TENNESSEE VALLEY AUTHORITY

1101 Market Street, Chattanooga, Tennessee 37402

CNL-21-019

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10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Watts Bar Nuclear Plant Unit 2 – License Amendment Request to Revise Updated Final Safety Analysis Report Section 15.5.5 – Steam Generator Tube Rupture Dose Analysis (WBN-TS-20-04)**

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," Tennessee Valley Authority (TVA) is submitting a request for an amendment to Facility Operating License No. NPF-96 for Watts Bar Nuclear Plant (WBN) Unit 2.

The proposed change will revise the WBN dual-unit Updated Final Safety Analysis Report (UFSAR) Section 15.5.5 dose analysis inputs and results for the Steam Generator Tube Rupture (SGTR) accident, as one of the SGTR dose consequences exceeds the minimum threshold criteria for prior Nuclear Regulatory Commission (NRC) approval per NEI 96-07, Rev.1, "Guidelines for 10 CFR 50.59 Evaluations." This analysis is being revised in support of the installation of the WBN Unit 2 Replacement Steam Generators (RSG) that is scheduled to be performed during the WBN Unit 2 spring 2022 refueling outage (U2R4).

The enclosure provides a description of the proposed change, a technical evaluation of the proposed change, a regulatory evaluation of the proposed change, and a discussion of environmental considerations. Attachment 1 to the enclosure provides the existing UFSAR pages marked up to show the proposed change. Attachment 2 to the enclosure provides the UFSAR final typed pages showing the proposed change. There are no Technical Specification changes associated with this license amendment request.

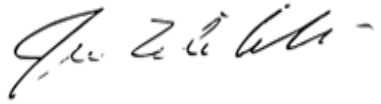
TVA has determined that there are no significant hazard considerations associated with the proposed change and that the change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). In accordance with 10 CFR 50.91, "Notice for Public Comment; State Consultation," TVA is sending a copy of this letter and the enclosure to the Tennessee Department of Environment and Conservation.

To support the schedule for the RSG project, TVA requests NRC approval of the proposed license amendment within one year of the date of this submittal, with implementation prior to entering Mode 4 during restart following the WBN U2R4 Refueling Outage (in Mode 4, the reactor coolant system is pressurized, and an SGTR may be postulated).

There are no new regulatory commitments associated with this submittal. If you have any questions about this proposed change, please contact Kimberly Hulvey, Senior Manager, Fleet Licensing, at (423) 751-3275.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 2nd day of March 2021.

Respectfully,



James T. Polickoski
Director, Nuclear Regulatory Affairs

Enclosure:

Evaluation of Proposed Change

cc (Enclosure):

NRC Regional Administrator – Region II
NRC Project Manager – Watts Bar Nuclear Plant
NRC Senior Resident Inspector – Watts Bar Nuclear Plant
Director, Division of Radiological Health – Tennessee State Department of Environment and Conservation

Enclosure

Evaluation of Proposed Change

Subject: **Watts Bar Nuclear Plant Unit 2 – License Amendment Request to Revise Updated Final Safety Analysis Report Section 15.5.5 – Steam Generator Tube Rupture Dose Analysis (WBN-TS-20-04)**

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2. Proposed UFSAR Section 15.5.5 Changes (Final Typed) for WBN Unit 2

1.0 SUMMARY DESCRIPTION

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," Tennessee Valley Authority (TVA) is requesting a license amendment to Facility Operating License (FOL) No. NPF-96 for the Watts Bar Nuclear Plant (WBN) Unit 2.

The proposed change will revise the WBN dual-unit Updated Final Safety Analysis Report (UFSAR) Section 15.5.5 dose analysis inputs and results for the Steam Generator Tube Rupture (SGTR) accident. This analysis is being revised in support of the installation of the WBN Unit 2 Replacement Steam Generators (RSG) that are scheduled to be installed during the WBN Unit 2 spring 2022 refueling outage (U2R4).

2.0 DETAILED DESCRIPTION

2.1 PROPOSED CHANGE

To support replacement of the Unit 2 steam generators (SG), the SGTR analysis is being revised to utilize the new primary and secondary side mass releases, and new Reactor Coolant System and SG masses, associated with the Unit 2 RSGs. The proposed amendment revises the following tables of the WBN UFSAR:

- Table 15.5-18, "Parameters Used in Steam Generator Tube Rupture Analysis"
- Table 15.5-19, "Doses from Steam Generator Tube Rupture"

Attachment 1 to this enclosure provides the existing UFSAR pages marked up to show the proposed change. Attachment 2 to this enclosure provides the final typed UFSAR pages showing the proposed change. There are no Technical Specification changes associated with this proposed change.

