

4.4 LOOSE PARTS DETECTION SYSTEM

4.4.1 DESIGN BASIS

The loose parts monitoring system monitors the RCS for internal loose parts. The system is designed to detect a loose part striking the internal surface of RCS components with an energy level of one-half foot pound or more.

4.4.2 SYSTEM DESCRIPTION

The loose parts monitoring system consists of transducers, preamplifiers, amplifiers and an analyzer to record the occurrence of a loose part within the RCS. Eight piezoelectric accelerometers are attached to the RCS boundary, where loose parts are most likely to become entrapped, as follows:

- 2 on the reactor vessel lower head, diametrically opposed
- 2 on the reactor vessel studs, diametrically opposed
- 2 on the primary head of each SG.

In addition, the RSGs are provided with two accelerometer attachment locations on the lower secondary shell adjacent to the tubesheet on the SG. These accelerometer attachment locations are provided for future use.

The signals from the transducers are amplified inside the Containment and are then directed to the data acquisition and analysis system in the Control Room. Signals that exceed a fixed and floating setpoint value actuate an alarm. Additional information may be obtained from an analysis module that records and analyzes the signals from all eight channels. The audio output of any one of the eight channels can also be monitored through the use of a loudspeaker and a selector switch.

4.4.3 DESIGN ANALYSIS

Experience in laboratories and on operating plants has shown that the signal-to-noise ratio resulting from a loose part with an energy level of one-half foot-pound or more is of sufficient magnitude that the loose part will be detected by the loose parts monitoring system.