

12.3 RADIATION PROTECTION PROGRAM

12.3.1 Program Objectives

The Radiation Protection Program provides evaluation and documentation of site radiological conditions and ensures that every reasonable effort is made to maintain personnel exposures "as low as reasonably achievable" (ALARA) in accordance with requirements of 10CFR20, Regulatory Guides, and Technical Specifications. The program is designed to protect the public and plant personnel from unnecessary exposure to radiation and radioactive materials. The personnel responsible for the Radiation Protection Program are, in order of authority, the Salem Site Vice President, the Plant Manager, the Radiation Protection Manager, Radiation Protection Supervisors, and Radiation Protection Technicians.

12.3.2 Organization

The Plant Manager is responsible for maintaining and implementing the Radiation Protection Program and receives direct reports from the Radiation Protection Manager concerning the status of the program.

The Radiation Protection Manager (RPM) is responsible for managing the Radiation Protection department to meet station operational needs and radiological safety standards. The Radiation Protection Manager manages the Radioactive Material Control program and implement the ALARA program as described in administrative procedures.

Radiation Protection Supervisors are responsible for planning, conducting, and supervising daily radiation protection activities.

Radiation Protection Technicians implement the radiation protection program under the supervision of Radiation Protection Supervisors.

Radiation Protection personnel have the authority to halt any work activity when, in their professional judgment, worker safety is being jeopardized or unnecessary personnel exposures are occurring.

In the absence of Radiation Protection supervision, the authorities of the above positions may be delegated in accordance with station radiation protection procedures to qualified supervisors or technicians.

The Radiation Protection Manager is familiar with the design features of nuclear power stations and possesses both the technical competence to establish radiation protection programs and the supervisory capability to direct the work of the professionals and technicians required to implement such programs.

The qualifications of the designated "Radiation Protection Manager" meet or exceed the requirements of Regulatory Guide 1.8, September 1975.

At least one member of the Radiation Protection Supervisor staff shall be designated as the backup "Radiation Protection Manager" in accordance with paragraph 4.4.4(d) of ANSI/ANS 3.1-1981.

The Radiation Protection Supervisors are qualified in accordance with ANSI/ANS 3.1-1981. They shall have a minimum of four years of experience in applied radiation protection, including two years of experience in a nuclear power plant or a nuclear facility.

The qualifications of the Radiation Protection Technicians meet or exceed the personnel requirements of ANSI/ANS 3.1-1981. Radiation Protection Technicians are additionally trained and qualified in accordance with administrative procedures.

12.3.3 Facilities, Equipment and Instrumentation

12.3.3.1 Personnel Protective Equipment

Protective Clothing

Personnel entering the radiologically controlled area (RCA) are required to wear protective clothing in contaminated areas. The nature of the work as well as the levels of contamination will govern the selection of protective clothing to be worn by individuals.

Protective apparel available is provided by Radiation Protection in accordance with plant conditions and need including items of specialized apparel such as plastic or rubber suits, face shields, and respirators are available for operations involving high level contamination. In all cases, radiation protection personnel will evaluate the radiological conditions and specify the required items of protective clothing to be worn on the Radiation Work Permit (RWP).

Respirators

Respiratory protective devices may be used in situations where airborne radioactivity which cannot be mitigated by engineering controls exists or is expected. In such cases, the airborne concentrations are monitored by radiation protection personnel. Protective devices, required according to concentration and type of airborne contaminants present, are specified on the RWP.

Self-contained breathing apparatus are available for use in situations involving exposure to significant gaseous activity or an oxygen deficient atmosphere.

The use of Delta Protection Mururoa V4 F1 and V4 MTH2 respiratory protection suits has been authorized for use at Salem with an assigned protection factor (APF) of 2,000 (Reference NRC to PSEG letter: "HOPE CREEK GENERATING STATION AND SALEM NUCLEAR GENERATING STATION, UNIT NOS. 1 AND 2 -REQUEST FOR AUTHORIZATION TO USE RESPIRATORY PROTECTION EQUIPMENT (TAC NOS. MD9199, MD9200, AND MD9201)", dated January 27, 2009). Approval was based on testing which demonstrated the suits met European Standard EN 1073-1 (January 1998), "Protective Clothing Against Radioactive Contamination, Part 1: Requirements and Test Methods for Ventilated Protective Clothing Against Particulate Radioactive Contamination," This standard is generally consistent with the pertinent acceptance criteria provided in Los Alamos National Laboratory Report LA-10156-MS, which is used to test and authorize the use of air-supplied suits at Department of Energy sites. The certification-testing was broadly based covering a range of various functional areas. Both models passed all required tests, and both provided a measured average protection level (fit factor) of 50,000. The following information on the Mururoa V4 F1 and V4 MTH2 suits is included to comply with commitment CM.CC.2008-121:

