

**Enclosure 1**  
**TVA Letter Dated August 4, 2011**  
**Responses to Licensee Open Items to be Resolved for SER Approval**

**Attachment 1**

**TVA Calculation WBNAPS3127, "EQ Dose in the Control Building," Revision 0**

LEGIBILITY EVALUATED AND

ACCEPTED FOR ISSUE. ALL PAGES

*Scott Helm* 6/18/11  
SIGNATURE REV 0 DATE

REV. 0 EDMS/RIMS NO. <b>T93110610011</b>		EDMS TYPE: calculations(nuclear)	EDMS ACCESSION NO (N/A for REV. 0) N/A																													
Calc Title: <b>EQ Dose in the Control Building</b>																																
CALC ID	TYPE	ORG	PLANT	BRANCH	NUMBER	CUR REV	NEW REV	REVISION APPLICABILITY Entire calc <input checked="" type="checkbox"/> Selected pages <input type="checkbox"/>																								
CURRENT	CN	NUC																														
NEW	CN	NUC	WBN	NTB	<b>WBNAPS3-127</b>		<b>0</b>																									
ACTION	NEW REVISION <input checked="" type="checkbox"/>	DELETE RENAME <input type="checkbox"/>	SUPERSEDE DUPLICATE <input type="checkbox"/>	CCRIS UPDATE ONLY <input type="checkbox"/> (Verifier Approval Signatures Not Required)		No CCRIS Changes <input type="checkbox"/> (For calc revision, CCRIS been reviewed and no CCRIS changes required)																										
UNITS	SYSTEMS		UNIDS																													
001/002	NA		NA																													
DCN.EDC.NA N/A		APPLICABLE DESIGN DOCUMENT(S) NA			CLASSIFICATION E																											
QUALITY RELATED? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	SAFETY RELATED? (If yes, OR = yes) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	UNVERIFIED ASSUMPTION Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	SPECIAL REQUIREMENTS AND/OR LIMITING CONDITIONS? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		DESIGN OUTPUT ATTACHMENT? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	SAR/TS and/or ISFS/ SAR/CoC AFFECTED? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>																										
PREPARER ID MCBERG	PREPARER PHONE NO 603-928-3810	PREPARING ORG (BRANCH) WorleyParsons Polastar		VERIFICATION METHOD Design Review	NEW METHOD OF ANALYSIS <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No																											
PREPARER SIGNATURE Marc C. Berg <i>Marc C. Berg</i>	DATE 5-11-2011	CHECKER SIGNATURE James E. Bouchard <i>J. Bouchard</i>		DATE 5/11/11																												
VERIFIER SIGNATURE James E. Bouchard <i>J. Bouchard</i>	DATE 5/11/11	APPROVAL SIGNATURE DGF <i>John F. Lund</i>		DATE 10/20/2011																												
<b>STATEMENT OF PROBLEM/ABSTRACT</b>																																
<p>This calculation determined the EQ dose in the Control Building. WBNTSR-112 determined the 100-day LOCA EQ doses using the radioisotope concentrations at the control room intake (either West/Normal or East/Emergency). The pressurization air for the rooms of interest is taken from the West/Normal intake. This calculation modified the WBNTSR-112 doses to correct for the West/Normal intake.</p> <p>The normal dose was based on an assumed 1 mrem/hr since there are normally no sources in the rooms.</p> <p>The results of the calculation were [rads]:</p> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th></th> <th>El.755 Mechanical Equipment Room*</th> <th>El.755 All Other Rooms</th> <th>All Other Control Building Elevations (El.685, 5, 729, and 708)</th> </tr> </thead> <tbody> <tr> <td>40 Year Gamma Normal</td> <td>350.4</td> <td>350.4</td> <td>350.4</td> </tr> <tr> <td>100-Day Gamma Accident</td> <td>710.5</td> <td>4.632</td> <td>66.7</td> </tr> <tr> <td>Gamma Total (Normal + Accident)</td> <td>1060.9</td> <td>355.03</td> <td>417.1</td> </tr> <tr> <td>100-Day Beta Accident</td> <td>95.4</td> <td>7.73</td> <td>95.4</td> </tr> <tr> <td>Gamma + Beta Total (Normal + Accident)</td> <td>1156.3</td> <td>362.76</td> <td>512.5</td> </tr> </tbody> </table> <p>* This is the HEPA large face, which is the largest dose in the room. For locations other than the HEPA large face, the dose will be less depending on location (see WBNTSR-005).</p>										El.755 Mechanical Equipment Room*	El.755 All Other Rooms	All Other Control Building Elevations (El.685, 5, 729, and 708)	40 Year Gamma Normal	350.4	350.4	350.4	100-Day Gamma Accident	710.5	4.632	66.7	Gamma Total (Normal + Accident)	1060.9	355.03	417.1	100-Day Beta Accident	95.4	7.73	95.4	Gamma + Beta Total (Normal + Accident)	1156.3	362.76	512.5
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MICROFICHE/FICHE Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> FICHE NUMBER(S)																																
<input type="checkbox"/> LOAD INTO EDMS AND DESTROY <input type="checkbox"/> LOAD INTO EDMS AND RETURN CALCULATION TO CALCULATION LIBRARY. ADDRESS: <input type="checkbox"/> LOAD INTO EDMS AND RETURN CALCULATION TO:																																