2.2 CONDITION INTENDED TO RESOLVE

The WBN Unit 2 Westinghouse Model D3 Original Steam Generators (OSG) will be replaced with Westinghouse Model 68AXP SGs. The reanalysis of the SGTR for the RSGs has resulted in a more than minimal increase in the Main Control Room (MCR) thyroid dose for the pre-accident iodine spike case, as specified in NEI 96-07, Rev.1, "Guidelines for 10 CFR 50.59 Evaluations". Thus, per 10 CFR 50.59, this License Amendment Request (LAR) requests NRC approval of the revised SGTR accident analysis, to be described in the UFSAR, resulting from the WBN Unit 2 RSGs.

2.3 DESCRIPTION OF THE PROPOSED CHANGE

The UFSAR Table 15.5-18 is revised to indicate the primary and secondary side mass release rates for the Unit 2 RSGs.[1] UFSAR Table 15.5-19 is revised to change the WBN Unit 2 SGTR accident dose values which will be applicable when the Unit 2 RSGs are installed.

[1] A minor revision is also made to update the Secondary Side Activity parameter as "Technical Specification Limit," consistent with the entry for Primary Side Activity. This update is included for clarity and is not part of the Proposed Change.

3.0 TECHNICAL EVALUATION

The WBN Unit 2 SGTR analysis of record was approved with License Amendment 27 (Reference 1) for a tritium production core. Specifically, Section 3.2.8 of Reference 1 states:

> The NRC staff performed independent, confirmatory dose evaluations as necessary to ensure a thorough understanding of the licensee's methods. The NRC staff finds, with reasonable assurance, that the licensee's estimates of the dose consequences of a design basis MSLB and SGTR will comply with the requirements of 10 CFR 100.11, 10 CFR Part 50, Appendix A, GDC 19, and the accident specific dose guidelines specified in RG 1.195, and are therefore, acceptable.

The SGTR parameters were provided in Tables 4.1-4, 4.1-5, 4.1-6, 4.1-7, and 4.1-16 of the associated LAR (Reference 2). All of the parameters remain the same in the revised SGTR dose calculation except for the following parameters from Table 4.1-16 of Reference 2 (as shown on Table 1 below).

- Primary and secondary side mass releases from the intact and faulted SGs
- Mass of reactor coolant system (RCS)
- Mass of secondary side water in the SGs

Note - Because the mass of the RCS and SG volumes increase with the RSGs, the resulting radionuclide concentrations would be lower. Thus, for conservatism, the radionuclide concentrations based on the OSGs were retained.

Table 1 - Revised Parameters

	Current Value	New Value
Secondary-side mass release (ruptured steam generator)		
0-2 hours	103,300 lbm	109,000 lbm
2-8 hours	32,800 lbm	33,200 lbm
Secondary-side mass release (intact steam generator)		
0-2 hours	492,100 lbm	571,300 lbm
2-8 hours	900,200 lbm	969,400 lbm
Primary coolant mass release		
Total	191,400 lbm	131,400 lbm
Flashed	10,077.2 lbm	9585 lbm
Flashed before MCR isolation*	1179 lbm	1425 lbm
Mass of Reactor coolant	2.136E8 g[2]	2.35E8 g
Mass of water in all SGs	1.724E8 g	1.987E8 g

* Note - The flashing value before MCR isolation was not provided in Reference 2, but is provided in Table 1 because the increased flashing before isolation is the reason why only the MCR thyroid dose increases while all other results decrease.

[2] It is noted that Reference 2 incorrectly stated this value as “2.316E8 g,” when compared with the supporting dose calculation. This error did not affect the final dose conclusions provided in that LAR.

Tables 2 and 3 provide the revised dose consequences for the pre-accident iodine spike case and the accident initiated spike case, respectively.

Table 2

Pre-Accident Iodine Spike (14 µCi/gm maximum peak)

(rem)	Current SGs	Replacement SGs	Difference	Regulatory Limit (rem)
2 Hour Exclusion Area Boundary Doses				
Gamma	4.11E-01	3.58E-01	Decreases with RSGs	25
Beta	2.37E-01	1.92E-01	Decreases with RSGs	300
Thyroid – ICRP-30	1.44E+01	1.36E+01	Decreases with RSGs	300
30 Day Low Population Zone Doses				
Gamma	1.21E-01	1.04E-01	Decreases with RSGs	25
Beta	7.26E-02	5.78E-02	Decreases with RSGs	300
Thyroid – ICRP-30	4.13E+00	3.88E+00	Decreases with RSGs	300
Main Control Room Doses				
Gamma	6.47E-02	5.19E-02	Decreases with RSGs	5
Beta	7.23E-01	5.65E-01	Decreases with RSGs	30
Thyroid – ICRP-30	1.31E+01	1.51E+01	Increases 2 rem with RSGs (> 10%)	30

