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CRYSTAL RIVER NUCLEAR GENERATING PLANT UNIT 3

TECHNICAL SPECIFICATIONS

The Technical Specification activity limits on the primary and secondary coolant for the Crystal River Nuclear Generating Plant Unit 3 have been calculated by the Accident Analysis Branch. The primary coolant noble gas and iodine activities are set by a postulated tube rupture accident and the secondary iodine activity by a steam line break accident. A loss of offsite power is assumed to occur at the same time.

The Technical Specifications should read as follows:

1. Maximum Reactor Coolant Activity

Specification

The specific activity of the reactor coolant due to dose equivalent I-131^{1/} shall not exceed 2.0 $\mu\text{Ci}/\text{gram}$ during equilibrium conditions or prior to startup. The iodine activity will be allowed to exceed the equilibrium limit but shall not exceed the maximum values indicated in Figure 1 during 48-hour periods during iodine transients. Operation with a primary coolant activity higher than the equilibrium value, however, shall not exceed 5% of the plant total yearly operating time. The total specific activity of the reactor coolant due to all nuclides, excluding tritium, with half-lives of more than 20 minutes shall not exceed 225/E $\mu\text{Ci}/\text{gram}$.

If the limits specified above are not satisfied, shutdown procedures shall be initiated immediately and the reactor shall be cooled to 500°F or less within eight hours after detection. If the iodine activity exceeds the indicated maximum value the equilibrium iodine activity limit must be lowered by an amount proportionate to the amount by which the 48 hour limit was exceeded.

Sampling Frequency

Whenever the reactor is critical, the sampling frequencies given in Table 4.2.1 shall be used to determine primary and secondary coolant

^{1/} Dose equivalent I-131 concentration is defined as that concentration of I-131 which alone would produce the same dose as the quantity and isotopic mixture actually present.

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activity levels. In addition, the sampling program described in Table 4.2.2 shall be initiated,

- (a) following a change in power exceeding 15 percent of rated power which occurs within one hour period;
- (b) during the first 48 hours following a partial or complete depressurization of the reactor coolant system; and
- (c) whenever the primary or secondary coolant activity exceeds the equilibrium limits specified above.

These tests shall be recorded together with the following information:

- (a) reactor power history starting 48 hours prior to the first sample,
- (b) fuel burnup by core region,
- (c) clean-up flow history starting 48 hours prior to the first sample, and
- (d) history of de-gassing operations if any.

Reporting Requirements

The above information shall be included in the semi-annual operating report. If the limits of the specification are exceeded, a report shall be made to the Directorate of Licensing within 30 days.

TABLE 4.2.2

<u>Sample</u>	<u>Measurements</u>	<u>Frequency</u>
Reactor Coolant liquid sample	Iodine activity, isotopic analysis including at least I-131, I-133, I-135	Every 4 hours*

Basis

The basis for the primary coolant iodine activity limit is a computed dose to the thyroid at the site boundary of 1.5 rem during the 2-hour period following a steam generator tube rupture accident and a primary to secondary steam generator leakage of 1.0 gpm.

*In all cases, the minimum number of samples shall not be less than three for each transient.