**NPG CALCULATION COVERSHEET/CCRIS UPDATE**

CALC ID	TYPE	ORG	PLANT	BRANCH	NUMBER	REV
	CN	NUC	WBN	NTB	WBNAPS3127	000

**ALTERNATE CALCULATION IDENTIFICATION**

BLDG NA	ROOM NA	ELEV NA	COORD/AZIM NA	FIRM Polestar	Print Report Yes <input checked="" type="checkbox"/>
CATEGORIES : NA					

**KEY NOUNS (A-add, D-delete)**

ACTION (A/D)	KEY NOUN	A/D	KEY NOUN
A	EQ		

**CROSS-REFERENCES (A-add, C-change, D-delete)**

ACTION (A/C/D)	XREF CODE	XREF TYPE	XREF PLANT	XREF BRANCH	XREF NUMBER	XREF- REV
A	P	CN	WBN	NTB	WBNNAL3018	
A	P	CN	WBN	NTB	WBNNAL3025	
A	P	CN	WBN	NTB	WBNTSR005	
A	P	DW	WBN	NTB	1-47W866-4	
A	P	CN	WBN	NTB	WBNAPS3104	
A	P	CN	WBN	NTB	TIRPS198	
A	P	DW	WBN	NTB	47W200-5	
<del>A</del>	<del>P</del>	<del>CN</del>	<del>GEN</del>	<del>NTB</del>	<del>GENAPS3018</del>	
A	P	CO	GEN	NTB	FENCDOSE	
A	S	CN	WBN	NTB	WBNOSG4004	
A	S	CN	WBN	NTB	WBNAPS4004	
A	P	CN	WBN	NTB	WBNTSR112	
A	P	DW	WBN	NTB	47W200-3	
A	P	DW	WBN	NTB	47W200-4	
A	P	DW	WBN	NTB	47W200-6	

*4/6/15/11*

**CCRIS ONLY UPDATES:**

Following are required only when making keyword/cross reference CCRIS updates and page 1 of form NEDP-2-1 is not included:

PREPARER SIGNATURE	DATE	CHECKER SIGNATURE	DATE
PREPARER PHONE NO.	EDMS ACCESSION NO.		

NPG CALCULATION RECORD OF REVISION	
CALCULATION IDENTIFIER WBNAPS3-127	
Title EQ Dose in the Control Building	
Revision No.	DESCRIPTION OF REVISION
0	Initial Issue. WBNAPS4-004 and WBNOSG4-004 will become successors to this calculation and should be revised to reflect the results.  R0: 13 total pages

<b>NPG CALCULATION TABLE OF CONTENTS</b>		
Calculation Identifier: WBNAPS3-127	Revision: 0	
<b>TABLE OF CONTENTS</b>		
<b>SECTION</b>	<b>TITLE</b>	<b>PAGE</b>
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	Revision Log	2
	Calculation Design Verification Form	3
	Table of Contents	4
	Calculation Verification Form	5
	Computer Input File Storage Information Sheet	6
	Computer Output Microfiche Information Sheet	7
	<b>Purpose</b>	8
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	<b>Assumptions</b>	8
	<b>Special Requirements/Limiting Conditions</b>	8
	<b>Calculations</b>	9
	<b>Results</b>	13
	<b>References</b>	13

