

I 03/25/78

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SUBJECT:

LTR 3 ENCL 40

REQUEST FOR LICENSE AMENDMENT PRIMARY & SECONDARY COOLANT SPECIFIC ACTIVITY
TO REVISE LIMITS ON REACTOR COOLANT AND SECONDARY COOLANT SPECIFIC ACTIVITY
FOR REQUESTED POWER UPGRATING TO 2300 MW.

PLANT NAME: H B ROBINSON - UNIT 2

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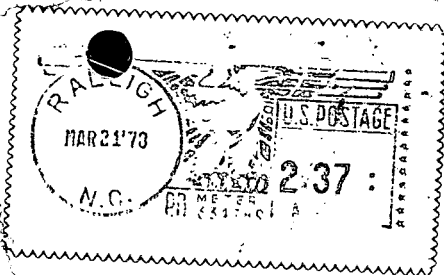
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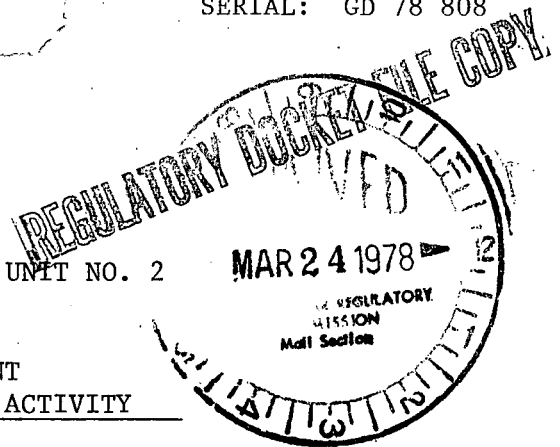


FILE: NG 3514 (R)

SERIAL: GD 78 808

Office of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Operating Reactors Branch No. 1
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
REQUEST FOR LICENSE AMENDMENT
PRIMARY AND SECONDARY COOLANT SPECIFIC ACTIVITY

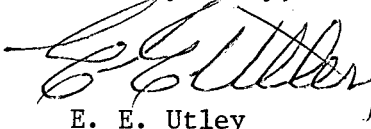


Dear Mr. Schwencer:

In accordance with the Code of Federal Regulations, Title 10, Part 50.90 and Part 2.101, Carolina Power and Light Company (CP&L) hereby requests a revision to the Technical Specifications for its H. B. Robinson Steam Electric Plant (RSEP) Unit No. 2. The changes revise the limits on Reactor Coolant and Secondary Coolant Specific Activity which were requested by the NRC staff as a prerequisite for approval of our requested power uprating to 2300 MwT.

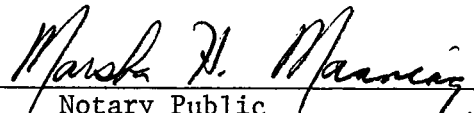
Pages which incorporate this revision are attached with the changes indicated by a vertical bar in the right hand margin. These page changes have been prepared in the format of the retyped technical specifications which were submitted to NRC on August 13, 1976.

Yours very truly,


E. E. Utley
Senior Vice President
Power Supply

DCS/gsm
Attachment

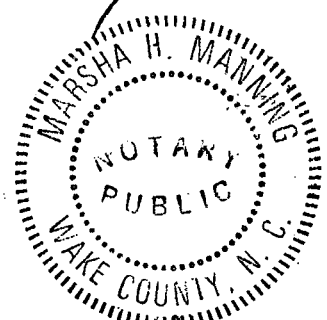
Sworn to and subscribed before me this 20th day of March, 1978.


Notary Public

My Commission Expires: 6-28-82

780830026

336 Fayetteville Street • P. O. Box 1551 • Raleigh, N. C. 27602



Accl
3/40
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3.1.4 Maximum Reactor Coolant Activity

The total specific activity in $\mu\text{Ci}/\text{gram}$ of the reactor coolant shall not exceed $1.0 \mu\text{Ci}/\text{gram}$ dose equivalent I-131 and $100/\bar{E} \mu\text{Ci}/\text{gram}$ under all modes of operation. (\bar{E} is the average of beta and gamma energy (MEV) per disintegration of the specific activity.)

Whenever the reactor is critical or the average reactor coolant temperature is greater than 500°F , with the specific activity of the primary coolant $> 1.0 \mu\text{Ci}/\text{gram}$ DOSE EQUIVALENT I-131 but within the allowable limit (below and to the left of the line) shown on Figure 3.1.4-1, 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. With the total cumulative operating time at a primary coolant specific activity $> 1.0 \mu\text{Ci}/\text{gram}$ DOSE EQUIVALENT I-131 exceeding 500 hours in any consecutive six month period, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 within 30 days indicating the number of hours above this limit.

