TABLE 4.2.E

MINIMUM TEST AND CALIBRATION FREQUENCY FOR DRYWELL LEAK DETECTION

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check
1) Equipment Drain Sump Flow Integrator	(1)	Once/3 months	Once/day
2) Floor Drain Sump Flow Integrator	(1)	Once/3 months	Once/day
3) Drywell Atmosphere Radioactivity Monitor	(1)	Once/3 months	Once/day

3.2 BASES (Cont'd)

trip and the other a downscale trip. There is a fifteen minute delay before the air ejector off-gas isolation valve is closed. This delay is accounted for by the 30-minute holdup time of the off-gas before it is released to the stack during reactor power operation when the recombiner system is not operating.

Both instruments are required for trip but the instruments are so designed that any instrument failure gives a downscale trip. The trip settings of the instruments are set so that the instantaneous stack release rate limit given in Specification 3.8 is not exceeded.

Four sets of two radiation monitors are provided which initiate the Reactor Building Isolation function and operation of the standby gas treatment system. Four instrument channels monitor the radiation from the refueling area ventilation exhaust ducts and four instrument channels monitor the building ventilation below the refueling floor. Each set of instrument channels is arranged in a 1 out of 2 twice trip logic.

Trip settings of less than 16 mr/hr for the monitors in the refueling area ventilation exhaust ducts are based upon initiating normal ventilation isolation and standby gas treatment system operation so that none of the activity released during the refueling accident leaves the Reactor Building via the normal ventilation path but rather all the activity is processed by the standby gas treatment system.

Flow integrators are used to record the integrated flow of liquid from the drywell sumps. The integrated flow is indicative of reactor coolant leakage. A Drywell Atmosphere Radioactivity Monitor is provided to give supporting information to that supplied by the reactor coolant leakage monitoring system. (See Bases for 3.6.C and 4.6.C)

For each parameter monitored, as listed in Table 3.2.F, there are two (2) channels of instrumentation. By comparing readings between the two (2) channels, a near continuous surveillance of instrument performance is available. Any deviation in readings will initiate an early recalibration, thereby maintaining the quality of the instrument readings.

The recirculation pump trip has been added at the suggestion of ACRS as a means of limiting the consequences of the unlikely occurrence of a failure to scram during an anticipated transient. The response of the plant to this postulated event fall within the envelope of study events given in General Electric Company Topical Report, NEDO-10349, dated March, 1971.

LIMITING CONDITIONS FOR OPERATION

3.6.B Coolant Chemistry (Cont'd)

b) Chloride Concentration

Time above 0.2 ppm — 2 weeks/year

Maximum limit 1.0 ppm

c) pH
During operations, if the conductivity exceeds 1.0 umho/cm, pH shall be measured and brought within the 5.6 to 8.6 range within 24 hours. If the pH cannot be corrected, or if the pH is outside a range of 4 to 10, the unit shall be placed in Hot Shutdown within 12 hours and in Cold Shutdown with 36 hours.

C. Coolant Leakage

1. Any time irradiated fuel is in the reactor vessel and reactor coolant temperature is above 212 degrees F, the rate of reactor coolant leakage to the primary containment from unidentified sources shall not exceed 5 gallons per minute. The rate of change of unidentified leakage shall not exceed 2 gallons per minute per 24 hour surveillance period when the reactor is operated in the "Run" mode. In addition, the total reactor coolant system leakage into the primary containment shall not exceed 25 gpm averaged over any 24 hour surveillance period.

SURVEILLANCE REQUIREMENTS

4.6.B Coolant Chemistry (Cont'd)

C. Coolant Leakage

1. Reactor coolant system leakage shall be determined by the primary containment (Drywell) sump collection and flow monitoring system and recorded every 4 hours or less.