Table 3

Accident Initiated Iodine Spike (0.265 µCi/gm steady state)

(rem)	Current SGs	Replacement SGs	Difference	Regulatory Limit (rem)
2 Hour Exclusion Area Boundary Doses				
Gamma	6.39E-01	5.36E-01	Decreases with RSGs	2.5
Beta	2.85E-01	2.28E-01	Decreases with RSGs	30
Thyroid – ICRP-30	8.51E+00	7.00E+00	Decreases with RSGs	30

(rem)	Current SGs	Replacement SGs	Difference	Regulatory Limit (rem)
30 Day Low Population Zone Doses				
Gamma	1.88E-01	1.55E-01	Decreases with RSGs	2.5
Beta	8.75E-02	6.84E-02	Decreases with RSGs	30
Thyroid – ICRP-30	2.52E+00	2.03E+00	Decreases with RSGs	30
Main Control Room Doses				
Gamma	6.27E-02	4.85E-02	Decreases with RSGs	5
Beta	7.28E-01	5.49E-01	Decreases with RSGs	30
Thyroid – ICRP-30	2.45E+00	2.58E+00	Increases 0.13 rem with RSGs (< 10%)	30

As shown in the above tables, except for the 14 µCi/gm case MCR thyroid dose, the WBN Unit 2 SGTR accident dose values either decrease with the RSGs or the increase calculated is less than ten percent of the allowable increase up to the regulatory limit by applying NEI 96-07, Revision 1. The SGTR accident doses associated with the Unit 2 RSGs will remain less than the 10 CFR 100, *"Reactor Site Criteria,"* (and as specified in NUREG-0800, *"Standard Review Plan"),* and 10 CFR 50, Appendix A, GDC 19, *"Control Room,"* dose limits.

4.0 REGULATORY EVALUATION

4.1 APPLICABLE REGULATORY REQUIREMENTS AND CRITERIA

WBN Unit 2 was designed to meet the intent of the "Proposed General Design Criteria for Nuclear Power Plant Construction Permits" published in July 1967. The WBN construction permit was issued in January 1973. The UFSAR, however, addresses the General Design Criteria (GDC) published as Appendix A to 10 CFR 50 in July 1971. Conformance with the GDCs is described in Section 3.1.2 of the UFSAR.

> *Criterion 19-Control Room.* A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions including LOCAs. Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident.
>
> Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures.

Compliance with GDC 19 is described in Section 3.1.2.2 of the WBN UFSAR.

In addition, the offsite dose limitations contained in 10 CFR 100.11, *"Determination of Exclusion Area, Low Population Zone, and Population Center Distance,"* and NUREG-0800, Section 15.6.3, *"Radiological Consequences of Steam Generator Tube Failure (PWR),"* are applicable to the submittal.

4.2 PRECEDENT

The proposed change is similar to a previous license amendment for WBN Unit 1 (Reference 3), which also revised UFSAR Section 15.5.5 to reflect the increased doses for the SGTR accident resulting from installation of the WBN Unit 1 RSGs. The licensing basis SGTR accident dose values for the WBN Unit 2 OSGs are derived from the tritium production core license amendment, as documented in Reference 1.

4.3 NO SIGNIFICANT HAZARDS CONSIDERATION

Tennessee Valley Authority (TVA) is revising the Watts Bar Nuclear Plant (WBN) dual-unit Updated Final Safety Analysis Report (UFSAR) to change the dose analysis and results for the Unit 2 Steam Generator Tube Rupture (SGTR) accident for the WBN Unit 2 Replacement Steam Generators (RSG).

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. *Does the proposed amendment involve a significant increase in the probability or consequence of an accident previously evaluated?*

   Response: No

   The postulated SGTR analysis was revised to determine the control room operator and offsite doses due to the WBN Unit 2 RSGs. The revised analysis results in an increase to the calculated Main Control Room (MCR) SGTR accident doses. However, the changes do not increase the probability of an accident previously evaluated.

   The revised dose analysis associated with the WBN Unit 2 RSGs produce an increase in the calculated MCR pre-accident iodine spike thyroid dose and MCR accident initiated iodine spike thyroid dose. The other SGTR calculated doses decrease with the RSGs. The resulting calculated MCR thyroid doses do not exceed 10 CFR 50, Appendix A, General Design Criteria (GDC) 19, *"Control Room,"* dose limits. All offsite SGTR doses decreased with the RSGs and remain within a small fraction of the 10 CFR 100, *"Reactor Site Criteria,"* limits. Consequently, the changes do not involve a significant increase in the consequences of an accident previously evaluated.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. *Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?*

   Response: No.

