implementation of this program. The responsibility for implementation has been redelegated to the CRP Foreman. This individual has a wealth of technical training but lacks the theoretical background to properly direct such a program. The licensee plans to reassign the respiratory protection program to a CRPE when the CRPE staff is returned to full strength.

The Unit-1 facility has benefitted from a commitment by the staff to maintain low airborne contamination levels. According to the Unit-1 staff, the existence of these low levels of airborne radioactive materials has minimized the necessity for a respiratory protection program. It is the general practice to make available unfitted half face respirators to anyone desiring one and in certain instances to specify such use on an REP. No protection credit is claimed for the use of half face mask respirators under any conditions. A physician's evaluation is not required for an individual prior to allowing or requiring the use of half face mask respirators. With such devices available and with no controls on issuance or return, a careless attitude on the part of the workers concerning the care and use of respiratory protective equipment has developed. The Appraisal Team learned that the Unit-2/3 radiation protection staff plan to implement a conventional respiratory protection program involving the use of fitted and tested respirators. The contrasting approach to respiratory protection used by the two different organizations at the same site may create problems in conducting effective respiratory protection programs in the future.

The requirement for the use of unfitted half face respirators on some REP's is viewed as being in conflict with good ALARA practices as well as giving workers a false sense of security. This attitude was confirmed in discussions with various workers. In many cases, half face respirators are used for dusty work where airborne radioactive materials do not present a problem such as concrete drilling and chipping or welding and grinding on clean systems. Withdrawal of the half face respirator from use without the substitution of a suitable dust mask would deny the possible benefit such unfitted devices provide.

Respiratory protection for steam generator work consists of transparent bubble hoods with continuous air flow from a manifold. A protection factor of 1000 was taken for this system and a physician's approval was required before an individual could use the system. The air supply, from a special compressor (not oil lubricated), is filtered, equipped with a high temperature alarm before the cooler and includes a carbon monoxide monitor. Prior to use a grab sample is analyzed by gas chromotograph for oxygen content.

MPC hours are calculated based on the product of the time spent within the Controlled Access Area and the highest measured MPC level in any area to be occupied as specified in the REP. Records of exposure to airborne radioactive material are maintained in the form of MPC-hours in the exposed individual's file.

Six self contained breathing (SCB) systems are available on the Unit-1 site for which a protection factor could be claimed and which would be suitable for use in an emergency. A total of 30 charged SCB bottles are available onsite. SCB bottles must be recharged offsite at a facility 25 miles from SONGS.

### 4.3 Surveillance Program and Access Controls

The Unit-1 radiological controls program was examined, including: (1) the routine radiation and contamination survey program;

(2) radiation monitoring practices for routine and specific operations; (3) access controls, including implementation of the REP program; and (4) instrumentation available to the CRP group. Because this appraisal was conducted during an extended refueling outage, many more surveillance activities were in progress than would occur routinely during non-outage conditions.

4.3.1 Routine Surveillance

The general procedures governing routine surveillance activities at Unit-1 are covered in Section S-VII of the Station Procedures and are based on the requirements enumerated in Station Order S-E-201, Clean, Controlled and Exclusion Area Definitions and Monitoring. Specific instructions are contained in Procedures S-VII-1.34. Radiation Survey Procedure; S-VII-1.13, Determination of Radioactive Surface Contamination by Smear Surveys; S-VII-1.28, Routine Building Air Monitoring; S-VII-1.2, Evaluation and Testing of Containment Sphere Atmosphere Prior to Entry During Operation; and S-VII-1.22, Operation of the General Atomic Particulate and Iodine Sampler. In addition to these routine procedures for use during operations, procedure S-VII-1.10, Evaluating the Containment Atmosphere During Outages, provides additional guidance for outage activities.

Routine surveillance (daily and weekly) consists of direct radiation measurements, smear samples and airborne radioactive material surveys. The radiation measurements are usually taken at about three (3) feet above the floor or platform (whole body dose rate) and in close proximity (detector contact) to known or suspected radiation sources at specific locations identified on predrawn plot plans. Smear samples are collected at specific floor locations identified on predrawn plot plans and other locations where there is reason to suspect radioactive contamination or where there is need to assure the absence of contamination (e.g. lunchrooms, offices, etc.). The airborne surveys (particulate and iodine) are made at several work locations within the Controlled Access Area. The results of all surveys (radiation, contamination, and airborne) are reviewed by the CRP Foreman and copies of each form are posted on the bulletin board outside the Health Physics office (Door 16). A duplicate set of the most recent survey results are kept at the REP desk to assist in determining radiation exposure conditions and control requirements in the preparation of REPs.

According to procedures (S-VII-1.2, 1.10, 1.28), air samples are for "evaluating the radiological conditions of the...atmosphere..." and for determining MPCs. The Appraisal Team observed that air samples were collected and appropriately counted to determine MPCs.

The routine air sampling program during the outage included:

- One 24-hour air sample per week in the Radwaste Building.
- Two continuous air samplers within the containment sphere (one on the operating deck, the other within the secondary shield).
- Ten-minute grab samples at open manways to steam generators prior to entry and similar grab samples on the respective steam generator platforms approximately twice a day.

The air sample data reviewed (May 1980) generally indicated concentrations below one MPC; however the air samples were not of the breathing zone and specific air samples were not taken during, and for duration of, jobs with the potential for generating airborne contaminants. Although air sampling data indicated low concentrations, this may result more from non-representative samples than from the conditions to which workers were exposed. Although an air sampler calibration device was available, there was no apparent flow calibration of any of the portable air samplers. In spite of the apparent limitations of the air sampling program there were no indications of internal depositions identified by the whole body counting program. The Appraisal Team attempted to compare the current outage MPC data with that of the last refueling outage in the fall of 1978 only to discover that no data for that outage was on file in the CRP Foreman's office or at the EDM. The licensee was informed and is attempting to locate the data to assure that a complete record exists.

### 4.3.2 Radiation Monitoring Practices

Radiation protection monitoring practices for routine and specific operations were reviewed along with selected records of radiation, contamination, and airborne radioactivity surveys performed since the current outage began in April 1980. As part of this review CRT's were observed monitoring a number of jobs within the containment sphere, performing part of a routine dose rate survey, changing air particulate and charcoal cartridge samples, and preparing smear and filter samples for counting and documenting the results. The monitoring practices observed were in accordance with established SCE procedures. The Appraisal Team observed that the CRT's were effective in performing surveys, however certain practices were noted which raised questions. Smear samples using numbered filter papers were collected and recorded properly. Following collection the smears were stacked in a single container without any means of preventing cross contamination of smears. This practice was contrasted with the use of individual plastic bags for each air sample collected. Smear samples were collected routinely only from floor surfaces.

It was noted that workmen used handrails and on occasion leaned or brushed against walls while working or moving in and about the workplace. It would appear that smear surveys routinely should include a sampling of walls and handrails, telephones or other surfaces which might become contaminated. During the containment monitoring tour the CRT had some difficulty in locating the air sampler inside the secondary shield. When questioned, the CRT stated that the air sampler was occasionally relocated; however, these changes in location were not documented. It was also observed that running time meter readings were not recorded for the air samplers. These data are not of significance unless a sampler is inadvertently turned off for some time during the sampling period. Should such an error in sampling time be included in the calculation of MPC's, the resulting value would yield a lower and less conservative MPC. The Ge(Li) spectrometer/computer system is used to count air samples and compute MPCs. The computer code (AIRBRN) used for air sample MPC calculation does not include the calculation of the air volume samples. The CRT is required to independently determine the sampling elapsed time, average flow rate, calculate the volume of air sampled and convert english to metric units. This would appear to increase the potential for error.

The licensee had located friskers, line operated, pancake G-M count rate instruments, at a number of locations near the workplace for personnel contamination surveys. A significant number of these instruments were located in areas of relatively high background. The licensee's flexibility of the location of such devices was severely limited by station design and space limitations. It is possible that lower background areas could be located or created through the use of temporary shielding.

4.3.3 Independent Measurement - Survey

During the appraisal, a survey was performed within the Unit-1 Protected Area outside of the Controlled Access Area. The survey was performed with an Eberline, PRM-7, "micro R" per hour meter, serial number 247, with ranges of 0 to 25, 50, 500 and 5000 micro R/per hour. The instrument was last calibrated (using Cs-137) February 6, 1980. The survey included ground areas, waste (non-radioactive trash) containers, equipment, contractor work areas, the secondary (turbine plant) portion of the facility and the machine shop. One small, less than six inch diameter, area of localized contamination was identified on the yard paving. The indicated radiation level was less than 100 micro R per hour (less than 0.1 mR/hr). The contamination area was located at the south end of the turbine building under the gantry crane in an area used for loading and unloading spent fuel shipping casks. The Supervisor CRP was informed of the Appraisal Team's findings.

It is noted that in areas near the containment on the west and north sides of the facility, the sensitivity of the survey was limited by increased background radiation levels. The increased background resulted from packaged waste stored in the Controlled Access Area. The sensitivity of the survey on the east side of the facility was limited by a trailer mounted cask of resin awaiting shipment for disposal.

The survey identified no loss of control of radioactive materials either through unauthorized methods of disposal, transfer by poor contamination control procedures to paved surfaces or by inadequate contaminated tool or equipment control procedures.

