

p. Dose Equivalent I-131

Dose Equivalent I-131 shall be that concentration of I-131 (microcurie/gram) which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in Table III of TID-14844, "Calculation of Distance Factors for Power and Test Reactor Sites."

q. \bar{E} - Average Disintegration Energy

\bar{E} shall be the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration (in MeV) for isotopes, other than iodines, with half lives greater than 15 minutes, making up at least 95% of the total non-iodine activity in the coolant.

C. MAXIMUM COOLANT ACTIVITY

Specification:

The specific activity of the reactor coolant shall be limited to:

1. Less than or equal to 1.0 microcurie per gram Dose Equivalent I-131.
 - a. If the specific activity of the reactor coolant is greater than 1.0 microcurie per gram Dose Equivalent I-131 but within the allowable limit (below and to the left of the line) shown on Figure 15.3.1-5, operation may continue for up to 48 hours provided that the cumulative operating time under these circumstances does not exceed 800 hours in any consecutive 12-month period. REactor Coolant Sampling shall be in accordance with Table 15.4.1-2.
 - b. If the specific activity of the reactor coolant is greater than 1.0 microcurie per gram Dose Equivalent I-131 for more than 48 hours during one continuous time interval or exceeds the allowable limit (above and to the right of the line) shown on Figure 15.3.1-5, the reactor will be shutdown and the average reactor coolant temperature will be less than 500°F within 10 hours.
2. Less than or equal to $100/\bar{E}$ microcuries per gram.
 - a. If the specific activity of the reactor coolant is greater than $100/\bar{E}$

microcuries per gram, the reactor will be shutdown and the average reactor coolant temperature will be less than 500°F within 10 hours. Reactor Coolant Sampling shall be in accordance with Table 15.4.1-2.

Basis

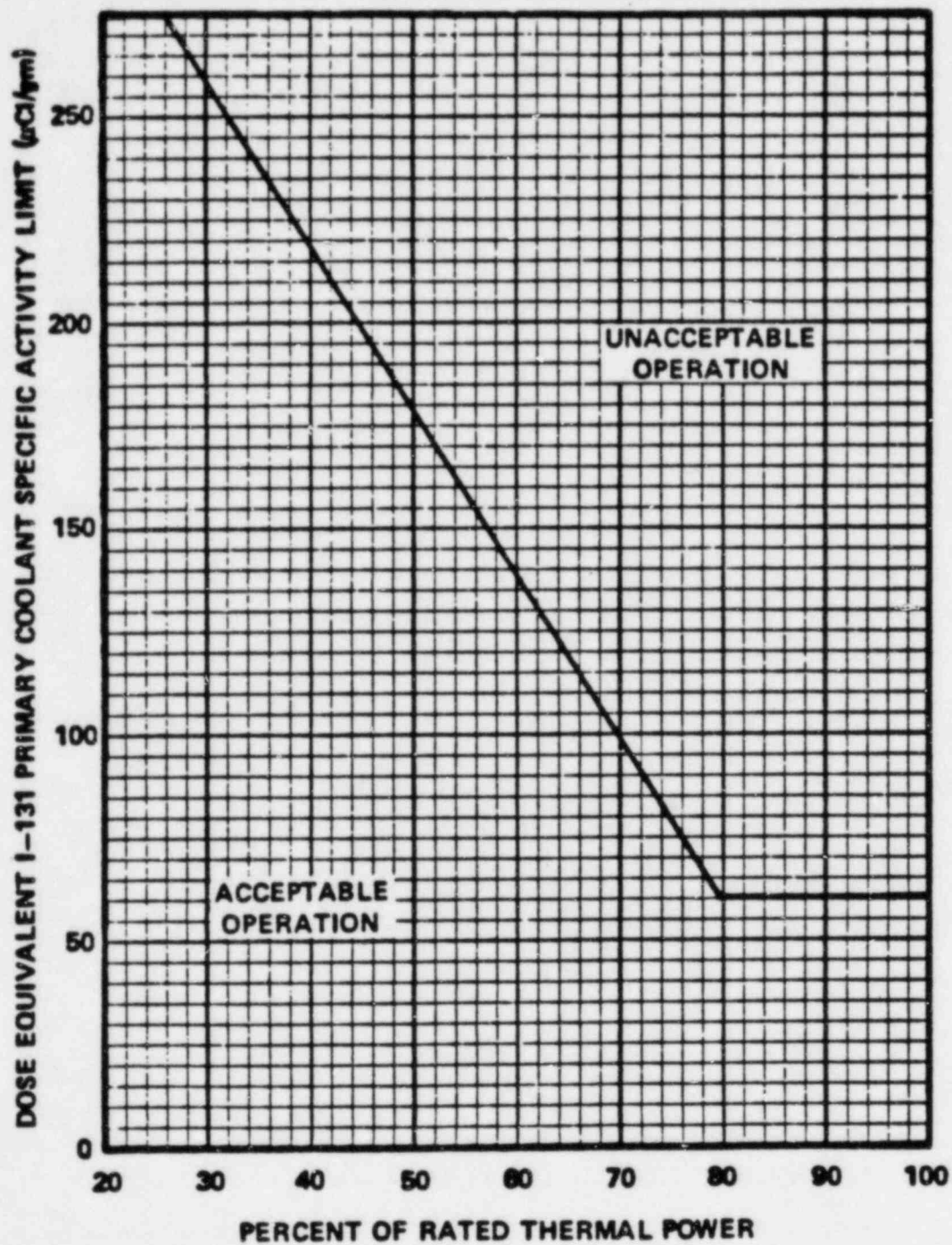
The limitations on the specific activity of the reactor coolant ensure that the resulting 2-hour doses at the site boundary will not exceed and appropriately small fraction of Part 100 limits following a steam generator tube rupture accident in conjunction with an assumed steady state primary-to-secondary steam generator leakage rate of 1.0 GPM. The values for the limits on specific activity represent limits based upon a parametric evaluation by the NRC of typical site locations. These values are conservative for Point Beach Nuclear Plant.