   Installation of the WBN Unit 2 RSGs result in changes to inputs to the current SGTR accident analysis. The revised analysis results in an increase in the calculated MCR doses. However, the changes do not create the possibility of a new or different kind of accident than previously evaluated.

   Based on the above, the changes will not initiate an accident nor create any new failure mechanisms. The changes do not result in any event previously deemed incredible being made credible. In addition, the changes will not result in any increase in the challenges to safety systems.

   Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. *Does the proposed amendment involve a significant reduction in a margin of safety?*

   Response: No.

   The proposed changes to the affected UFSAR tables revise the calculation input for offsite and MCR dose values for the WBN Unit 2 SGTR accident. The MCR thyroid dose (14 µCi/gm case) for the revised mass releases associated with the Unit 2 RSGs exceeds the ten percent allowable increase criterion of NEI 96-07, Revision 1, yet remains within the regulatory requirements for this specific MCR SGTR accident dose. The MCR thyroid dose (0.265 µCi/gm case) involves a small increase in value that is within the ten percent allowable dose increase criterion of NEI 96-07, Revision 1. Offsite doses for the Unit 2 RSGs decrease slightly as compared to the Unit 2 Original Steam Generators.

   The above changes in SGTR accident doses are acceptable because the MCR doses do not exceed the requirements in 10 CFR 50, Appendix A, GDC 19, and the offsite doses at the exclusion area boundary and the low population zone show a decrease relative to UFSAR values.

   Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of “no significant hazards consideration” is justified.

4.4 Conclusion

The revised SGTR dose analysis based on the RSG parameters is acceptable because the resulting offsite and MCR doses remain within NRC regulatory limits.

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. NRC Letter to TVA, "Watts Bar Nuclear Plant, Units 1 and 2 – Issuance of Amendment Regarding Revision to Watts Bar Nuclear Plant, Unit 2, Technical Specification 4.2.1, 'Fuel Assemblies,' and Watts Bar Nuclear Plant, Units 1 and 2, Technical Specifications Related to Fuel Storage (EPID L-2017-LLA-0427)," dated May 22, 2019 (ML18347B330)

2. TVA Letter to NRC, "Application to Revise Watts Bar Unit 2 Technical Specification 4.2.1, 'Fuel Assemblies,' and Watts Bar Units 1 and 2 Technical Specifications Related to Fuel Storage (WBN-TS-17-028)," dated December 20, 2017 (ML17354B282)

3. NRC Letter to TVA, "Watts Bar Nuclear Plant, Unit 1 – Issuance of Amendment Regarding Steam Generator Tube Rupture Accident Control Room Dose Analysis (TAC No. MD0218) (TS-06-02)," dated October 4, 2006 (ML062290485)

ATTACHMENT 1

Proposed UFSAR Section 15.5.5 Changes (Mark Ups) for WBN Unit 2

WBN

TABLE 15.5-18

PARAMETERS USED IN STEAM GENERATOR TUBE RUPTURE ANALYSIS

Primary Side Activity	Technical Specification Limit	
Secondary Side Activity	~~ANSI/ANS-18.1-1984 (Expected levels, 150 gpd/SG)~~	Technical Specification Limit
Iodine Spiking Factor	Case 1: Accident initiated spike of 500 times equilibrium iodine concentration. Case 2: Pre-accident spike of 14 µCi/gm I-131 equivalent.	
Iodine Partition Factor	100	
	Unit 1	Unit 2
Secondary Side Mass Release (Ruptured Steam Generator)		
0-2 hours	108,200 lbm	~~103,300 lbm~~ 109,000 lbm
2-8 hours	35,500 lbm	~~32,800 lbm~~ 33,200 lbm
Secondary Side Mass Release (Intact Steam Generator)		
0-2 hours	539,500 lbm	~~492,100 lbm~~ 571,300 lbm
2-8 hours	925,000 lbm	~~900,200 lbm~~ 969,400 lbm
Primary Coolant Mass Release (Total)		
0-2 hours	166,200 lbm	~~191,400 lbm~~ 131,400 lbm
Primary Coolant Mass Release (Flashed)		
0-2 hours	9189 lbm	~~10,077.2 lbm~~ 9585 lbm
Meteorology	See Table 15.5-14 and 15A-2	