4.3.4 Access Controls

Unit-1 Protected Area is defined as that area of the site which is enclosed by the security fence and is surrounded by the Owner Control Area boundary. Routine access to the Protected Area is through the continuously manned access control point. The security force is responsible for ensuring that personnel are authorized site access and that the portal radiation monitor is used upon leaving the protected area.

Access to the radiologically Controlled Access Area, which lies within the Protected Area of the site, is provided through separately manned stations with additional access controls. The Appraisal Team reviewed the licensee's methods for controlling access and work in the Controlled Access Area.

The station operates under the REP concept which requires everyone entering the Controlled Access Area be identified on a valid REP. During routine operations few personnel require entry to the Controlled Access Area, except for station personnel who enter on the basis of permanent REPs. During an outage a continuing need for entry by different working groups exists and REPs are issued daily for each separate job. Up to 10 persons may enter on the same REP provided that all are working on the same job. The radiological conditions are evaluated on the basis of survey and MPC data and specific guidance on protective clothing and equipment is included on the REP. When completed, the REP data is entered in the computer system, including the identity of personnel named on the REP. During the outage two radiological access control points were used, each staffed by a trained security clerk who records the name, date, time, and badge number of each person entering the Controlled Access Area. During this outage this information was entered into a computer. The computer memory is updated regularly with the identity of individuals authorized entry on the basis of training. Qualified Escorts are included in this listing. No person is permitted past the entry point without verification of inclusion on a valid REP. In addition, each individual must be qualified for entry on the basis of previous training or be accompanied by a Qualified Escort. The REP specifies the protective clothing and respiratory protection required. In addition a pocket dosimeter and film/TLD packet with photo identification badge are required and verified by the guard at the access point. Only after being logged in by the guard on duty at that location may one enter the Controlled Access Area. Upon exit from the Controlled Access Area the reverse of the process is required. Protective clothing is removed, the pocket dosimeter is read by the exposed individual and returned to the entry desk, and the dosimeter reading and time of exit are entered into the computer by the guard. Prior to leaving the immediate area (adjacent to the login/logout desk) all persons are required to self frisk their hands, shoes and clothing and then exit through a portal monitor. The personnel ID badge and film/TLD packet are stored at the security exit/entrance to the Protected Area. Final egress from the Protected Area (after returning ID, Film/TLD packet) includes another portal monitor station.

As noted earlier (Section 4.3.1), a duplicate set of radiation, contamination and airborne surveillance data sheets is maintained at the REP desk. The REP desk is staffed by a CRT and by a computer clerk to enter REP information into the computer files for later use by the security person at the entrance to the Controlled Access Area. Each person desiring to enter the Controlled Access Area must report to the REP desk and fill out the form giving information such as name, badge number, job location and job description. The CRT then prescribes protective clothing, dosimetry, and respiratory equipment requirements (based on the job described and the most recent survey data). It was noted that different protective clothing requirements (based on the work to be performed) exist for a specific location. The CRT also enters the appropriate radiation, contamination, and airborne levels from the duplicate set of surveillance data sheets, an allowable exposure and any other remarks such as a requirement for continuous health physics surveillance.

According to CRP group personnel, posted area radiation/contamination signs are normally updated as conditions warrant. However, the Appraisal Team observed a number of "Radiation Area" and "High Radiation Area" signs within the Controlled Access Area which were obviously not current, some dated prior to 1979, contained incorrect dose rate information when compared with independent surveys using a calibrated station cutie pie. The radiation levels observed were lower than those indiciated by the outdated postings. In general, "High Radiation Area" signs seemed to be posted somewhat indiscriminately, especially at locations for which the radiation level was not (at time of appraisal) greater than 100 mR/hr and in other cases it was not clear whether the posting referred to a general area or a specific source of radiation such as a pipe or valve.

"High Radiation Area" signs posted on locked gates or fences were clear and in compliance with 10 CFR 20 requirements.

Station attention to contamination control is evidenced by the absence of high levels of surface or airborne contamination. This is further supported by the strict use of protective clothing; daily smear surveys; the REP program; and the assignment of special Qualified Escort personnel (Wells Fargo security guards) to confirm and assist in the proper donning and removal of protective clothing and personnel frisking at critical locations in or adjacent to the Controlled Access Area. The Appraisal Team observed that occasionally additional coveralls (paper, plastic or fabric) were donned over potentially contaminated shoe covers. The licensee reuses rubber shoe covers, over plastic shoe covers. This practice tends to increase the potential for contamination transfer and appears to be contrary to good contamination control practice.

4.3.5 Instrumentation

The licensee's supplies, use and limitations of portable and semifixed (portal monitors and line operated frisker monitors) radiological instrumentation were examined. Specific problems were identified regarding the availability and supply of survey instruments, testing of personnel monitoring instrumentation at access control points before use, user personal preference for specific portable instruments, and some long delays in instrument maintenance because of difficulty in obtaining replacement parts, Several of these problems reflect the age of the station and the instrumentation.

Dose Rate Survey Instruments

Unit-1 uses a variety of portable ion chamber and GM instruments for assessing radiation dose rates and contamination levels. These instruments include Nuclear Chicago (2 units) and Technical Associates (4 or 5 units) cutie pies; 3 Teletectors; and 4 or 5 Xetex extendable probe devices. Since a specific instrument inventory list was not available, these instrument numbers are based on recollections of the CRP Foreman. At the time of a weekly radiation survey on graveyard shift (May 27), only two extendable probe instruments (one Xetex and one Teletector) and three cutie pies were available. On May 28 the available serviceable instruments were limited to one Xetex and two cutie pies. The slow response time of the digital indicating Xetex was considered by the CRT's to be a distinct disadvantage particularly when making surveys in high radiation fields. Out of service time has been longest for the Teletectors due to problems in obtaining replacement meter movements.

Procedures governing use of these instruments are adequate for gamma radiation. Apparently the station makes no beta radiation measurements and hence no beta correction factors are included in applicable instrument use procedures. It was observed that survey instrument detectors were placed in contact with known sources (e.g. piping, valves, etc.) of radiation and the observed values were recorded without the use of any geometric correction factors. Check sources are not supplied with each dose rate instrument for verifying their operability before use. Fan sources or similar instrument operability check sources are not available. The use of such checks are described in ANSI-N323-1978. According to licensee personnel, survey instrument operability is not always verified; however, it may be checked in the Health Physics office using the existing radiation field from the source storage cabinet.

Neutron Dose Rate Survey Instrument

Only one portable neutron dose rate survey instrument is available at Unit-1, a Studsvik model Rem meter. At the time of the appraisal, the instrument was calibrated and operable.

Contamination Detection Instruments

Portable contamination survey instrumentation consists of six Technical Associates model PUG-1A G-M survey meters with thin window pancake probes. In addition, 16 AC powered personnel friskers are strategically located throughout the station. Frisker stations were checked during this outage several times per week by the night shift CRT, while routine operational checks are performed less frequently according to Procedure S-VII-1.31.

Instruments on Order

The Appraisal Team was informed by the licensee that additional instruments had been ordered but not received at the time of the Appraisal. The instruments on order included (6) cutie pie ion chamber survey instruments; (6) AC/DC, alarming rate meters for use with GM or scintillation detectors; (6) Teletectors, three to be added to the emergency equipment supplies; (4) Xetex extendable probe instruments had been received but returned due to faults identified on receipt inspection.

Portal Monitors

The plant had six portal monitors in use, three at the Controlled Access Areas control points and three at the protected area access control point. All of these portal monitors are the conventional units with side, top, and shoe detectors. All units in use have thin walled GM tubes. During the outage, the night shift CRT performed a daily operational check on each of the five detectors (2 sides, 2 shoes, 1 top) of each portal monitor. During nonoutage conditions the portal monitors are operationally checked according to Procedure S-VII-1.40.

Continuous Air Monitors (CAMs)

Unit-1 has no continuous air monitors which can be used for trend monitoring and detection of gross changes in airborne radiological conditions. The station relies on the stack monitors (particulate and gaseous) to provide trend indications within containment during reactor operation. During refueling outages, the stack monitors are used in conjunction with continuous air sampling (particulate and charcoal, changed daily) on the refueling deck and within the secondary shielding. Additional grab sampling is performed for and at specific job sites.

Instrument Control

Survey instruments are stored in several locations, both onsite and offsite. The principal storage location is the Health Physics office adjacent to the access control point. The segregation methods for functional (green tag) and nonfunctional (red tag) instruments was weak in that both types were observed on the shelf in the Health Physics office. Typically the red tagged instruments are delivered by a CRT to the maintenance shop. Although survey instruments are located throughout the plant, no inventory by location is maintained.

## 4.4 Conclusions - Exposure Controls

External Exposure Control

Based on the above findings this portion of the program appears to be acceptable, but the following matters should be considered for the improvement of the program.

(1) The ratio of control film badges to personnel badges processed can reach as low as 1/1500. This number is considered too small for statistical purposes and should be evaluated. The present practice of sending control badges with each shipment should be continued.

(2) Reg. Guide 8.14 (Revision 2) no longer recommends the use of NTA film for neutron dosimetry at power reactors because of its demonstrated insensitivity to the neutron spectra found in such locations. The use of a calculated neutron dose based on neutron Rem meter surveys and work time as recommended in the Reg. Guide is apparently the only method which Unit-1 is presently equipped to use. Existing procedures should be examined to assure that the work times and survey data are used to compute doses and that the doses are entered in the computer based dosimetry records system.

(3) In the event that separate personnel dosimetry programs are conducted at Unit-1 and Unit-2/3, a system should be developed to assure that individuals receiving exposures at both facilities do not receive total exposures in excess of regulatory limits.