With the specific activity of the primary coolant $> 1.0 \mu\text{Ci}/\text{gram}$ DOSE EQUIVALENT I-131 for more than 48 hours during one continuous time interval or exceeding the limit line shown on Figure 3.1.4-1, be in at least HOT SHUTDOWN with $T_{\text{avg}} < 500^\circ\text{F}$ within 6 hours.

With the specific activity of the primary coolant $> 100/\bar{E} \mu\text{Ci}/\text{gram}$, be in at least HOT SHUTDOWN with $T_{\text{avg}} < 500^\circ\text{F}$ within 6 hours.

In any operating mode, with the specific activity of the primary coolant $> 1.0 \mu\text{Ci}/\text{gram}$ DOSE EQUIVALENT I-131 or $> 100/\bar{E} \mu\text{Ci}/\text{gram}$, perform the sampling and analysis requirements of Item 1 of Table 4.1-2 until the specific activity of the primary coolant is restored to within its limits. A REPORTABLE OCCURRENCE shall be prepared and submitted to the Commission pursuant to Specification 6.9.1. This report shall contain the results of the specific activity analyses together with the following information:

1. Reactor power history starting 48 hours prior to the first sample in which the limit was exceeded,
2. Fuel burnup by core region,
3. Clean-up flow history starting 48 hours prior to the first sample in which the limit was exceeded,
4. History of de-gassing operation, if any, starting 48 hours prior to the first sample in which the limit was exceeded, and
5. The time duration when the specific activity of the primary coolant exceeded $1.0 \mu\text{Ci}/\text{gram}$ DOSE EQUIVALENT I-131.

The specific activity of the primary coolant shall be determined to be within the limits by performance of the sampling and analysis program of Table 4.1-2.

Basis

The limitations on the specific activity of the primary coolant ensure that the resulting 2 hour doses at the site boundary will not exceed an 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 statement permitting POWER OPERATION to continue for limited time periods with the primary coolant's specific activity $> 1.0 \mu\text{Ci}/\text{gram}$ DOSE EQUIVALENT I-131, but within the allowable limit shown on Figure 3.1.4-1, accommodates possible iodine spiking phenomenon which may occur following changes in THERMAL POWER. Operation with specific activity levels exceeding $1.0 \mu\text{Ci}/\text{gram}$ DOSE EQUIVALENT I-131 but within the limits shown on Figure 3.1.4-1 must be restricted to no more than 800 hours in any consecutive 12 month period, since the activity levels allowed by Figure 3.1.4-1 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 $\leq 500^{\circ}\text{F}$ prevents the release of activity should a steam generator tube rupture since the saturation pressure of the primary coolant is below the lift pressure of the atmospheric steam relief valves. The surveillance requirements provide adequate assurance that excessive specific activity levels in the primary coolant will be detected in sufficient time to take corrective action. Information obtained on iodine spiking will be used to assess the parameters associated with spiking phenomena. A reduction in frequency of isotopic analyses following power changes may be permissible if justified by the data obtained.