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TABLE 15.5-19

DOSES FROM STEAM GENERATOR TUBE RUPTURE

UNIT 1

Pre-Accident Initiated Iodine Spike (14μCi/gm maximum peak)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	3.71E-01	1.09E-01	8.86E-02
Beta	2.11E-01	6.45E-02	9.76E-01
Thyroid (ICRP-30)	1.32E+01	3.79E+00	2.27E+01

Accident Initiated Iodine Spike (0.265 μCi/gm steady state)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	5.55E-01	1.62E-01	8.42E-02
Beta	2.48E-01	7.59E-02	9.64E-01
Thyroid (ICRP-30)	6.99E+00	2.06E+00	3.92E+00

UNIT 2

Pre-Accident Initiated Iodine Spike (14μCi/gm maximum peak)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	4.11E-01	1.21E-01	6.47E-02
Beta	2.37E-01	7.26E-02	7.23E-01
Thyroid (ICRP-30)	1.44E+01	4.13E+00	1.31E+01

Accident Initiated Iodine Spike (0.265 μCi/gm steady state)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	6.39E-01	1.88E-01	6.27E-02
Beta	2.85E-01	8.75E-02	7.28E-01
Thyroid (ICRP-30)	8.51E+00	2.52E+00	2.45E+00

See next page for new values calculated for Unit 2 SGTR accident doses with replacement steam generators installed.

REPLACE UNIT 2 VALUES IN UFSAR TABLE 15.5-19 WITH THE FOLLOWING:

UNIT 2

Pre-Accident Initiated Iodine Spike (14 µCi/gm maximum peak)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	3.58E-01	1.04E-01	5.19E-02
Beta	1.92E-01	5.78E-02	5.65E-01
Thyroid (ICRP-30)	1.36E+01	3.88E+00	1.51E+01

Accident Initiated Iodine Spike (0.265 µCi/gm steady state)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	5.36E-01	1.55E-01	4.85E-02
Beta	2.28E-01	6.84E-02	5.49E-01
Thyroid (ICRP-30)	7.00E+00	2.03E+00	2.58E+00

ATTACHMENT 2

Proposed UFSAR Section 15.5.5 Changes (Final Typed) for WBN Unit 2

WBN

TABLE 15.5-18

PARAMETERS USED IN STEAM GENERATOR TUBE RUPTURE ANALYSIS

Primary Side Activity	Technical Specification Limit	
Secondary Side Activity	Technical Specification Limit	
Iodine Spiking Factor	Case 1: Accident initiated spike of 500 times equilibrium iodine concentration.	
	Case 2: Pre-accident spike of 14 μCi/ gm I-131 equivalent.	
Iodine Partition Factor	100	
	Unit 1	Unit 2
Secondary Side Mass Release (Ruptured Steam Generator)		
0-2 hours	108,200 lbm	109,000 lbm
2-8 hours	35,500 lbm	33,200 lbm
Secondary Side Mass Release (Intact Steam Generator)		
0-2 hours	539,500 lbm	571,300 lbm
2-8 hours	925,000 lbm	969,400 lbm
Primary Coolant Mass Release (Total)		
0-2 hours	166,200 lbm	131,400 lbm
Primary Coolant Mass Release (Flashed)		
0-2 hours	9189 lbm	9585 lbm
Meteorology	See Table 15.5-14 and 15A-2	

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TABLE 15.5-19

DOSES FROM STEAM GENERATOR TUBE RUPTURE

UNIT 1

Pre-Accident Initiated Iodine Spike (14μCi/gm maximum peak)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	3.71E-01	1.09E-01	8.86E-02
Beta	2.11E-01	6.45E-02	9.76E-01
Thyroid (ICRP-30)	1.32E+01	3.79E+00	2.27E+01

Accident Initiated Iodine Spike (0.265 μCi/gm steady state)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	5.55E-01	1.62E-01	8.42E-02
Beta	2.48E-01	7.59E-02	9.64E-01
Thyroid (ICRP-30)	6.99E+00	2.06E+00	3.92E+00

UNIT 2

Pre-Accident Initiated Iodine Spike (14μCi/gm maximum peak)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	3.58E-01	1.04E-01	5.19E-02
Beta	1.92E-01	5.78E-02	5.65E-01
Thyroid (ICRP-30)	1.36E+01	3.88E+00	1.51E+01

Accident Initiated Iodine Spike (0.265 μCi/gm steady state)

(rem)	2 HR EAB	30 DAY LPZ	CONTROL ROOM
Gamma	5.36E-01	1.55E-01	4.85E-02
Beta	2.28E-01	6.84E-02	5.49E-01
Thyroid (ICRP-30)	7.00E+00	2.03E+00	2.58E+00