(4) Procedure S-VII-1.23 allows for a leakage of 3% per 24 hours at ambient conditions for direct reading pocket ionization chambers. ANSI-N13.5 recommends no more than 2% in 24 hours and ANSI-N322 recommends no more than 5% in 48 hours under environmental conditions of 122°F and 90% relative humidity. The use of the 3% value should be reevaluated in light of the stricter requirements contained in the ANSI standards.

(5) The direct reading pocket ionization chambers are not drop (shock) tested as required by ANSI-N322. Consideration should be given to the use of this acceptance test for at least a sampling of chambers received in each lot purchased.

Internal Exposure Control

(1) The delays incurred in the reporting of uranalysis results should be reviewed and the value of these data in exposure control efforts evaluated.

Respiratory Protection Program

(1) The quantity and type of respiratory protective equipment, for which protection factors may be claimed, that would be available for use during emergencies, should be evaluated. The training, fitting, testing, cleaning and maintenance programs necessary to support such a program should be considered in the evaluation.

(2) The possible impact of separate and different respiratory protection programs at Units-1 and 2/3 should be evaluated in, terms of response to emergencies, personnel training, fitting and testing and availability of equipment.

(3) The Appraisal Team viewed the casual, indiscriminate and largely uncontrolled use of half face respirators with concern. It is recognized that no protection factors are claimed for the use of these devices. Furthermore, the use of such devices, even though not fitted or tested, probably provides some unknown measure of protection against airborne radioactive materials and nonradioactive industrial type respiratory hazards. In addition, the use of half face respirators may provide a measure of psychological reassurance to the wearer. These same marginal values may lead to problems however. The false sense of security afforded by the use of half face respirators may lead to less careful work practices thereby increasing the potential hazard. The failure to maintain positive control on the return of respirators to the issuing location could conceivably result in an increased risk of hazard if an abandoned, dirty and possibly contaminated device were to be picked up in the work place and used. A final factor deserving of consideration is that the respiratory stress of protective equipment exists, whether or not a protection factor is claimed. All individuals wearing such equipment should be required to have a physician's approval. The present practice of requiring the medical examination only if a protection factor is claimed is considered to be inconsistent with the medical intent of Regulatory Guide 8.15 and good practice. It is the belief of the Appraisal Team that a respiratory protection program should be credible and should provide and not just imply protection. The licensee should evaluate the continued use of half face respirators in the light of these comments.

Surveillance

(1) The contamination (smear) survey program and techniques used should be examined to assure that appropriate evaluations exist for vertical surfaces, handrails and similar surfaces and that samples are appropriately handled to avoid cross contamination.

(2) The program for evaluation of airborne radioactive materials should be examined to assure that:

(a) The air sampling program appropriately considers breathing zone vs. floor level or other location sampling and job duration vs. grab sampling;

(b) Procedures are sufficiently comprehensive and are also usable by technician level personnel;

(c) Air sampling equipment is appropriately calibrated and that all appropriate information concerning individual samples (e.g. running time meter readings, sampler location or changes in location) are recorded;

(d) The methods used in the calculation of MPC's minimize, to the extent possible, the potential for calculational errors.

(3) The Appraisal Team believes that the supply of operable portable radiation protection instruments was marginally adequate for routine operations and was not adequate for outage conditions or for response to a possible emergency. The Team was aware that a significant number of instruments were on order at the time of the Appraisal. The licensee should assure that an adequate supply of such equipment is available at all times.

The program for the use and maintenance of an adequate supply of calibrated and operable radiation protection instruments should be examined to assure that:

(a) Adequate instrument inventory, maintenance and calibration records are maintained;

(b) Procedures incorporate, and technicians understand, beta radiation measurements and correction factors;

(c) Technicians are trained in the proper use of portable instruments with respect to detector and source geometry and correction factors;

(d) The calculation of personnel neutron doses is not jeopardized by the fact that only one neutron Rem meter is available;

(e) Serious consideration is given to the location and other measures used to reduce the background count rate of friskers for identifying possible personnel contamination;

(f) Check sources are available and used to confirm continued instrument operability during the period between calibrations and prior to intermittent use.

(4) With respect to the issuance of REP's and the use of protective clothing, existing practices and procedures should be examined to assure that:

(a) Personnel assigned to issue REP's are fully qualified and knowledgeable of plant conditions;

(b) Protective clothing requirements based on differing activities in the work place are clearly defined and understood;

(c) The potential for contamination spreads resulting from the reuse of shoe covers is minimized;

(d) Clean protective clothing meets existing contamination control limits before being made available for use;

(5) Posting of radiation and contamination area signs should be maintained current with respect to existing conditions.

(6) Consideration should be given to the posting of evacuation route or emergency exit signs within the Controlled Access Area.

## 5.0 Radioactive Waste Management

The primary responsibility for radioactive waste management has been delegated to the chemistry and radiation protection organization. Operations personnel are responsible for operating the liquid and gaseous radioactive waste systems. The Supervisor CRP has been delegated specific responsibility by job description to assure that all federal and state regulations addressing chemical and radioactive discharges from a nuclear power plant are met. Other assigned responsibilities have been identified in the station orders and procedures related to the liquid, gaseous and solid radioactive waste programs.

### 5.1 Liquids

Most of the radioactive waste liquids collect in either the monitor or holdup tanks with the latter receiving the major portion. There are three holdup tanks, 7,000 cubic feet each, and two monitor tanks, 500 cubic feet each. Normally the contents of a holdup tank are processed through ion exchange resin (usually two separate resin beds) and returned to a second holdup tank. When the contents of a holdup tank are disposed to the ocean via the circulating water system, the waste stream is usually additionally filtered through two ion exchange resin beds, a gas stripper and a mechanical filter before it reaches the circulating water. Because of the possible presence of oil, chemicals or dirt, the contents of the monitor tanks are only processed through the mechanical filter before being released to the circulating water. There is a capability for transferring the contents of a monitor tank to a holdup tank for those situations where the activity in the monitor tank would require processing before it could be disposed. Steam generator and feedwater blowdowns, which may contain small quantities of radioactivity as the result of steam generator tube leaks, are disposed of by direct release into the circulating water. The steam generator blowdown is treated as radioactive waste when the tritium concentration is $1 \times 10^{-4}$ uCi/cc. This value is based upon data showing that at a tritium concentration of $1 \times 10^{-4}$ $\mu$Ci/cc, other isotopes are present in concentrations of $1 \times 10^{-8}$ uCi/cc or less. The licensee's data indicates that tritium is the most sensitive indicator of primary to secondary steam generator leakage. The existing tritium corrective action level is such that significant leakage of other radionuclides is extremely unlikely.

The analytical and record keeping requirements for liquid releases are contained in Radiation Protection Procedure S-VII-1.15. The initial tank samples are collected after a period of recirculation to assure mixing. The samples are analyzed for tritium and other isotopes and the results are the basis for determining whether the contents can be disposed and the rate of release. The CRT's prepare a release permit that contains all of the pertinent data. The release permit must be examined and approved by either the Watch Engineer or the Supervisor CRP. The licensee considers the CRP Foreman, the Supervisor CRP or CRPE as persons who may approve the release permit in the name of the "Radiation Protection Supervisor". The permits have usually been signed by both the Watch Engineer and the "Radiation Protection Supervisor". The Station Superintendent's approval is required for all releases of liquid waste with activity greater than 5.3 X $10^{-4}$ uCi/cc. The disposal of 20 holdup tank volumes at this concentration would result in less than 5 curies of activity being released. A composite sampler, which collects a sample downstream of the final mechanical filter, is usually in operation during liquid releases. The procedure provides for grab samples and analyses when either the composite sampler or the effluent monitor is not in service. A monthly composite sample of liquid releases has been sent to LFE Environmental Analysis Laboratories, a contractor laboratory, for confirmatory analysis. Once a week samples have been obtained from the blowdown trains for analysis.

A random examination of the radioactive liquid waste release permits for the year 1979 was made. The permits appeared to be complete and in accordance with the station procedure and the appropriate signatures or other related statement pertaining to approvals were present. The concentration of activity in the releases was generally less than 5.3 X $10^{-4}$ uCi/cc and the Superintendent's approval had been obtained in those instances where the concentrations exceeded this value. None of the releases exceeded the limit in 10 CFR 20.106(a) or Technical Specification 4.5 of Appendix A.

Information about ion exchange resin performance and other equipment in the liquid radioactive waste system was obtained during discussions with licensee personnel. There are periodic checks of the resin beds for performance. The beginning of cesium breakthrough usually signals the need for a bed change.

The comparison of analytical results for samples obtained before and after processing through the bed(s) shows the bed performance as well as the need for bed changes. In the past there has been an occasional problem with cobalt (primarily $^{58}Co$ because of its higher concentration) passing through the resin beds. The licensee believes the problem is related to the chemical form, probably a colloid. The problem has apparently been eliminated by changing the size of the mechanical filter in the system from 10 microns to 2 microns. The preventive maintenance program includes the various components (e.g. pumps, valves and filters) in the liquid radioactive waste system. To date the licensee has not found it necessary to provide a capability for disposing of contaminated oils or organic liquids.

