

2.9 ENVIRONMENTAL RADIATION MONITORING

2.9.1 GENERAL

The objectives of the radiological environmental monitoring program at CCNPP are to:

- Measure actual radiation exposure to the general population at the fence line and beyond.
- Observe any sudden or unexpected rise in radiation levels in the vicinity of the plant.
- Document for legal and regulatory purposes actual radiation exposure levels and radionuclide concentrations in air, Bay surface water, sediment, fish, invertebrates, and vegetation.
- Provide monitoring services in emergency situations.

In order to fulfill these objectives, the radiological environmental monitoring program must differentiate between naturally-occurring and artificially-introduced radioactivity in the environment, and between plant-related and unrelated radioactivity. The radiological monitoring program is carried out in two phases: preoperational and operational.

2.9.2 PREOPERATIONAL RADIATION MONITORING

In accordance with the requirements of the Calvert Cliffs Safety Analysis Report and the conditions of the construction permits, BGE initiated work in 1969 on the design and development of the radiological environmental monitoring program for Calvert Cliffs. Concurrent with the design and development of the monitoring program, BGE, in contract with NUS, initiated several studies to assess the potential dose impact of expected radioeffluents from Calvert Cliffs. These studies addressed the following topics:

- Build-up of radionuclides in the aquatic environment;
- Relative biological significance of radionuclides;
- Estimate of potential dose to a maximum exposed individual via seafood ingestion;
- Estimate of potential immersion dose from noble gases, and thyroid inhalation dose to a hypothetical individual at the site boundary;
- Estimate of potential adult-thyroid and child-thyroid dose via the air-pasture-cow-milk pathway; and,
- Potential dose to population within 50-mile radius.

A review of the results of these studies was made in conjunction with other environmental data. The purpose of this review was to ascertain the significance of the various exposure pathways, and to identify the "potential critical pathways" in the area of the facility. The results of this review and the mandatory requirements based on the regulatory limitations on dose, radiation/radioactivity levels as published on June 7, 1971 (10 CFR Part 50, Appendix I) determined the design of the monitoring program.

The preoperational phase provided both seasonal and annual information about the distribution of natural radioactivity in the region, defined the ambient gamma-radiation levels, and obtained baseline data for some of the more important radionuclides, both natural and man-made.

2.9.3 OPERATIONAL RADIATION MONITORING

With the issuance of the operating license for Calvert Cliffs Unit 1 on August 1, 1974, BGE began the operational phase of the monitoring program.

Between 1974 and 1985, the program was carried out based on the environmental monitoring network designed in the preoperational phase. On February 22, 1985, the

NRC issued the Technical Specifications associated with the environmental monitoring program to assure the compliance with the provisions of 10 CFR Part 20, 10 CFR Part 50, 40 CFR Part 190, and NUREG-0472. The new operational program started on March 1, 1985.

In its present form, the radiological environmental monitoring program requires sufficient sample locations, types of samples, and analytical sensitivities which, in conjunction with the preoperational and background data, permit verification of the effectiveness of station radio-effluent control. The program provides data on changes in use of unrestricted areas and meets quality assurance criteria. The results of the program provide an indication of a measurable change, if any, in radiation and radioactivity in the environment, and provide reasonable assurance that the releases are within the limits specified in the Offsite Dose Calculation Manual for plant operation. The program is periodically reviewed to determine any changes that may be warranted in its content.