The manufacturer's instructions for use and storage of the Delta Protection Mururoa V4F1 and V4 MTH2 suits will be adhered to and integrated into the respiratory protection program, with the exception of the requirement to have a stand-by rescue person. New lesson plans will be developed to train workers on Mururoa's features, donning, use and removal, cautions and use of mouth strip and tear off strips for routine and emergency egress. Radiation Protection personnel will be provided additional training for selection, approval, issue, equipment set-up, operation and maintenance instructions for the Mururoa suit. The Mururoa V4F1 and V4 MTH2 suits will be discarded after a single use and will not be used in atmospheres that are immediately dangerous to life and health (IDLH). Any defects discovered with the Mururoa suit will be entered into the Corrective Action Program and reported to the manufacturer, as necessary. Industry notifications, when required, will be made through the Operating Experience Program.

12.3.3.2 Facilities

The general arrangement of the service facilities is designed to provide adequate personnel decontamination and change areas and to control access to the Radiologically Controlled Area (RCA).

The male and female clean locker room is used to store items of personal clothing not required or allowed in the radiologically controlled area and is employed as a protective clothing change area. A supply of clean protective clothing for personnel is maintained in this area.

All personnel will survey themselves before leaving the radiologically controlled area utilizing an approved personnel monitoring device provided by radiation Protection. Additional radiation monitoring devices for frisking tools, etc. are also available at the access control point.

A decontamination area is provided within the radiologically controlled area for the decontamination of hand tools and small equipment.

Radiation protection facilities include equipment to count air samples and contamination wipe surveys. A sufficient quantity of each type of instrument is available to support both routine operations and emergency response. The selection of radiation detection instrumentation is based on the ability of the instrument to perform with reliability and accuracy. Each instrument chosen for use is evaluated on the following parameters:

- a. Ease of calibration and repair;
- b. Interchangeability of components;
- c. Weight and size for user acceptance;
- d. Standard readouts;
- e. Response to radiation of interest.

Outside laboratories may be used for independent analysis or special samples beyond the scope of the stations' capabilities.

12.3.3.3 Area Control

The plant site is divided into two general areas: the protected area and the owner-controlled area. The protected area is that portion of the site which is enclosed by fencing and is posted with "No Trespassing" signs. The owner-controlled area encompasses all areas external to the fence but within the site property line.

The restricted area for the Salem Generating Station, as defined by 10CFR20.3, begins at the security fence (i.e., the protected area). Access to the restricted area is controlled by the licensee for the purposes of protection of the individuals from exposure to radiation and radioactive material. The unrestricted area as defined by 10CFR20.3 includes all areas outside the security fence which are not controlled by the licensee for the purposes of protection of individuals from exposure to radiation and radioactive material. The Radiologically Controlled Area (RCA) consists of discrete areas within the restricted area which are posted to alert individuals to hazards or potential hazards due to the presence of radiation or radioactive material. Salem station implements certain administrative controls for entrance to and exit from the RCA for the purposes of enhancing and simplifying radiological safety.

Access to the RCA is limited to those persons authorized for entry by plant supervisors and radiation protection personnel through the use of RWPs.

Any area within the RCA containing radioactive materials and radiation is surveyed, classified, and conspicuously posted with appropriate radiation caution signs.

Administrative and physical measures are employed to prevent unauthorized or unintentional entry of personnel into any High Radiation Area or Very High Radiation Area. Alarms, barricades, and locked doors are employed as necessary to restrict access to, and provide warnings of High Radiation Areas or Very High Radiation Areas.

One point (control point) of access to and exit from the RCA is normally utilized. It is located at Elevation 100 feet (ground level) in the Service Building. Other access points may be established as required by plant conditions.

The facilities are designed to provide proper radioactive material and contamination control and are common to both units.