5.2 Gases

There are three sources of gaseous radioactive waste that are released to the environment. Most of this gas is released from the three waste gas decay tanks. The contents of these tanks are held for a period of time to permit decay before being released to the atmosphere. Except for periods when the unit is out of service, the waste gases from the decay tanks are processed through the CVI cryogenic unit before being released to the atmosphere via a bank of high efficiency particulate (HEPA) filters and the stack. The cryogenic unit, which involves low temperature absorption on charcoal, provides a decontamination factor of 500 to 1,000 for noble gases and iodines. When the charcoal is deemed to be loaded, the absorbed gases are transferred to pressure tanks for storage. After a period for decay the pressure tanks are released through the HEPA filters to the stack. The second source of gaseous waste results from purging of the containment sphere. According to Station Procedure S-3-2.13, the containment atmosphere is to be circulated through the HEPA and charcoal filters located within the containment sphere for 16 hours before the start of purging. The purge passes through the bank of HEPA filters and is released to the atmosphere via the stack. The third source of gaseous radioactive waste is the condenser air ejectors; however, these exhausts are not treated as radioactive releases until tritium levels in the steam generator feedwater exceed $1 \times 10^{-4}$ uCi/cc. The basis for this concentration was described earlier in the liquid waste section. The air ejector exhausts are released directly to the atmosphere.

The analytical and record keeping requirements for gaseous releases have been placed in Radiation Protection Procedure S-VII-1.33. A sample must be obtained from a waste gas decay tank and analyzed using a gamma spectrometer system (Ge(Li) detector) before it can be released to the atmosphere. Samples from the containment sphere are also obtained and analyzed before the purge can be initiated. Release permits are prepared for all gaseous releases. According to the licensee the containment purge release permits use tritium data from the previous samples; however, the first entry into the containment includes obtaining a condensate sample from the air conditioners for tritium analysis. The licensee computes the atmospheric concentration inside containment by using the tritium concentration in the condensate and assuming a temperature of 85 degrees F and 90 percent relative humidity. The stack is continuously sampled for particulate and iodine activity. The particulate samples have been composited on a monthly basis and sent to LFE Environmental Analysis Laboratories for alpha and strontium-89/90 analyses. When the air ejector exhausts are considered to be radioactive waste, a sample of the exhaust is collected on a weekly frequency.

HEPA and charcoal filters are located in the control room emergency ventilation system and inside the containment sphere. HEPA filters are also located in the ventilation system at the base of the stack. Only the filters in the control room emergency ventilation system are required by the Technical Specifications (No. 4.11 of Appendix A) to be tested. This required testing was last performed on September 19, 1979, by Flanders Filter Company. The previous test was performed on October 3, 1978. The records of the 1979 test showed (1) they were performed in accordance with ANSI-N510-1975, (2) the system flow was 1025 cfm, (3) transmission of test material was less than 0.1 percent, and (4) the pressure drop across the filters was 3.8 inches of water. The laboratory test of a charcoal sample showed 90 percent removal for methyliodide. All of these results meet the technical specification requirements. According to the licensee the charcoal filters inside the sphere are changed during each refueling outage. The HEPA filters in the ventilation system at the base of the stack and those inside the sphere are changed approximately every two years. These filters, which are not included in the technical specification requirement for filter testing, are tested every refueling outage using the same techniques as those used for the Technical Specification required testing.

A random examination of the radioactive gaseous waste release permits for the year 1979 was made. The permits appeared to be completed in accordance with the procedure and the signatures of the Watch Engineer and "Radiation Protection Supervisor" were present. None of the releases exceeded 10 CFR 20.106(a) or Technical Specification 4.b of Appendix A.

5.3 Solids

The licensee's solid radioactive waste program consists essentially of collecting and packaging wastes for shipment to and burial at a commercial burial site, usually Beatty, Nevada. To date there has been no onsite solidification of any radioactive waste. The resin waste has been transferred from the spent resin storage tank to a shipping cask and then dewatered. According to the licensee the transferred resin has been subjected to two (2) hours of drying which consists of passing dry gaseous nitrogen through the resin. The licensee has determined that the drying removes all free standing water. Most of the solid waste consists of contaminated paper, rags, disposable protective clothing and noncompressible items. The compressible waste has normally been placed in 55 gallon steel drums. The licensee also uses 168 cubic foot plywood boxes for packaging solid waste materials, usually the noncompressible items. The primary responsibility for the solid radioactive waste program has been assigned to the CRP group. The operations group has the responsibility for operating the equipment used to transfer the spent resin from the storage tank to the shipping cask. Utility personnel have been provided to the CRP group to assist in the compressing and packaging of the solid waste. During outage and refueling periods the utility personnel have not always been available to assist in the waste packaging.

The licensee has three procedures that apply to solid radioactive waste shipments. Procedure S-VII-1.20 is devoted to solid radioactive waste shipments. The other two procedures, S-VII-1.7 and S-XII-1.32, are devoted to spent resin shipments and spent resin shipping cask inspections respectively. These procedures implement Station Order S-E-205, Receipt and Shipment of Radioactive Material.

During two tours of the controlled area, on May 19 and 28, the storage of solid radioactive waste was observed. The licensee has a radioactive waste storage area that is located behind the auxiliary building. This storage area has a shield wall around part of the area for storing drums and other containers that exibit higher levels of radiation. A roof covers the area within the shield wall. The remainder of the waste storage area is fenced and the gate is secured with a padlock that is under the control of the CRP group. A number of plywood boxes (168 cubic feet) used for radioactive waste were located near the sphere shield wall on the north side. The tops of the boxes were not secured and the waste materials inside were partially visible. In addition to the drums of waste stored within the waste storage area, pallets containing drums of compacted radioactive waste were stored in two other areas (in front of the equipment decontamination room of the auxiliary building and in front of the laundry storage room at the north end of the auxiliary building). Also a large pile (more than 6 feet high) of plastic bags containing contaminated compressible waste was observed in the yard area just outside the bailing room of the auxiliary building. The May 19 tour disclosed that none of the plywood boxes or 55 gallon drums of waste had been labeled. This was called to the licensee's attention and the May 28 tour established that labels showing a radiation caution symbol and the words "Caution Radioactive Material" had been placed on the plywood boxes and drums. A survey of the plywood boxes, drums of compacted wastes and the pile of waste in plastic bags was made on May 28. The survey was performed using a Region V, Xetex, Model 303A, survey meter that had been calibrated on May 4, 1980. The highest level of radiation detected at the surface of these drums of compacted waste was 230 mR/hr gamma. Several of the drums had surface radiation levels in the range of 25-60 mR/hr gamma. The maximum level of radiation detected at the surface of the plywood boxes was 4 mR/hr; however, most of these boxes were less than 1 mR/hr. Radiation levels associated with the plastic bags of waste were less than 5 mR/hr. Failure to label containers of radioactive material represents noncompliance with 10 CFR 20.203(f)(1) and (2).
(50-206/80-17-01)

The present storage of radioactive waste was discussed with licensee personnel. The licensee said that they normally ship the radioactive waste on a regular basis in order to prevent the accumulation of large quantities of radioactive waste. The licensee had intended to ship some waste prior to the present outage, but this was not possible due to lack of a contract for shipping as well as a problem at the burial site which temporarily prevented them from shipping. A shipment of spent resin has been held at the Unit-1 site because of questions raised by SCE Quality Assurance regarding the gasket used for the cask closure. The licensee also acknowledged that the utility personnel used to compact the waste were not always available during this outage. The licensee agreed that, at this time, the storage of the solid radioactive waste was presenting a problem. The licensee said it was likely that the contents of the plywood boxes would need to be checked to assure the absence of any liquids. Some personnel believe the drums of waste generated during this outage will also need to be checked for liquids.

Questions concerning a volume reduction program for solid radioactive waste were directed to employees in several of the groups. Some of the CRP personnel were aware of an effort to reduce the volume of such waste. The licensee has studied this problem and concluded that it was cost effective to purchase a new compacter with better ventilation control and a higher compaction capacity. Personnel in groups other than CRP were not aware of any effort to reduce the volume of solid waste.

## 5.4 Effluent/Process Instrumentation

The electronic and internal source calibration procedures for all effluent radiation monitors was documented in the procedure S-II-1.7, Operational Radiation Monitoring System Calibration. The procedure required semiannual calibration of:

Liquid Radwaste Discharge Flow;
Channel R-1211, Stack or Containment Sphere Particulate Monitor;
Channel R-1212, Stack or Containment Sphere Gas Monitor;
Channel R-1214, Stack Gas Monitor;
Channel R-1215, Condenser Air-Ejector Gas Monitor;
Channel R-1216, Steam Generator Blowdown Liquid Sample Monitor;
Channel R-1217, Component Cooling System Monitor;
Channel R-1218, Liquid Radwaste Effluent Monitor;
Channel R-1219, Stack Gas Monitor;
Channel R-1220, Stack Particulate Monitor; and
Channel R-1221, Stack Iodine Monitor.

Review of this procedure identified references to other procedures which no longer existed.

An initial, primary calibration was performed on each monitor identified in the procedure by the Unit-1 staff using solutions, gases, or particulate samples of known activity. Recalibration was performed using external cesium-137 sources. No correlation was found between the original primary calibration results and the external calibration source readings used to verify system efficiency when new detectors were installed. In addition two cesium-137 sources of different geometries and activities were referred to in the procedure as though only one source existed. The calibration of the Process/Effluent monitoring systems is the responsibility of the station instrumentation staff. The CRP group is not a participant in the calibrations and has no review function with respect to the adequacy or acceptability of the calibrations performed. Neither the CRTs or the CRPEs had participated in an external calibration source efficiency check when a detector was changed in one of the effluent radiation monitors.