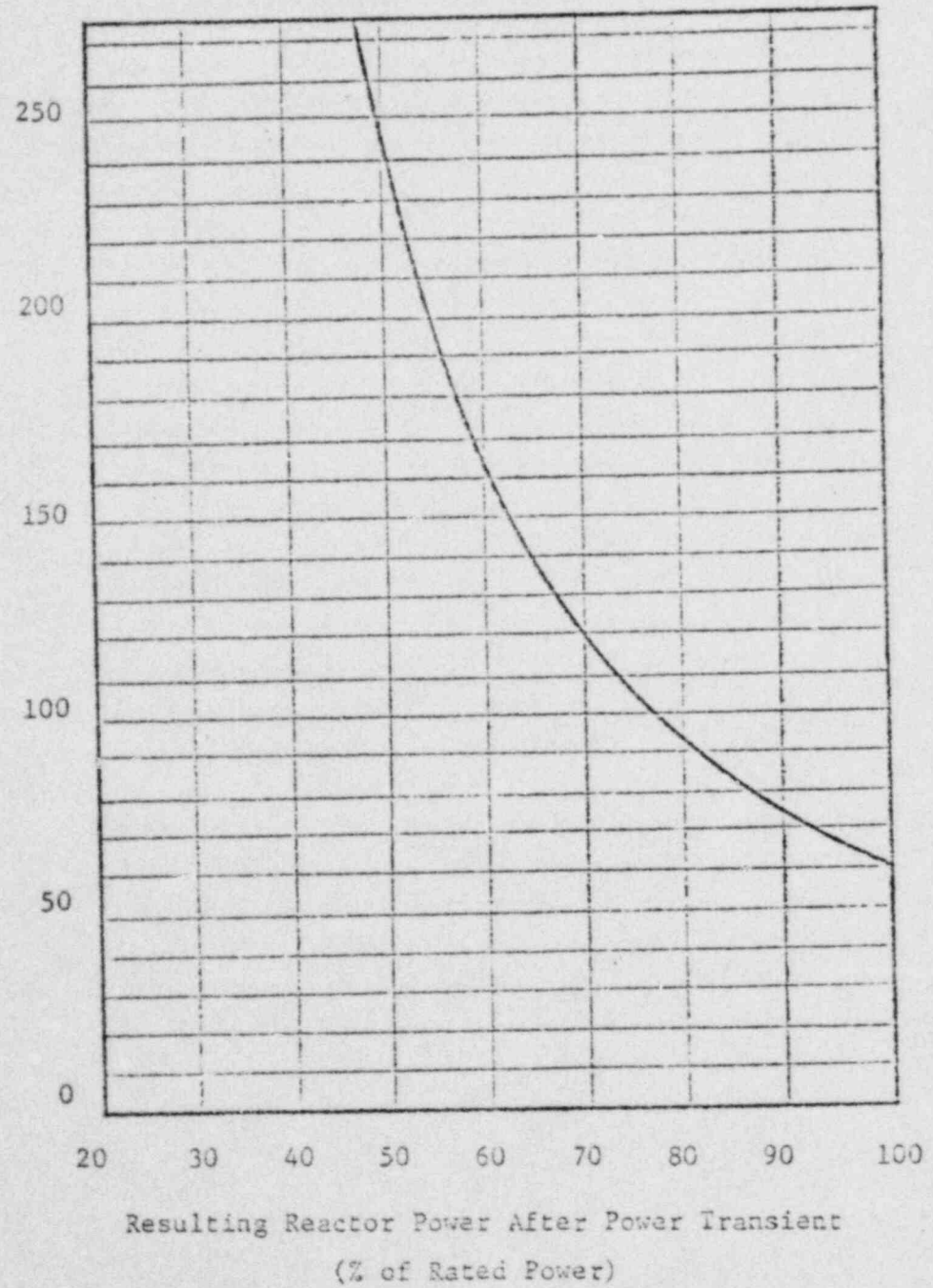
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FIGURE 1

FRACTION (F) OF DOSE EQUIVALENT I-131
PRIMARY COOLANT SPECIFIC ACTIVITY EQUILIBRIUM LIMITS
FOLLOWING POWER TRANSIENTS FOR
THE CRYSTAL RIVER NUCLEAR GENERATING PLANT UNIT 3

(Maximum Allowable Concentration = F
x Equilibrium Activity)

Fraction (F) of Dose Equivalent I-131 Primary
Coolant Equilibrium Activity Limit



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The basis for the total activity limit is a computed whole body dose at the site boundary of 0.5 rem during the 2-hour period following a steam generator tube rupture accident. Twenty minutes is the average time it takes the released gases to reach the site boundary under adverse meteorological conditions and \bar{E} is the average energy of betas and gammas per disintegration.

The allowance to exceed iodine equilibrium activity limits during the specified 48-hour periods following initiation of shutdown or a power transient is made in order to account for possible iodine spiking phenomena. The basis for the allowable maximum values is a resulting dose to the thyroid at the site boundary of 30 rem during the 2-hour period following a steam generator tube rupture accident.

In calculating the limits specified above a χ/Q value of 2.0×10^{-4} sec/m³ and an iodine decontamination factor of 10 between the steam and water phases were used.

2. Secondary System Activity

Specifications

The specific activity of the secondary coolant due to dose equivalent I-131 shall not exceed 0.05 μ Ci/gram. If the limits specified above are not satisfied, shutdown procedures shall be initiated within four hours and the reactor shall be cooled to 500°F or less within eight hours after detection.

Basis

The basis for this specified limit is a computed dose to the thyroid at the site boundary of 1.5 rem during the 2-hour period following a main steam line break accident. This is also based on a primary to secondary steam generator leakage of 1.0 gpm.

No specifications are made in regard to noble gas activity because these gases are assumed to be continuously removed through the condenser.

In calculating the limits specified above a χ/Q value of 2.0×10^{-4} sec/m³ and an iodine decontamination factor of 10 between the steam and water phases in the unaffected steam generator.

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ITEM 1 of TABLE 4.2-1

FREQUENCIES FOR SAMPLING TESTS

	<u>Check</u>	<u>Frequency</u>	<u>Maximum Time Between Tests</u>
1. Reactor Coolant Liquid Samples	Gross Activity	3 Times/Week ⁽¹⁾	4 Days
	Isotopic analysis to determine equivalent I-131 concentration	Bi-weekly	15 Days
	Radiochemical for E Determination	Semi-annual ⁽²⁾	7 Months
	Tritium Activity	Weekly	10 Days

⁽¹⁾ When radioactivity level exceeds 25 percent of limits in specifications 3.1.D, the sampling frequency shall be increased to a minimum of once each day.

⁽²⁾ Redetermined if the primary coolant radioactivity changes by more than 10 μ Ci/cc in accordance with specification 3.1.D.