12.3.4 Personnel Dosimetry

Individual dose monitoring devices are normally provided for all personnel who enter the RCA. As a minimum, personnel monitoring consists of a self-reading dosimeter (electronic dosimetry or another direct-reading dosimeter). Individuals who require monitoring in accordance with 10 CFR 20.1502 are normally also monitored with dosimeters of legal record (DLR). Individuals who do not enter the RCA as a part of their jobs are not normally provided with individual dose monitoring devices.

Official record dose for individuals who require monitoring in accordance with 10 CFR 20.1502 is usually obtained from DLR readings. Radiation Protection may specify a different source as a basis for determination of record dose.

Monitoring in accordance with 10 CFR 20.1502 is usually required only for deep dose equivalent (DDE) and lens dose equivalent (LDE). The individual monitoring devices previously discussed are normally used to monitor DDE and LDE. The air sampling program and the bioassay program (principally whole body counting) are used to show compliance with the monitoring thresholds for committed dose equivalent (CDE) and committed effective dose equivalent (CEDE). Passive techniques such as whole body contamination monitors at the RCA exit assist in showing compliance. Individuals who work in the RCA normally receive whole body counts upon initial entry, annually while employed, and upon termination, depending upon the potential for detectable radioactivity. Radiation Protection may prescribe other methods for demonstrating compliance as appropriate.

12.3.4.1 NVLAP Certified Dosimetry

Occupational whole body beta and gamma radiation exposure in the RCA is normally monitored by NVLAP certified Dosimetry for individuals who require monitoring in accordance with 10 CFR 20.1502. Occupational whole body neutron radiation exposure is determined whenever significant neutron exposure is likely. It is determined either by calculation, based on area stay times and survey or neutron/gamma ratio information, or by neutron-sensitive dosimeters.

Special or additional DLRs are issued at the discretion of radiation protection personnel as dictated by working conditions or the RWP.

Dosimeters are processed by an appropriate approved vendor on a periodic basis. Approved vendors of dosimetry services are required to maintain current accreditation by the National Voluntary Laboratory Accreditation Program in all applicable areas.

12.3.4.2 Self-Reading Dosimeters

A self-reading dosimeter (SRD) is issued to all individuals working inside the RCA to provide a continuous, real-time indication of accumulated dose during each individual entry. Electronic dosimeters are normally used. SRDs are read regularly and recorded upon exit from the RCA. SRDs furnish the exposure data for the administrative control of external gamma radiation exposure. Each individual is required to examine his/her SRD reading frequently while in radiation areas.

Self-reading dosimeters are tested and calibrated in accordance with current industry standards.

12.3.4.3 Administrative Exposure Control

Radiation Work Permits (RWPs) are required for work in areas where excessive exposure to personnel is possible. Radiation Work Permits describe the work to be performed and specifies special precautions, and protective clothing.

PSE&G has established an incremental series of administrative controls to carefully monitor radiation exposures. The Radiation Protection Program is the governing document which defines these controls. The administrative controls ensure that under normal operating conditions no regulatory limits will be exceeded. These administrative limits are below the federal limits for occupational radiation exposure in 10CFR20.

Processing of dosimetry devices is carried out as required to maintain a record of cumulative exposure. In addition, special processing will be initiated whenever it is suspected that the individual has received a cumulative dose approaching the maximum annual limit.

12.3.5 PROCEDURES

12.3.5.1 Departmental Procedures

Radiation Protection procedures have been developed in accordance with station procedures to provide administrative control over radiation protection areas of responsibility, including:

- a. Organization, Administration, Training and Qualification;
- b. Access Control;
- c. External Exposure Monitoring;
- d. Internal Exposure Monitoring;

- e. Instrumentation and Sources;
- f. Surveys;
- g. Dose Control;
- h. Radioactive Material Control;
- i. Shipment and Receipt of Radioactive Material;
- j. Radiological Incidents;
- k. Special Evolutions.

12.3.5.2 Access Training

All personnel requiring unescorted access to the stations are trained in the basic principles and practices of radiation protection. The level of training required is commensurate with the individual's responsibilities. Successful completion of a written exam is required at each level of training. This training requirement does not apply to authorized individuals who have completed an approved training program elsewhere. Requalification is required on a routine basis. Visitors requiring escorted access are provided a briefing on radiation protection principles and practices appropriate to the circumstances of the visit.