2. Drywell atmosphere radioactivity levels shall be monitored and recorded at least once per day.

LIMITING CONDITIONS FOR OPERATION | SURVEILLANCE REQUIREMENTS

3.6.C. Coolant Leakage

2. The primary containment (Drywell) sump collection and flow monitoring system shall be operable during reactor power operation. From and after the time that this system is made or found to be inoperable for any reason, reactor power operation is permissible only during the succeeding 24 hours unless the system is made operable sooner. For purposes of this paragraph, the primary containment (Drywell) sump collection and flow monitoring system operability is defined as the ability to measure reactor coolant leakage.

3. The Drywell Atmosphere Radioactivity Monitor shall be operable during reactor power operation as a supplement to the reactor coolant leakage monitoring system. From and after the time that this system is made or found to be inoperable for any reason, reactor power operation is permissible for up to 30 days provided garb samples of the containment atmosphere are obtained and analyzed at least once per 24 hours.

4. If the conditions in 1, 2, or 3 cannot be met, an orderly shutdown shall be initiated and the reactor shall be in at least Hot Shutdown within the next 12 hours and in Cold Shutdown Condition within the following 24 hours.

3.6.C & 4.6.C BASES

Coolant Leakage

Allowable leakage rates of coolant from the reactor coolant system have been based on the predicted and experimentally observed behavior of cracks in pipes and on the ability to makeup coolant system leakage in the event of loss of offsite ac power. The normally expected background leakage due to equipment design and the detection capability for determining coolant system leakage were also considered in establishing the limits. The behavior of cracks in piping systems has been experimentally and analytically investigated as part of the USAEC sponsored Reactor Primary Coolant System Rupture Study (the Pipe Rupture Study). Work utilizing the data obtained in this study indicates that leakage from a crack can be detected before the crack grows to a dangerous or critical size by mechanically or thermally induced cyclic loading, or stress corrosion cracking or some other mechanism characterized by gradual crack growth. This evidence suggests that for leakage somewhat greater than the limit specified for unidentified leakage, the probability is small that imperfections or cracks associated with such leakage would grow rapidly. However, the establishment of allowable unidentified leakage greater than that given in 3.6.C on the basis of the data presently available would be premature because of uncertainties associated with the data. For leakage of the order of 5 gpm, as specified in 3.6.C, the experimental and analytical data suggest a reasonable margin of safety that such leakage magnitude would not result from a crack approaching the critical size for rapid propagation. Leakage less than the magnitude specified can be detected reasonably in a matter of a few hours utilizing the available leakage detection schemes, and if the origin cannot be determined in a reasonably short time, the plant should be shutdown to allow further investigation and corrective action.

A rate of change limit of 2 gpm per 24 hour surveillance period is specified to provide additional conservatism. This limit is applicable to reactor operations in the "Run" mode, during which time there is little variation in primary coolant system pressure. The limit does not apply to the "Startup" mode since this period is characterized by large variations in system pressure and consequently, changes in measured leakage would not be indicative of system degradation. During the limited duration of the startup phase, the 5 gpm limit will ensure the integrity of the primary coolant system.

The total leakage rate consists of all leakage, unidentified and identified, which flows to the drywell floor drain and equipment drain sumps, respectively. Both the Drywell floor drain and the equipment drain sumps have pump-out capacitites of 50 gpm per pump. Any one pump can therefore handle in excess of the maximum allowable total leakage of 25 gpm. If the ability to measure pump-out flow from either of these sumps is lost, the inoperable

sump will overflow into the remaining operable sump. The remaining operable sump pump-out flow will then represent the total leakage rate. During the time when one sump is overflowing, any increase in total flow will be assumed to be from an unidentified source. This primary containment (Drywell) sump collection and flow monitoring system can provide viable measurement of reactor coolant system leakage so long as one pump and its associated flow meter are operable.

The Drywell Atmosphere Radioactivity Monitor provides supporting information to that provided by the reactor coolant leakage monitoring system. There is no direct correlation between the radioactivity monitor indication and the leakage rate because of the uncertainties regarding coolant activity levels, source of leakage, and background radiation levels. While the radioactivity monitors will not quantify primary coolant leakage, they would provide an early warning of a major leak especially if there is a significant difference in the radioactivity level between the leakage source and drywell background.