In the case of the Stack Gas Monitor (Channel R-1214) the internal check source reference reading shifted from 30,000 cpm to 39,000 cpm between the October 1976 and the March 1977 calibrations. Documentation as to the reason for this change could not be found.

For all planned releases of either liquids or gases, a sample is assayed using the Ge(Li) spectrometer and the radioactivity released is calculated on the basis of the Ge(Li) analysis and the volume released.

## 5.5 Conclusions - Radioactive Waste Management

Based on the above findings, improvements in the following areas are required to achieve an acceptable program:

(1) Containers should be labelled as soon as waste has been placed inside.

(2) The radioactive waste program warrants a specific operational responsibility assignment and staffing support.

Based on the above findings, the following matters should be considered for improvement of the program:

(1) Provisions should be made for storage of radioactive waste in order to minimize the impact on other activities.

(2) A volume reduction effort should be incorporated into the solid radioactive waste program.

(3) The responsibility for maintenance and calibration of radioactive effluent monitors should be shared by the instrumentation and radiation protection groups. Changes possibly affecting system efficiency should arise from a joint evaluation of the possible effects.

(4) Changes in process/effluent monitor systems affecting system response (e.g. detector replacements) should be documented in detail.

(5) A retrospective analysis should be made of the primary calibration and instrument maintenance check data to obtain a correlation between the external calibration check source and the primary calibration. Correction for decay of the cesium-137 check source should be included in this analysis.

(6) Procedure S-II-1.7 should be rewritten and updated to properly reference source details and procedures involved.

6. ALARA Program

SCE's company policy is to keep all personnel radiation exposures as low as practicable. This policy has been specifically stated in the Accident Prevention Manual that has been given to all SCE employees. The policy has also been stated in Procedure S-VII-1.17, Radiation Exposure Standards. This standard assigns "--- each individual and his supervisor ---" the responsibility for keeping "--- his exposure as low as possible consistent with discharging his duties." The Supervisor CRP is responsible for directing the radiation protection program so as to maintain personnel radiation exposures as described by the NRC "Regulatory Guide and Federal Regulations" (stated in Duties and Responsibilities section of the job description). Interviews with personnel from several of the onsite groups disclosed that they were generally aware of an ALARA policy, but a great majority of them did not relate this knowledge to the statement in the Accident Prevention Manual. The commitment to keep exposures ALARA has also been stated in some of the other radiation protection procedures. The above summarizes the documented commitment to ALARA, the assigned responsibilities, and procedures and instructions generated to date.

The extent of the ALARA program in effect was ascertained by interviewing personnel at the site as well as at the corporate office and examining related written material. The following items were identified as being a part of the ALARA program.

(1) Preplanning discussions have been held in connection with activities (e.g. modifications, repairs and maintenance) that would be expected to result in higher personnel exposures.

(2) REP's have been required for all entries inside the Controlled Access Area. The REP specifies the required protective clothing, respiratory protective equipment and sets the exposure limit. The REP also shows the current survey results (weekly survey data) and normally identifies areas of higher radiation which should be occupied only during periods of necessity.

(3) Time, distance and shielding have been used to reduce exposures received by personnel during the performance of their work inside the Controlled Access Areas. Shielding has been used on both a temporary and permanent basis.

(4) Item 23 of the design review checklist, used by the engineering staff involved in design changes and modifications, addresses the subject of radiation effects. Some of the engineering staff view this item as ALARA related and the Onsite Review Committee does include ALARA considerations during their review of such changes and modifications.

(5) Radiation safety training of personnel includes the subject of ALARA.

(6) The establishment of exclusion areas and entries into them involve controls that are related to ALARA. According to Station Order S-E-201 exclusion areas have been established when (1) contamination levels exceed 10,000 dpm/$ft^2$ beta-gamma or 1,000 dpm/$ft^2$ alpha, (2) airborne radioactivity exceeds Table 1, Column 1, of Appendix B of 10 CFR Part 20, or (3) radiation levels are above 2.5 mR/hr. With the exception of areas involving radiation levels only, exclusion areas have stepoff pads at the entrances.

(7) The Plant Manager, Superintendent Unit-1, and Supervisor CRP examine daily a report of exposures received during periods of refueling or other outages. The daily exposure report shows the exposures for the highest 100 persons as well as the exposures received by all personnel. The Plant Manager also receives a daily and monthly report that shows the following information: employer groups (9 identified), number of entries by group, the number of people per group, the manhours per group, the average hours per man by group, the average time per entry by group, the mrem per man by group and the mrem per entry by group.

(8) Administrative controls related to exposures authorized to be received are part of the ALARA program. Specific approvals must be obtained before exposures above 900 mrem/quarter can be received. According to Radiation Protection Procedure S-VII-1.7, Radiation Exposure Standards, the "Radiation Protection Supervisor" may grant permission to receive exposures up to 1800 mrem/quarter. The Superintendent must approve exposures above 1800 mrem, but such approval is conditioned upon the fact that exposure received during the quarter, as shown by film badge data, is greater than 1600 mrem. The maximum administrative quarterly exposure limit is 2250 mrem.

(9) Operation of the primary coolant system with full letdown flow of the chemical and volume control system plus the primary coolant water chemistry have been instrumental in reducing the production and accumulation of crud.

(10) Management considers upgrading of equipment (including those for radiation protection) and the daily morning/afternoon meetings during refueling and other outages to be ALARA related. The meetings provide an opportunity for advance knowledge about upcoming jobs that may have exposure impacts on other groups or permit input by radiation protection.

Licensee personnel explained that additional efforts related to the ALARA program were expected to be made in the near future. The Supervisor CRP plans to prepare a formal documented ALARA program that will become part of the Station Orders/Procedures. The computer dosimetry data will be used to prepare a report showing exposures received by REP or job. These reports should provide data that will be helpful in preplanning efforts to reduce exposures.

The interviews with site personnel generated several comments related to the ALARA program. The CRPEs believe that they need more guidance on ALARA in order to perform their duties and that the ALARA program should be better documented. Some of the CRP staff also believe that additional preplanning could result in a reduction of personnel exposures. However, the interviews also disclosed that these staff personnel were not aware of all of the preplanning being accomplished. Personnel in site organizations other than CRP were aware of the ALARA policy and the responsibility they have for keeping their own exposures as low as possible, but they believed that the other aspects of the ALARA program were the responsibility of CRP personnel.

Section C.1.b of Regulatory Guide 8.8 discusses the importance of upper-level management support and the need for designating responsibility and authority in connection with the ALARA program. In establishing such a program, upper-management should ensure the presence of (1) the responsibility for development of an ALARA program, (2) the means for providing the resources necessary to implement the program, (3) an effective measurement system and (4) a means for reviewing ALARA results and incorporating corrective actions resulting from such review. The above described information on the licensee's ALARA effort shows that upper-level management guidance in the four areas described in the previous sentence was not discernable. Also, the documentation supporting the ALARA program appears to be limited to a corporate commitment and the assignment of responsibility for directing the radiation protection program so as to maintain exposures ALARA to the Supervisor CRP.

## 6.1 Conclusions - ALARA Program

Based on the above findings, improvements in the following areas are required to achieve an acceptable program:

1. Upper-level management guidance needs to be provided in the areas of (1) assigning responsibility for the development of an ALARA Program, (2) providing resources to achieve the ALARA goals and objectives, (3) establishing an effective measurement system, (4) reviewing results and taking corrective actions, and (5) establishing implementing procedures.

2. The ALARA program, including upper-level management guidance and implementing procedures and instructions, needs to be more fully documented.

3. The preplanning efforts related to ALARA should include the use of past exposure data.

## 7.0 Facilities and Equipment

### 7.1 Analytical Laboratories

The chemical laboratories, primary system radiochemistry and secondary plant, appeared to be properly equipped and to provide adequate working room. The analytical laboratories were cluttered by the storage of nonlaboratory equipment.

The air flow was measured in the following locations: Radiochemistry, cold chemistry and sampling hoods; the dumb waiter used to transfer primary coolant samples; the entrance to the primary coolant sample room. All flows were found to be in the proper direction and hood face velicities of 100 linear feet per minute could be achieved with the hood face half open. Measurements were performed with an Alnor Velometer, type 6006B and Lo Flow Probe type 6050, with a range of 0-300 linear feet per minute.

The radioactive sample counting rooms were over crowded. It was noted that a large portion of the newer equipment in use had been purchased for Units-2/3 and was scheduled for transfer to those units when they become operational.

It was noted that the automatic sample changer, G-M counting equipment used for analysis of smear samples in the Health Physics office is no longer state-of-the-art in design.

Air particulate, iodine and gas samples and liquid samples are counted using a Ge(Li) spectrometer system which has been calibrated by a consultant using NBS point sources. This calibration was then adjusted, using computer modeling techniques, to the 10 sample geometries in use at Unit-1. The calibration technique has been quality control verified by the Unit-1 staff using NBS isotopic standards and actual geometeries. At the time of the Appraisal the Unit-1 Ge(Li) detector had failed and been returned for repair. A Ge(Li) detector and multichannel analyzer purchased for Unit-2/3 had been set up and was in use at the time the Unit-1 system failed. An additional Ge(Li) detector had been acquired on a temporary basis until the Unit-1 detector repairs had been completed. Transfer of the Unit-2/3 Ge(Li) system to Unit 2/3 will limit Unit-1 to a single Ge(Li) system. The existing Unit-1 counting equipment is older and less versatile than state-of-the-art equipment. It appeared to the Appraisal Team that availability and capability of the existing Ge(Li) system as well as other counting equipment could easily become a limiting factor in the number of samples which could be analyzed. In addition the existing Unit-1 counting equipment provides essentially no backup capability in the event of equipment failure.

