

## **11.3 RADIATION SAFETY**

### **11.3.1 GENERAL**

The Plant General Manager-Calvert Cliffs Nuclear Power Plant Department is responsible for the Radiation Safety Program at Calvert Cliffs. This responsibility is shared by all supervisors and plant personnel. Personnel assigned to the plant and all visitors are required to follow all rules and procedures established for protection against radiation, contamination and airborne activity.

Administration of the Radiation Safety Program at Calvert Cliffs is the responsibility of the General Supervisor-Radiation Protection. The implementation of this program is the responsibility of the Health Physics Operations Unit and Health Physics Support Unit, with their primary purpose being to administrate, control, and eliminate, if possible, any and all radiological hazards within the plant. Additional responsibilities are in the areas of assisting the various plant training, operations, and maintenance sections in assuring the plant is operated and maintained in a safe condition, and that compliance with Company, State, and Federal regulations in regard to radiation safety are adhered to.

### **11.3.2 ACCESS CONTROL**

A radiologically controlled area (RCA) is defined as an area within the plant site in which radioactive materials and/or radiation are present, or where there is a potential for their release in sufficient quantities (as designated by 10 CFR Part 20) to require protective measures. Entry into radiologically controlled areas is limited to those persons authorized to accomplish a specific task.

Radiologically controlled areas are designated by appropriate signs and barriers. Prior to entering these areas, personnel will meet the requirements for dosimetry, protective clothing and procedures as detailed in Calvert Cliffs Radiation Safety Procedures.

### **11.3.3 PERSONNEL PROTECTIVE AND MONITORING EQUIPMENT**

#### **11.3.3.1 Protective Equipment**

All personnel entering a RCA may be required to wear anti-contamination clothing. This is directly dependent on the locations, plant condition and the task to be performed.

Generally the standard dress will be coveralls (over personal undergarments or medical "scrubs"), shoe covers, cotton glove liners, rubber gloves, rubber boots, and a hood. The requirements may be increased or decreased depending upon contamination and airborne radioactivity concentrations and the task to be performed.

Respiratory protection devices may be required when high or the potential for high airborne radioactive material exists. In such situations, the air will be monitored by the Health Physics Technicians and the required protective devices will be issued as appropriate for the type and concentrations of airborne radioactive material present. Monitoring and evaluating airborne radioactive material and the use of respiratory protection is performed according to the Calvert Cliffs Radiation Safety Procedures and 10 CFR Part 20.

#### **11.3.3.2 Personnel Monitoring Program**

The personnel monitoring program at Calvert Cliffs is based on the use of Dosimeter of Legal Record (DLR), Electronic Dosimeter (ED), and direct-reading dosimeters (DRD) for determining personnel exposures due to external Beta, Gamma, and neutron sources. When neutron exposures may be expected, a

combination of DLR and/or a direct reading portable neutron survey instrument will be used for exposure determination.

All personnel working in an RCA will be issued DLRs. Dosimeters of legal record will be processed routinely in accordance with Radiation Safety Procedures. Additional processing will be in accordance with applicable Radiation Safety Procedures. Additional DLRs will be issued for critical organs and/or extremity monitoring where prescribed by applicable Radiation Safety Procedures.

Under conditions specified in 10 CFR 20.1502 and the Calvert Cliffs Radiation Safety Manual or upon entering radiologically controlled areas of the plant, all personnel are required to wear a DLR and/or ED or DRD. In the case of visitors, they shall wear an DRD and be accompanied by an escort wearing a DLR and/or ED for the group. Direct-reading dosimeters shall be read daily or upon exit from the RCA to provide estimates of personnel exposure between DLR processing periods. The DRD also provides data as needed for evaluation of a lost or damaged DLR or evaluations of equipment, jobs, techniques, shielding, etc. Electronic Dosimeters may be used in place of DRDs.

The bioassay program requires all employees designated for assignment to Calvert Cliffs to pass a physical examination prescribed by the Calvert Cliffs Nuclear Power Plant, Inc. (CCNPP) Environmental, Safety & Health Department. For individuals required to work in RCAs of the plant, this examination will include a whole body count or passive screening. Periodic physical reexaminations, including in vivo counting or passive screening, will be given to plant employees who do significant work in an RCA. Employees terminating employment with CCNPP who have worked in an RCA at Calvert Cliffs will receive an in vivo analysis or passive screening.

Special health examinations may be required for any individual whose records show they are exceeding of yearly whole body or tissue/organ dose limits, or for any individual suspected of assimilating radioactive material. This examination may include in vivo analysis and/or in vitro analysis whenever uptake of significant radioactive materials is suspected.

Records showing the occupational dose accumulated at Calvert Cliffs of all individuals provided with personnel monitoring shall be maintained in accordance with 10 CFR 20.2106. Lists of the current status of personnel dose are available to plant supervision to aid in job planning. In addition, an alert list system will be used to emphasize those individuals who are approaching the administrative annual individual ALARA dose goal.

An individual radiation history record folder and/or electronic media will be maintained for each occupational worker. The folder contains records of: external and internal occupational dose received at Calvert Cliffs; prior occupational exposure history, to the extent required by revised 10 CFR Part 20; radiation orientation and/or training received; and special measurement results (in vivo, in vitro, respirator tests).

Additional records and reports to employees, other individuals, and the US NRC, shall be in accordance with 10 CFR 20.2202 through 20.2206.

## 11.3.4 RADIATION SAFETY FACILITIES

### 11.3.4.1 Change Room and Decontamination Facilities

Change room facilities are provided where personnel change into the protective clothing required for RCA work. Showers, sinks and appropriate monitoring equipment are provided to aid in personnel decontamination.

Equipment decontamination facilities are also provided at the plant for large and small equipment and components.

### 11.3.4.2 Health Physics Laboratory Facilities

The radiation safety laboratory contains facilities and equipment for detecting, analyzing, and measuring all types of ionizing radiation. In addition, a small source "calibrator" is available to perform operational checks of portable gamma survey instruments. The chemistry laboratory includes a counting room for analyzing environmental survey samples, including identification of specific radionuclides.

### 11.3.4.3 Health Physics Instrumentation (Excluding Process and Area Monitoring Systems)

Portable radiation survey instruments are provided for use to Health Physics Technicians as well as for operating and maintenance personnel. A variety of instruments are selected to cover the spectrum of radiation measurement requirements anticipated, i.e., instruments for detecting and measuring alpha, beta, gamma, and neutron radiation. Sufficient quantities are provided to allow for routine and emergency use, and allowing for unavailability of instruments due to maintenance and calibration.

In addition to the portable instruments, appropriate monitoring instruments are located at the exits from an RCA and at various locations within an RCA. These instruments are intended to detect contamination on personnel, materials, or equipment, so as to prevent contamination from being spread within or beyond controlled areas. Portal monitors will also be utilized, as appropriate, to monitor for radioactive material at plant ingress and egress.

Details on the Health Physics instrumentation used are contained in the Calvert Cliffs Radiation Safety Procedures and Instrument Test Equipment and Calibration procedures.