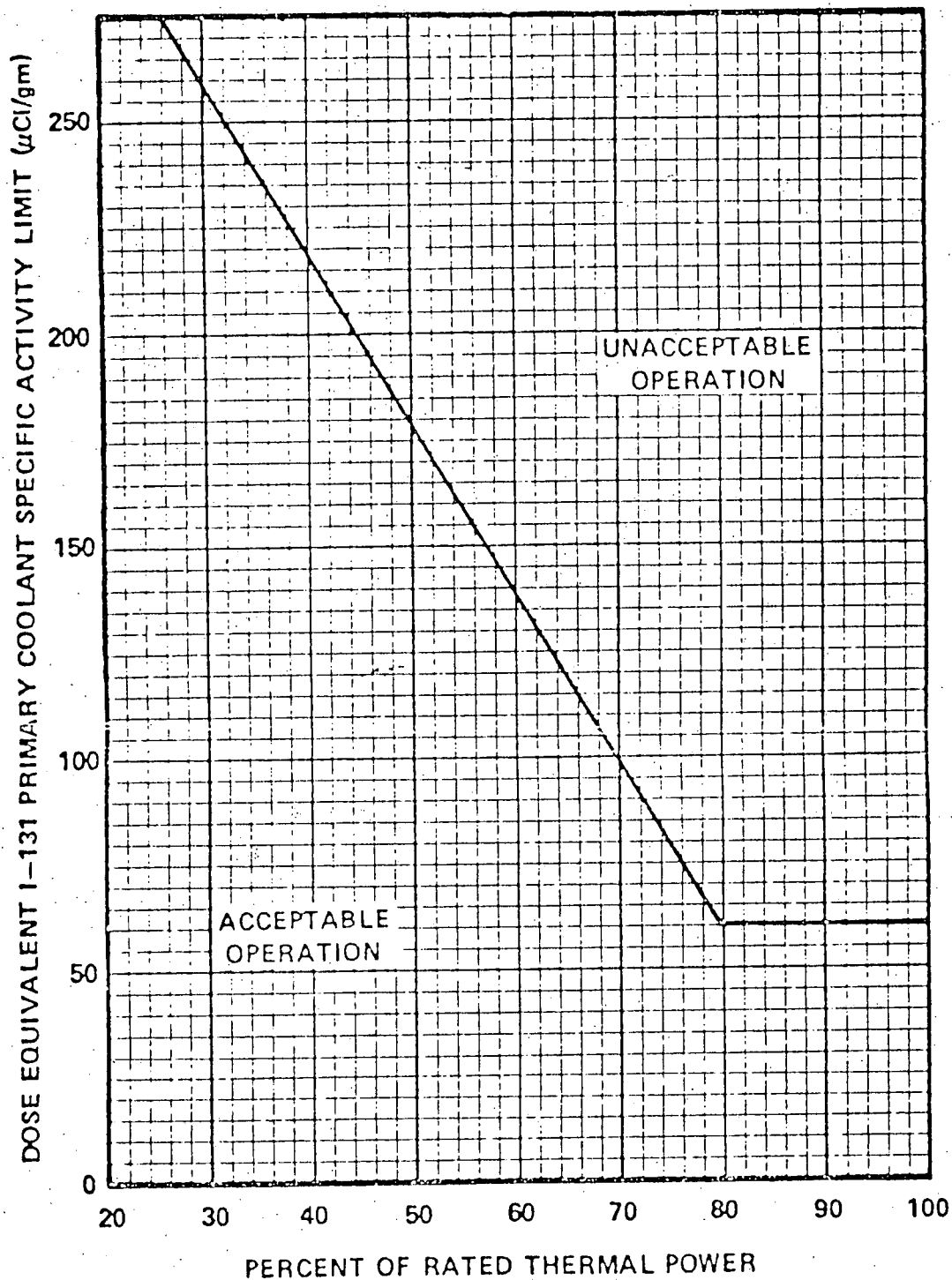


FIGURE 3.1.4-1

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

- 3.4.2 The specific activity of the secondary coolant system shall be ≤ 0.10 $\mu\text{Ci/gram}$ DOSE EQUIVALENT I-131 under all modes of operation from cold shutdown through power operation. When the specific activity of the secondary coolant system is >0.10 $\mu\text{Ci/gram}$ DOSE EQUIVALENT I-131, be in at least HOT SHUTDOWN within 6 hours and in COLD SHUTDOWN within the following 30 hours.

The specific activity of the secondary coolant system shall be determined to be within the limit by performance of the sampling and analysis program of Table 4.1-2.

- 3.4.3 If, during power operations, any of the specifications in 3.4.1 above cannot be met within 24 hours, the operator shall initiate procedures to put the plant in the hot shutdown condition. If any of these specifications cannot be met within 48 hours, the operator shall cool the reactor below 350°F using normal procedures.

Basis

A reactor shutdown from power requires removal of core decay heat. Immediate decay heat removal requirements are normally satisfied by the steam bypass to the condenser. Therefore, core decay heat can be continuously dissipated via the steam bypass to the condenser as feedwater in the steam generator is converted to steam by heat absorption. Normally, the capability to return feedwater flow to the steam generators is provided by operation of the turbine cycle feedwater system.

The twelve main steam safety valves have a total combined rated capability of 10,068,845 lbs/hr. The total full power steam flow is 9,589,000 lbs/hr.; therefore, twelve (12) main steam safety valves will be able to relieve the total steam flow if necessary.⁽¹⁾ Following a loss of load, which represents the worst transient, steam flows are below the total capacity of the 12 safety valves. Therefore, overpressurization of the secondary system is not possible.