Continued power operation for limited time periods with the reactor coolant's specific activity greater than 1.0 microcurie/gram Dose Equivalent I-131, but within the allowable limit shown on Figure 15.3.1-5, accommodates possible iodine spiking phenomenon which may occur following changes in thermal power. Operation with specific activity levels exceeding 1.0 microcurie/gram Dose Equivalent I-131 but within the limits shown on Figure 15.3.1-5 increase the 2-hour thyroid dose at the site boundary by a factor of up to 20 following a postulated steam generator tube rupture.

Reducing T_{avg} to less than 500°F normally prevents the release of activity should a steam generator tube rupture since the saturation pressure of the reactor coolant is below the lift pressure of the atmospheric steam relief valves. The surveillance requirements provide adequate assurance that exces-

sive specific activity levels in the primary coolant will be detected in sufficient time to take corrective action. A reduction in frequency of isotopic analyses following power changes may be permissible if justified by the data obtained.

FIGURE 15.3.1-5



DOSE EQUIVALENT I-131 Primary Coolant Specific Activity Limit Versus
Percent of RATED THERMAL POWER with the Primary Coolant Specific
Activity $> 1.0 \mu\text{Ci/gram}$ Dose Equivalent I-131

TABLE 15.4.1-2

MINIMUM FREQUENCIES FOR EQUIPMENT AND SAMPLING TESTS

	<u>Test</u>	<u>Frequency</u>
1. Reactor Coolant Samples	Gross Beta-gamma activity (excluding tritium)	5/week (7)
	Tritium activity	Monthly
	Radiochemical \bar{E} Determination	Semiannually (2)
	Isotopic Analysis for Dose EQUIVALENT I-131 Concentration	Every two weeks (1)
	Isotopic Analysis for Iodine including I-131, I-133, and I-135	a) Once per 4 hours whenever the specific activity exceeds $1.0 \mu\text{Ci}/\text{gram}$ Dose Equivalent I-131 or $100/\bar{E} \mu\text{Ci}/\text{gram}$. (6) b.) One sample between 2 and 6 hours following a thermal power change exceeding 15% of rate power in a one-hour period.
	Chloride Concentration	5/week (8)
	Diss. Oxygen Conc.	5/week (6)
	Flouride Conc.	Weekly
2. Reactor Coolant Boron	Boron Concentration	Twice/week
3. Refueling Water Storage Tank Water Sample	Boron Concentration	Weekly (6)
4. Boric Acid Tanks	Boron Concentration	Twice/week
5. Spray Additive Tank	NaOH Concentration	Monthly
6. Accumulator	Boron Concentration	Monthly
7. Spent Fuel Pit	Boron Concentration	Monthly
8. Secondary Coolant	Gross Beta-gamma Activity or gamma isotopic	Weekly (6)

TABLE 15.4.1-2 (Continued)

	<u>Test</u>	<u>Frequency</u>
24.	Integrity of Post Accident Recovery Systems Outside Containment	Evaluate Yearly
25.	Containment Purge Supply and Exhaust Isolation Valves	Verify valves are locked closed Monthly ⁽⁹⁾

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- (1) Required only during periods of power operation.
- (2) E determination will be started when the gross activity analysis of a filtered sample indicates $\geq 10\mu\text{c/cc}$ and will be redetermined if the primary coolant gross radioactivity of a filtered sample increases by more than $10\mu\text{c/cc}$.
- (3) Drop tests shall be conducted at rated reactor coolant flow. Rods shall be dropped under both cold and hot conditions, but cold drop tests need not be timed.
- (4) Drop tests will be conducted in the hot condition for rods on which maintenance was performed.
- (5) As accessible without disassembly of rotor.
- (6) Not required during periods of refueling shutdown.
- (7) At least once per week during periods of refueling shutdown.
- (8) At least three times per week (with maximum time of 72 hours between samples) during periods of refueling shutdown.
- (9) Not required during periods of cold or refueling shutdown.
- (10) During end-of-cycle period of operation when boron concentration is less than 100 ppm, this test may be waived due to operational limitations.