7.14 Drywell Leak Detection Radiation Monitoring System

7.14.1 Safety Objective

The safety objective of the Drywell Leak Detection Radiation Monitoring System is to maintain containment integrity when subjected to a primary containment isolation signal, to prevent the release of radioactive material to that area of the plant outside of the containment boundary.

7.14.2 Power Generation Objectives

The objectives of the Drywell Leak Detection Radiation Monitoring System are to provide diversity in primary coolant leak detection ability and to annunciate abnormally high concentrations of radioactive particulates, iodines, and Noble gases within the drywell due to primary coolant leakage (Unit 1 only). The comparable Unit 2 and 3 systems shall provide similar diversity in primary coolant leak detection ability and will annunciate abnormally high concentrations of radioactive particulates and Noble gases within the drywell due to primary coolant leakage.

7.14.3 Power Generation Design Basis

The Drywell Leak Detection Monitoring System shall provide operations personnel with indication and alarms, both locally and in the main control room, of the presence of radioactive particulates, iodines, and Noble gases in excess of preestablished limits based on the particular system/plant design (Unit 1 only). The comparable Unit 2 and 3 systems will provide indication and alarms, both locally and in the respective main control rooms, of the presence of radioactive particulates and Noble gases in excess of pre-established limits based on the particular system/plant design.

7.14.4 Description

The Drywell Leak Detection Radiation Monitoring System consists of three Continuous Air Monitors (CAMs), one CAM per unit, located on the 593' elevation of their respective reactor buildings. Each CAM's supply and return lines are piped to allow selectable or composite samples from above the main steam relief valves and/or the recirculation pumps.

The Unit 1 system utilizes a CAM which is a self-contained radiation detection instrument capable of monitoring particulates, iodines, and Noble gases and providing local indication and alarms. The Units 2 and 3 systems utilize CAMs which are self-contained microprocessor based radiation detection instruments capable of monitoring radioactive particulates and Noble gases and providing local

indication. Operator selected operating parameters for the Units 1, 2, and 3 CAMs are stored in the non-volatile random access memory to prevent erasing during power outages.

Each CAM is hard wired to its respective main control room to provide indication and alarm capabilities in the main control rooms. Upon receipt of alarm, timely action will be taken to confirm the alarm and assess the possibility of increased drywell leakage.

The sample inlet of the Unit 1 CAM is routed through a two-chambered sampler assembly where the process stream goes through a filter paper, on which any particulate is deposited, then through the charcoal cartridge which traps the iodines, and into the gas chamber for low-range Noble gas measurement. The process stream goes through the solid state flow sensor, then through the pump, and finally to the sample outlet.

The sample inlets of the Unit 2 and Unit 3 CAMs are routed through a sampler/detector assembly where the process stream goes through filter paper which is monitored for particulate activity, then through a charcoal cartridge for removal of iodines and then into the gas chamber for low-range Noble gas measurement. The charcoal cartridge may be removed periodically to monitor for iodines. The process stream goes through the solid state flow sensor then through the pump and finally to the sample outlet.

Radioactive check sources are utilized for periodic checking of the detectors and the electronics for proper responses to pre-determined radiation levels.

7.14.5 Safety Evaluation

The sample and return lines of each CAM are equipped with containment isolation valves which automatically close on a Primary Containment Isolation Signal (A, F, and Z) as described in Section 7.3.4.7. Thus, the system provides primary containment integrity when required, satisfying the safety objective.