The counting room adjoining the radiochemistry laboratory area is no more than a short hallway and is too small to house the equipment and permit efficient operation. If the space presently occupied by Unit-2/3 counting equipment were to become available as an addition to the exiting Unit-1 counting room the space problem would be largely resolved.

7.2 Portable Instrument Calibration

Survey instruments are calibrated in an outside calibration range using isotopic source systems which are exposed to the weather. Radiation background measured in the range area (1 mR/hr) can reach 20% or more of full scale reading on the lower ranges of some instruments being calibrated. The equipment available for calibration is appropriate; however, the location of one calibration device unprotected from the weather and the other in an area of high humidity and temperature extremes has resulted in deterioration of the equipment. It was observed that a failed micro switch on one device resulted in a false source exposed light display and rusting of operating portions of the equipment was noted.

## 7.3 Sampling Facilities and Equipment

In response to NUREG 0578 (TMI Lessons Learned) sections 2.1.8 a,b and c, the licensee has established procedures and installed temporary sampling points and instruments.

The existing sampling areas for primary coolant, stack gas, containment gas, and containment airborne levels were considered adequate for normal operation. The licensee recognizes that the location of the primary system sampling station adjacent to the Health Physics office, and Door 16 could deny access to the Health Physics office and the normal Controlled Access Area control point in the event of an emergency which resulted in high dose rates in the vicinity of the sampling station. The licensee believes that, in the event of an accident, primary system samples would be collected if the control room exposure could be limited to 5 REM in 30 days. In addition, procedures have been established for the collection of a primary system sample in the boron analyzer room.

A temporary containment airborne sampling point has been established on the north wall of the Ventilation Building which has been described in procedures. The licensee has developed the Emergency Procedures S-VIII-1.22 through 1.29 (see documents reviewed section) related to post LOCA sampling and release evaluation. The precautions sections of appropriate procedures specifically direct personnel to terminate activities in the event that exposures approach 3 Rem. These procedures were issued in January and February, 1980 however no training in the implementation of these procedures had been conducted for the CRP staff.

The recently installed temporary facilities for post LOCA collection of samples, which might reach 700 R/hr/ml at contact, did not provide for the use of any remote handling tools, shielding, or other systems to reduce personnel exposure. Due to the temporary nature of the existing LOCA sampling system (a permanent system is to be installed by January 1, 1981), this portion of the program appears to be acceptable. However, if installation of the permanent system is delayed, additional improvements in the temporary system should be made.

## 7.4 Contamination Control

The only permanent facilities available for personnel decontamination consist of a single stall shower and a large sink. These facilities share a narrow hallway space which is used by personnel entering or exiting the Controlled Access Area at the main control point, Door 16. This decontamination area is used for both men or women. The same short hallway has entrances to the primary sampling room and the Health Physics office, used both as a radiation protection office and laboratory for contamination control analysis. In addition this approximately 10 foot wide by 15 foot long hallway is used for storage of anti-contamination clothing and is frequently used as a dressing area. A security guard and the entry control/ dosimetry record computer console is also located in this area.

The licensee has no onsite contaminated laundry facilities and uses a commercial supplier for such supplies. The practice of surveying clean protective clothing prior to use is recommended but not required by station procedures. The amount, type, and method of use of protective clothing for contamination control appeared generally adequate. A single contamination "frisker", set at the 3000 cpm scale, at the Controlled Access Area exit near Door 16 was used to monitor clean clothing prior to use.

The same "frisker" set on the 1000 cpm scale was used to monitor all personnel exiting from Door 16 whether dressed in street clothing or moving to the locker room to don clean anti-contamination clothing or after having removed used anti contamination clothing. The instructions at the "frisker" require that the instrument be set on the 3000 cpm scale for clean clothing surveys and on the 1000 cpm scale for personnel surveys. Failure to reset the "frisker" to the correct scale for the intended use was observed on several occasions. It is normal practice to reuse rubber foot coverings prior to cleaning. The Appraisal Team believes that this practice contributes to contamination control problems and is therefore considered to be undesirable.

The use of control techniques consisting of drapes, floor coverings and step off pads to confine contamination spread in areas outside of containment was noted, e.g. tents in machine shop. The failure to extend the use of such controls, with the exception of step off pads, to locations inside containment, for use on such tasks as steam generator work, was also noted.

## 7.5 Conclusions - Facilities and Equipment

Based on the above findings, improvements in the following areas are required to achieve an acceptable program.

(1) The use of the access control area at Door 16 needs to be reevaluated to provide a better separation of conflicting functions and to provide adequately for the required operational and radiation protection activities. The space presently available for the various activities occuring in this area is inadequate.

(2) An alternate personnel decontamination facility should be provided to assure that such facilities are available in the event of an accident which would deny access to the Door 16 area (e.g. high radiation levels from the adjacent primary sampling station).

(3) Assurance should be provided that all personnel exiting the Controlled Access Area frisk themselves using the lowest range possible on the instrument. The frisker at Door 16 must be switched between the 1000 and 3000 cpm range scales depending on whether protective clothing or personnel are being frisked. This is not a satisfactory practice for contamination control.

In addition the following matters should be considered for improvement of the program:

(1) Additional sample counting equipment should be acquired to support the air sampling program. In the event that a Unit-1 onsite uranalysis program is instituted an automatic liquid scintillation counting system would probably be required. The equipment used to count smear smear samples should be considered for replacement.

(2) The survey instrument calibration sources are adquate for their purpose but the facility is considered marginal. The exposure of one source continuously to the weather and the second source to continuous high humidity and temperature extremes has had a deleterious effect on their operation which was observed during the Appraisal. Similar problems were observed in connection with the neutron source exposure device. Consideration should be given to the establishment of an indoor portable instrument calibration facility.

(3) A mechanism needs to be developed to permit female employees to decontaminate without compromising either their modesty or the station's ability to gain access to the Controlled Access Area through Door 16.

## 8.0 Emergency Response Capabilities

The licensee's emergency response capability has resulted from planning performed over the years since the operating license was issued. Currently additional planning is underway to upgrade the emergency response capability to meet new requirements. Some modifications related to the new requirements have already been implemented. Emergency response has involved both corporate and site personnel with the former mainly involved in the planning effort.

The current response of SCE to radiological emergencies is primarily limited to onsite actions. Environmental monitoring is limited primarily to the collection of data at the site boundaries. Emergency planning presently provides, under the more serious situations, for a team of SCE corporate personnel to assemble at the San Diego Gas and Electric Company office in San Clemente. This corporate team will provide a very limited capability for offsite environmental monitoring, primarily the collection of biological and water samples for analyses. The corporate team's primary responsibilities are to provide liaison with various offsite organizations and support to the station and local authorities.

The licensee has generated procedures for implementing planned emergency actions and has provided training related to the emergency actions. The implementing procedures address such items as emergency telephone numbers, onsite and offsite radiological emergency responses, Units- 2/3 evacuation procedures, iodine blocking pills, emergency kit inventory and emergency exposure. In 1980 ten new procedures were developed that are related to upgrading the emergency planning. Some of the normal Radiation Protection Procedures - e.g., Offsite Dose Determination, Surveys, Access to Controlled and Exclusion Areas - are also intended to be used during emergency situations. Training related to the emergency plan and response capability has been described previously (Sections 3.2.4 and 7.3). The appraisal disclosed that only a minimum amount of training has taken place with respect to the corporate team that will assemble at the San Diego Gas and Electric office. The procedures for sampling and equipment operation have been reviewed in detail with the corporate team members. The CRP group had apparently received no training to date related to most of the new emergency procedures that have been added in 1980. The licensee does not provide first aid training for the site personnel because all injured personnel are expected to be treated by a physician or sent to a hospital.

The primary response of CRP personnel during those emergencies that involve the plant or offsite areas is to vacate the Controlled Access Area and go to the assembly area. CRP personnel are to bring survey instruments with them as they leave the Controlled Access Area. Personnel leaving the exclusion areas under such circumstances are not to use the stepoff pads, but should remove anti-contamination clothing at the exit(s) from the Controlled Access Area and then go to the assembly area. After reaching the assembly point, CRP personnel are to perform the functions they are assigned by the Emergency Coordinator.

The inventory of equipment and supplies in the emergency kits located in the AWS first aid room, health physics office (entrance to Controlled Access Area), control room and the San Diego Gas and Electric office in San Clemente were checked against the listings in Procedure S-VIII-1.19 (completely revised on December 19, 1979). The following deficiencies and inadequacies were identified.

a. AWS First Aid Room:

   (1) The self reading dosimeters required recharging before use, however no charger was contained in the kit. The inventory list did not require a charger.

   (2) Only 1 package (100) of swabs was present rather than the required 300.

   (3) The scissors were in poor condition.

   (4) The copy of Emergency Procedure S-VIII-1.19 contained in the kit was not the most recent revision.

   (5) The full face masks were located in another box and the condition of storage raised questions concerning their readiness for use.

b. Health Physics Office - Door 16

   (1) The items on the inventory list were not located in a container or single location identified for emergency use. Many of the items appear to be used for everyday situations, e.g. bandaging cuts or cleaning dirty hands.