In the unlikely event of complete loss of turbine-generator and off-site electrical power to the plant, decay heat removal would continue to be assured by the availability of either the steam-driven auxiliary feedwater pump or one of the two motor-driven auxiliary steam generator feedwater pumps operated from the diesel generators and steam discharge to the atmosphere via the main steam safety valves and atmospheric relief valves. One motor-driven auxiliary feedwater pump can supply sufficient feedwater for removal of decay heat from the plant.⁽²⁾ The minimum amount of water in the condensate storage tank is the amount needed for at least two-hour operation at hot standby conditions. If the outage is more than two hours, deep well or Lake Robinson water may be used.

An unlimited supply is available from the lake via either leg of the plant Service Water System for an indefinite time period.

The limitations on secondary system specific activity ensure that the resultant off-site radiation dose will be limited to a small fraction of 10 CFR Part 100 limits in the event of a steam line rupture. This dose also includes the effects of a coincident 1.0 GPM primary to secondary tube leak in the steam generator of the affected steam line. These values are consistent with the assumptions used in the accident analyses.

References

- (1) FSAR Section 10.3
- (2) FSAR Section 14.2.5

TABLE 4.1-2

FREQUENCIES FOR SAMPLING TESTS

	<u>Check</u>	<u>Frequency</u>	<u>Maximum Time Between Tests</u>
1. Reactor Coolant Samples	-Gross Activity (1) -Radiochemical (2) -Radiochemical for E Determination -Isotopic Analysis for Dose Equivalent I-131 Concentration -Isotopic Analysis for Iodine Includ- ing I-131, I-133 and I-135 -Tritium Activity -Cl & O ₂	Minimum 1 Per 72 hrs. Monthly 1 per 6 mos. (6)(7) 1 per 14 days (7) a) Once per 4 hours (8) b) One sample (9) Weekly 5 day/week	3 days 45 days 6 months 14 days 10 days 3 days
2. Reactor Coolant Boron	Boron concentration	Twice/week	5 days
3. Refueling Water Storage Tank Water Sample	Boron concentration	Weekly	10 days
4. Boric Acid Tank	Boron concentration	Twice/week	5 days
5. Boron Injection Tank	Boron concentration	Weekly (5)	10 days
6. Spray Additive Tank	NaOH concentration	Monthly	45 days
7. Accumulator	Boron concentration	Monthly	45 days
8. Spent Fuel Pit	Boron concentration	Prior to Refueling	NA*
9. Secondary Coolant	Gross activity Isotopic Analysis for Dose Equivalent I-131 Concentration	Minimum 1 Per 72 hrs. a) 1 per 31 days (10) b) 1 per 6 months (11)	3 days
10. Stack Gas Iodine & Particulate Samples	I-131 and particulate radioactivity releases	Weekly (3)	10 days
11. Steam Generator Samples	Primary to secondary tube leakage	5 days/week	3 days

(1) A gross activity analysis shall consist of the quantitative measurement of the total radioactivity of the primary coolant in units of $\mu\text{Ci/gram}$

- (2) A radiochemical analysis shall consist of the quantitative measurement of each radionuclide with half life greater than 30 minutes making up at least 95% of the total activity of the primary coolant.
- (3) When iodine or particulate radioactivity levels exceed 10% of the limit in Specification 3.9.2.1, the sampling frequency shall be increased to a minimum of once each day.
- (4) When the iodine-131 activity exceeds 10% of the limit in Specification 3.4.2, the sampling frequency shall be increased to a minimum of once each day.
- (5) The boron concentration in the boron injection tank shall be checked immediately after any actuation of the safety injection system that might result in dilution of the boron concentration in the boron injection tank.
- (6) Sample to be taken after a minimum of 2EFPD and 20 days of power operation have elapsed since the reactor was last subcritical for 48 hours or longer.
- (7) Samples are to be taken in the power operating condition.
- (8) Samples taken at all operating conditions whenever the specific activity exceeds $1.0 \mu\text{Ci/gram}$ DOSE EQUIVALENT I-131 or $100/E \mu\text{Ci/gram}$. These samples are to be taken until the specific activity of the reactor coolant system is restored within its limits.
- (9) One sample between 2 and 6 hours following a thermal power change exceeding 15 percent of the rated thermal power within a one hour period. Samples are required when in the hot shutdown or power operating modes.
- (10) Sample whenever the gross activity determination indicates iodine concentrations are greater than 10% of the allowable limit.
- (11) Sample whenever the gross activity determination indicates iodine concentrations are below 10% of the allowable limit.

NA* - Not applicable.