**NPG CALCULATION VERIFICATION FORM**

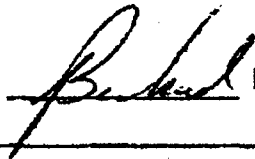
Calculation Identifier **WBNAPS3-127**

Revision **0**

**Method of verification used:**

- 1. Design Review
- 2. Alternate Calculation
- 3. Qualification Test

Verifier



Date

5/11/11

**Comments:**

I have reviewed WBNAPS3-127 and have found the calculation to have been completed in a technically sound and appropriate manner for the scenario specified in the text. In conducting the verification, I reviewed the methodology, design input, and assumptions, which I have found to be valid and conservative.

**NPG COMPUTER INPUT FILE  
STORAGE INFORMATION SHEET**

Document WBNAPS3-127

Rev. 0

Plant: WBN

Subject:

**EQ Dose in the Control Building** Electronic storage of the input files for this calculation is not required. Comments:

There are no computer runs associated with this calculation

 Input files for this calculation have been stored electronically and sufficient identifying information is provided below for each input file. (Any retrieved file requires re-verification of its contents before use.) Microfiche/eFiche



**NPG COMPUTER OUTPUT  
MICROFICHE INFORMATION SHEET**

page 7

Document WBNAPS3-127

Rev. 0

Plant: WBN

Subject:

**EQ Dose in the Control Building**

Microfiche Number

Description

There are no computer runs associated with this calculation





Calculation No. WBNAPS3-127	Rev: 0	Plant: WBN	Page: 8
Subject: EQ Dose in the Control Building	Prepared: MCB	Date:	
	Checked: JEB	Date:	

Purpose

The purpose of this calculation is to determine the total EQ dose (100-day accident plus 40-year normal dose) in the Control Building.

Introduction

This calculation is to establish an EQ dose of  $<1E3$  rads for the Control Building. Additionally, the dose in the El.755 Mechanical Equipment Room (where the control room filters are located) is also performed.

Assumptions

1. It is assumed that the normal operation dose rate in the Control Building has a 1 mrem/hr background dose rate.

Technical Justification: References 1 and 2 have documented no normal radiation source in the Control Building. The assumed value of 1 mrem/hr is the customary and reasonable assumed value for such rooms. Also, this is the value at which RADCON considers an area to be a general access area. See also assumption #2.

2. In all Control Building Rooms the dose due to the Control Building Emergency filters may be neglected, except for the room where the filters are located (El.755 Mechanical Equipment Room):

Technical Justification: The Control Building Emergency Filers will be contaminated during a LOCA (ref.3). The largest dose in the El.755 room is on the HEPA large face (705.9 rads). However, once one gets a distance from the filters, the doses drop dramatically. For instance, in the control room proper (through a cinder block wall), the doses drop to  $<5E-4$  rads. It can be concluded that doses due to the filters may be ignored due to intervening floor/ceilings plus the distance involved.

3. The air in the Control Building that is not in the Control Room Habitability Zone may be assumed to be the same as that found at the west end (normal) intake of the control building.

Technical Justification: From ref. 4, the outside air that is used to pressurize the Control Building excluding the Control Room Habitability Zone during both normal and post Control Room Isolation (CRI) modes is normally aligned to the Control Building air intake located on the West end of the building (the "normal control room intake"). The flow rate is not specified on the flow diagram, but the balancing damper associated with this flow path was set in order to achieve a pressure that is a minimum of 1/8 inch w.g. less than the MCR during a CRI in order to maintain a positive pressure in the MCR. Since there is a positive flow of air into the rooms from the intake, the concentrations in the room may be assumed to be same as that at the intake. Also, any leakage will come from the control room habitability zone (same intake, and is also filtered), or from adjacent buildings. Air from adjacent buildings, such as the Turbine Building, will have had greater dilution than the intake location due to greater distance and circuitous travel path to get to those locations.