(2) Only one bottle of tincture green soap could be located.

(3) The fingernail file was missing.

(4) The swabs were not packaged.

(5) The two cans of Septisal could not be located.

(6) The plastic containers could not be located.

c. Control Room

(1) The selfreading dosimeters were present, however the kit contained no charger. A charger was not required by the inventory list.

(2) A number of items, apparently now required to be available in the Technical Support Center, were still in the control room, e.g. P and I drawings, floor plans, map overlays for evaluating doses from activity releases.

(3) The three self contained breathing devices had no records inside the container to indicate the device condition or the date(s) of inspection. This condition was also found to exist for the two devices located at the entrance to the 4 kv room and the one at the Health Physics office.

d. San Diego Gas and Electric Office

(1) The 0-100 R/hr Technical Associate survey meter was not present.

(2) According to the date on the plastic bag, the self reading dosimeters were last calibrated on November 14, 1979. The log book indicated the dosimeters were replaced on August 20, 1979. The inventory list requires calibration on a quarterly basis.

The self contained breathing devices are supposed to be checked for operability monthly. The Chairman of the Safety Committee has the responsibility for reviewing the monthly checklists to assure the monthly checks were being made. There were no records of the monthly checks made after December 1979 and confirmation of the checks for the period January through May 1980 was not made because the Chairman did not know who was to perform the monthly checks or that it was his responsibility to review the monthly checks.

A limited number of survey instruments have been assigned to the emergency kits. A cutie pie survey meter, 0-1 R/hr, was kept in the control room for emergency use. The kit at the San Diego Gas and Electric office contained a Nuclear Chicago cutie pie (0-1 R/hr) and a Johnson portable counting system that included a calibrator, digital counter, a GM detector, a GM end window detector, an alpha scintillation probe and a survey meter. The inventory lists show that a survey meter is kept at the South Coast Community Hospital. The inventory list for the new Technical Support Center shows two cutie pie survey meters. The new Operational Support Center will be supplied with a Xetex "Fission Probe" and a cutie pie survey meter. The Technical Support and Operational Support Centers have not yet been supplied with the required survey meters. The other survey meters available for use during an emergency are those used on a daily basis for radiation surveys.

The licensee has some portable air sampling equipment. The only air sampler designated specifically for emergency use is the one in the San Diego Gas and Electric office which can be battery operated. The licensee has portable electric air samplers that can be used during an emergency. These electric air samplers can sample at the rate of four cubic feet per minute. The licensee has a large supply of charcoal filters and recently purchased about 100 silver zeolite filters for emergency use. The silver zeolite filters are being stored in the CRP Foreman's office to prevent their use during nonemergency situations. The silver zeolite filters provide a capability of detecting iodine in the presence of noble gases.

The licensee's computer program for personnel exposure control and the related data base are intended to be used during emergencies. The program can provide a listing of personnel by specific location who are in the Controlled Access Area. The exposure data can also be used during emergencies. During emergency situations, all loads on the computer can be shed except for the San Onofre site. There is also a standby computer that can be operational in 20-30 minutes.

8.1 Conclusions - Emergency Response Capabilities

Based on the above findings, improvements in the following areas are required to achieve an acceptable program.

(1) The equipment and supplies in the various emergency kits should be complete and available for use at any time. The kits should be reserved only for use in emergency situations.

(2) The self contained breathing devices should be checked for operability on a regular basis and appropriate records maintained. Some means should be provided which indicates that emergency equipment has been checked (on schedule) and is in operating condition. Appropiate training for potential users of such equipment should be conducted and documented.

(3) The number of portable survey meters specifically designated for emergency use does not appear to be adequate for a major plant or offsite emergency. Emergency equipment of this type should provide a capability to measure radiation levels up to 1000 R/hr.

(4) The training in emergency response should assure that the CRP staff is familiar with equipment and procedures which they will be expected to use. The training should provide reasonable assurance that the staff will be able to respond appropriately to an emergency.

## 9.0 General Procedure Development

The authority and policy for preparation, revision, and review of all station documents is contained in Station Order S-A-109. In addition, Station Order S-A-110 provides for an On Site Review Committee (OSRC) which reviews all station documents and meets at least monthly to deliberate on these matters. Such documents include the following: Station Orders (e.g. S-A, administrative, and S-E, engineering), Procedures (S-I through S-XII, and special procedures, S-P), and Operating Instructions (S-0 through S-12). Specifically, Radiation Protection Procedures are designated S-VII, yet some Station Orders and some Procedures of the S-III (Chemistry) and S-VIII (Emergency) series include items with radiation protection concerns.

The master (signed) copy of all Station Orders, Procedures and Instructions is maintained at the EDM from which four "originals" (white copies) are produced and distributed. Additional working copies (pink) are distributed to a matrix of station users by the EDM office and a further supply is maintained for quick retrieval by all employees in the files at the entrance to EDM in the AWS Building.

The preparation, revision, and review of all procedures is well documented, including computer generated monthly up dates of procedures requiring revision/review, and follows the plan established in Station Order S-A-109. The format and amendment process are in accord with the Station Technical Specifications (Section 6.8) and with ANSI-N18.7-1971.

Radiation protection procedures (section S-VII) reviewed (especially those pertaining to areas examined during this appraisal) were generally clear and understandable at the user or technician level. However, there is clearly the need for well defined and a more consistent use of titles in Station Orders and Radiation Protection Procedures. Some examples of the variety of titles used for possibly the same or a limited number of positions are presented here to emphasize that point. The title "Radiation Protection Supervisor" is used in a number of procedures (e.g., S-VII-1.5, 1.13, 1.34, and PSSO-21), and is also specifically identified in this report, however this position is not an official title within the SEC organization. Further confusion is noted in the use of the titles Chemical-Radiation Protection Engineer (S-A-110 and S-A-126), Chemistry and Radiation Protection Engineer (S-A-105), and Supervisor of Chemistry and Radiation Protection (S-A-109).

The failure to follow existing procedures was another problem area identified. This problem can arise from a laxity in enforcement of adherence to procedures or the failure to effect revisions to procedures to keep them current. This area includes items such as: the assignment of CRTs to the Radiation Exposure Permit (REP) issuance desk for review and signoff on REPs, while the Procedure (S-VII-1.5) requires signature by the "Radiation Protection Supervisor" (a position designation which does not exist); having trained security guards rezero (charge) pocket dosimeters at the entrances to the Controlled Access Area (Door 16 and contractor trailer), rather than by Radiation Protection Personnel as delineated in Procedure S-VII-1.5; and the failure of a less experienced CRT to alpha count smear samples with high beta activity ( 22,000 dpm/100 cm$^2$) on one occasion, prior to the disposing of the samples, contrary to the requirements of Procedure S-VII-1.13. The failure to alpha count samples was identified by a CRP Foreman.

Because the Station Order (S-A-109) requiring the preparation and review of procedures is newer (January 7, 1980) than many of the current procedures (revisions required only every 24 months), those dated prior to January 1980 are not in a consistent format (a potential for confusion and misuse). The stated Station goal is to upgrade all Unit-1 procedures to conform to S-A-109 by the end of this year. This upgrading should also eliminate unneeded procedures or sections thereof, such as item IV.D of Procedure S-VII-1.1 (outdated by the issuance of Procedure S-VII-1.46), and Procedure S-VII-1.36 (which has not been implemented and is inconsistent with Station Order S-E-201). In addition it was noted that several procedures had not been revised within the past two years; specifically, S-VII-1.28 and many of the S-III group of Procedures.

9.1 Conclusions - General Procedure Development

Based on the above findings, this portion of the licensee's program appears to be adequate, but the following matters should be considered for improvement of the program.

(1) Procedural inconsistencies and terminology should be clarified, including clearly defined and appropriate position titles.

(2) Procedure revisions should be consistent, where appropriate, with existing practice and additional attention should be directed to compliance with existing or revised procedures.

(3) A program to revise all outdated procedures should be instituted to assure that the stated goal of completion by the end of 1980 is met.

(4) Procedures should be expanded to include the following functional areas not presently covered, e.g., calibration and use procedures for particulate and iodine air sampling, requirements for audits of the radiation protection program and ALARA reviews, and pocket dosimeter quality assurance requirements.

10.0 Exit Interview

On May 30, 1980 the members of the Health Physics Appraisal Team met with those members of the SCE Corporate and Station organizations identified in ANNEX A. The Appraisal purpose, scope and preliminary conclusions were discussed. The teams conclusions were limited to those areas identified in APPENDIX A - Significant Appraisal Findings and APPENDIX B - Notice of Violation to the report transmittal. On August 1, 1980, a revision to APPENDIX A - Significant Appraisal Findings was discussed with J. Curran by telephone.

None of the items discussed were considered to be of such significance as to require an immediate commitment for corrective action on the part of the licensee.

ANNEX A

Personnel Contacted

*J. Curran  Plant Manager  SONGS

SONGS UNIT 1

*R. Brunet  Superintendent
*M. Sullivan - Supervisor Chemistry and Radiation Protection (CRP)
G. Peckham  Chemistry and Radiation Protection Engineer (CRPE)
*J. Mortenson - CRPE
*B. Graham - CRPE
*D. Duran - CRPE
*E. Bennett - Foreman, Chemistry and Radiation Protection (CRP)
G. Goff - Chemical-Radiation Technician (CRT)
J. Heflin - CRT
S. Hock - CRT
S. Jones - CRT
R. Morgan - CRT
W. Rising - CRT
L. Vulchev - CRT
J. Tate - Supervisor of Operations
R. Santosuosso, Supervisor Plant Instrumentation
M. Wharton - Supervising Engineer
G. Beetz - Acting Supervisor of Plant Maintenance
J. Krohn - Machinist, Temporary Supervisor, Machinists - Electricians
F. Briggs - Engineer
M. Bruns - Watch Engineer
W. Jones - Chairman - Safety Committee
W. Rutland, Quality Assurance Engineer

SONGS Units 2/3

*H. Morgan - Superintendent
*R. Warnock - Supervisor CRP
*J. Albers - CRPE
S. Medling - CRPE
*S. Folsom - CRPE
*G. Davis - Foreman, CRP
S. Corey - Foreman, CRP
R. Burton - CRT
E. Ho - CRT
K. Darcy, CRT
R. Lacuata, CRT
J. Scott, CRT

SCE - Corporate

*R. Dietch - Vice President, Nuclear Engineering and Operations Department
*J. Haynes - Chief, Nuclear Engineering
*H. Ottoson - Manager, Nuclear Operations
E. Donovan - Supervisor, Core Engineering and Nuclear Analysis
D. Evans - Engineer
D. Pilmer - Supervising Engineer - Nuclear Systems and Equipment
*D. Nunn - Manager, Quality Assurance
G. Bogosian - Project Supervisor, Quality Assurance
*H. Chun - Quality Assurance Engineer
*J. Dunn - Project Supervisor, Quality Assurance
*G. McDonald - Quality Assurance/Quality Control Supervisor

Non SCE Personnel

H. Houserman - Westinghouse Outage Coordinator
R. Rhinehart - Wells Fargo Escort

*Denotes those individuals present at the exit interview.

# ANNEX B

Documents Reviewed

Regulatory Guide 1.21, Measuring Evaluating and Reporting Radioactivity in Solid Waste and Release of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants.

Regulatory Guide 1.101, Rev. 1, Emergency Planning for Nuclear Power Plants

Regulatory Guide 1.33, Rev. 2, Quality Assurance Program Requirements (operations), February 1978

Regulatory Guide 8.8, Rev. 3, Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As is Resonably Achievable

Regulatory Guide 8.9, Acceptable Concepts, Models, Equations and Assumptions for a Bioassay Program

Regulatory Guide 8.10, Rev. 1-R, Operating Philosophy for Maintaining Occupational Radiation Exposure as Low as is Reasonably Achievable (Nuclear Power Reactors)

Regulatory Guide 8.14, Personnel Neutron Dosimeters

Regulatory Guide 8.14 (Rev. 2) Personnel Neutron Dosimeters

Regulatory Guide 8.15, Acceptable Program for Respiratory Protection

ANSI-N13.5 Performance Specification for Direct Reading and Indirect Reading Pocket Dosimeter for X and gamma Radiation.

ANSI-N13.10 Specification and Performance of OnSite Instrumentation for Continuously Monitoring Radioactivity in Effluents.

ANSI-N13.11, Criteria for Testing Personnel Dosimetry Performance

ANSI-N18.1-1971, Selection and Training of Nuclear Power Plant Personnel

ANSI-N18.7-1971, Administrative Controls and Quality Assurance for Operational Phase of Nuclear Power Plants

ANSI-N42.14, Calibration and Usage of Germanium Detector for Measurement of Gamma-ray Emission of Radionuclides

ANSI-N320, Performance Specification for Reactor Emergency Radiological Monitoring Instrumentation

ANSI-N322-1977, Inspection and Test Specifications for Direct and Indirect Reading Quart Fiber Pocket Dosimeter

ANSI-N323-1978, Radiation Protection Instrumentation Test and Calibration

ANSI-N324, Performance of Thermoluminescence Dosimetry Systems

ANSI-N343, Internal Dosimetry for Mixed Fission and Activation Products

ANSI-N510-1975, Testing of Nuclear Air-Cleaning Systems

NUREG 0041, Manual of Respiratory Protection Against Airborne Radioactive Material

Technical Specifications for the San Onofre Nuclear Generating Station, Unit 1, Appendix A to Provisional Operating License DPR-13

Quality Assurance Audit Report ENV-SCE-3-80, Special Health Physics - Radiological Audit, dated April 10, 1980

San Onofre Nuclear Generating Station, Radiation Protection Training Manual, Rev. 2, February 1976

Station Orders:

S-A-1, Safety
S-A-10, Station Inspections and Housekeeping
S-A-12, Emergency Treatment
S-A-15, Safety Precautions in Confined Areas
S-A-105, Assignment of Responsibility by Key Personnel
S-A-108, Admittance to the Station
S-A-109, Station Documents  Preparation, Revision and Review
S-A-110, Organization and Responsibilities of the Onsite Review Committee
S-A-126, Personnel Training
S-A-132, Station Incident Reports
S-E-201, Clean, Controlled and Exclusion Area Definitions and Monitoring
S-E-204, Radioactive Liquid and Gas Waste Disposal
S-E-207, Containment Sphere Access and Evacuation
S-E-209, Respiratory Protection Program

Operating Instruction:

S-3-2.35, Operation of the Cryogenic Waste Gas Treatment System

Maintenance Procedure

S-I-1.68 In-Place Leak Test - HEPA Filter Banks

Instrument and Test Procedures:

S-II-1.5, Area Radiation Monitoring System Calibration
S-II-1.7, Operational Radiation Monitoring System Calibration
S-II-1.8, Area Radiation Monitoring System Maintenance

Chemical Procedures:

S-III-1.19, Calibration, Maintenance and Background Check of the Canberra Spectrometer

Security Procedures:

S-IV-1.12, Duties and Obligations of Members of the Security Organization

Radiation Protection Procedures:

S-VII-1.1, Calibration of Portable Radiation Survey Instruments

S-VII-1.2, Evaluation and Testing of Containment Sphere Atmosphere Prior to Entry During Operation

S-VII-1.4, Entering and Leaving Steam Generators

S-VII-1.5, Access to Controlled and Exclusion Areas

S-VII-1.7, Spent Resin Shipments

S-VII-1.8, Decontamination Procedure - Personnel

S-VII-1.9, Decontamination and Clearance of Tools, Equipment and Areas

S-VII-1.10, Evaluating the Containment Atmosphere During Outages

S-VII-1.13, Determination of Radioactive Surface Contamination by Smear Surveys

S-VII-1.14, Steam Generator Tube Leak Rate Determination

S-VII-1.15, Liquid Radioactive Waste Releases

S-VII-1.17, Radiation Exposure Standards

S-VII-1.20, Solid Radioactive Waste Shipments

S-VII-1.23, Dosimeter Calbration Check

S-VII-1.28, Routine Building Air Monitoring

S-VII-1.31, Frisker Monitor Calibration

S-VII-1.32, Verifying the Calibration Using Source Standards Radiation Monitoring Sample System Channels 1211, 1212, 1214, and 1218

S-VII-1.33, Gas Radioactive Waste Releases

S-VII-1.34, Radiation Survey Procedure

S-VII-1.36, Use of the Staplex High Volume Air Sampler

S-VII-1.37, Respiratory Protection Equipment Training

S-VII-1.38, Use, Maintenance and Care of Respiratory Systems for Airborne Radioactive Areas

S-VII-1.39, Radiation Protection During Steam Generator Tube Plugging

S-VII-1.40, Portal Monitor Operational Check

S-VII-1.45, Qualified Escort Training

S-VII-1.46, Operation and Calibration of the Studsvik Neutron Survey Meter

S-VII-1.51, Operation and Calibration of Frontier Respiratory Test Booth

Emergency Procedures

S-VIII-1.4, Offsite Radiological Emergency

S-VIII-1.22, Collection of Containment Airborne Sample Following LOCA

S-VIII-1.23, Collection of Reactor Coolant Sample Following LOCA

S-VIII-1.24, Monitoring Airborne Levels in Onsite Technical Support Center

S-VIII-1.25, Noble Gas Release Rates From Steam Release

S-VIII-1.26, Plant Stack Iodine and Particulate Release Rates

S-VIII-1.27, Iodine Release Rate Determination for a Steam Release

S-VIII-1.28, Noble Gas Release Rates from Plant Stack

S-VIII-1.29, Airborne Monitoring During a Radiological Emergency

S-12-7, Use of "Supplied Air" Equipment

Sol-III-1.21, Operation and Calibration of Packard Prias Liquid Scintillation Counter

Sol-VII-1.49, Tritium Analysis of Urine Samples

S-3-2.26, Receiving, Storage, Processing and Discharge of Liquid Waste

Station Forms:

San Onofre Nuclear Generating Station, Qualified Escort Examination, Form B

San Onofre Nuclear Generating Station, Qualified Escort Review Examination, Form F

PSSO (1) 21, Radiation Exposure Permit

PSSO (1) 30-1, Radioactive Material Shipment Record

PSSO (1) 30-2, Instructions to Carrier for Maintenance of Exclusive Use of Shipment Controls

PSSO (1) 57, Document Routing Control Form

PSSO (1) 298, Qualified Escort Examination and Check-Off Record

PSSO 299, Qualified Escort Review Examination Record

PSSO (1) 404, Notice of Escort Qualification

PSSO (1) 409, Design Review Checklist

PSSO (1) 446, Procedure Change Notice

SO (1) 462, Contractor Orientation Checklist

Employees Guide to Radiation Protection Booklet