Special Requirements/Limiting Conditions

There are no special requirements or limiting conditions in this calculation



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Calculations

40-Year Normal Gamma Dose

Since there are no identified normal operation sources in these rooms (ref.1 and 2), it is assumed that the background dose rate is 1 mrem/hr. The 40-year normal operating dose is therefore:

$$1 \text{ mrem/hr} * 1 \text{ rad/rem} * 24 \text{ hr/day} * 365 \text{ days/yr} * 40 \text{ yr} / (1000 \text{ mrem/rem}) = 350.4 \text{ rads}$$

100-day Accident Gamma Dose

For Rooms in the Control Room Habitability Zone the contaminated air is filtered. The 100-day airborne gamma dose was determined in WBNTSR-005 (ref.3) as 4.632 rads. In the Mechanical Equipment Room the filter shine dose was determined to be an additional 705.9 rads (HEPA large face).

For Control Building rooms not in the Control Room Habitability Zone the air is not filtered, therefore the doses will be different. From ref. 4, the outside air that is used to pressurize the Control Building during both normal and post Control Room Isolation (CRI) modes is normally aligned to the Control Building air intake located on the West end of the building. The flow rate is not specified on the flow diagram, but the balancing damper associated with this flow path was set in order to achieve a pressure on the elevations that is a minimum of 1/8 inch w.g. less than the MCR during a CRI.

The doses due the activities at the intake were determined in WBNTSR-112 (ref.5) which in turn were derived from LOCA releases from TI-RPS-198 (ref.7). These dose rates were determined using the worst case X/Q values for the first 8 hours, then the more favorable intake X/Q after 8 hours. Since the more favorable intake is not the normal (West) intake, the dose rates must be modified by the ratio of the X/Q values.

From WBNTSR-104:  
LOCA X/Q [sec/cum]

			0-2 hr	2-8 hr	8-24 hr	1-4 day	4-30 days	Air intake No/location
Unit 1	Case No. 1	Full Rx Bldg	4.47E-04	2.81E-04	1.21E-04	9.36E-05	7.77E-05	1/East
Unit 1	Case No. 2	Full Rx Bldg	1.09E-03	9.50E-04	4.56E-04	3.09E-04	2.35E-04	2/West
		1/2 Rx Bldg	1.09E-03	9.59E-04	4.60E-04	3.09E-04	2.37E-04	2/West
		1/4 Rx Bldg	1.09E-03	9.72E-04	4.65E-04	3.10E-04	2.39E-04	2/West
		1/8 Rx Bldg	1.12E-03	9.78E-04	4.73E-04	3.10E-04	2.41E-04	2/West
		No Bldg Area	1.29E-03	1.16E-03	5.55E-04	3.35E-04	2.64E-04	2/West
Unit 2	Case No. 3	Full Rx Bldg	8.28E-04	7.69E-04	3.90E-04	2.98E-04	2.17E-04	1/East
		1/2 Rx Bldg	8.28E-04	7.75E-04	3.94E-04	2.99E-04	2.18E-04	1/East
		1/4 Rx Bldg	8.63E-04	7.69E-04	4.01E-04	2.99E-04	2.19E-04	1/East
		1/8 Rx Bldg	8.85E-04	7.73E-04	4.09E-04	3.00E-04	2.21E-04	1/East
		No Bldg Area	9.78E-04	9.08E-04	4.71E-04	3.21E-04	2.36E-04	1/East
Unit 2	Case No. 4	Full Rx Bldg	4.13E-04	3.54E-04	1.90E-04	1.43E-04	1.03E-04	2/West

TI-RPS-198/WBNTSR-112 X/Q values [sec/cum] used were:

0-2 hr	2-8 hr	8-24 hr	1-4 day	4-30 days
1.12E-03	9.78E-04	1.21E-04	9.36E-05	7.77E-05

Worst case X/Q (unit 1 case 2 vs. unit 2 case 4, 1/8 Rx. Bldg)

		0-2 hr	2-8 hr	8-24 hr	1-4 day	4-30 days
case 2	U1 to West	1.12E-03	9.78E-04	4.73E-04	3.10E-04	2.41E-04
case 4	U2 to West	4.13E-04	3.54E-04	1.90E-04	1.43E-04	1.03E-04
<b>Worst Case:</b>		1.12E-03	9.78E-04	4.73E-04	3.10E-04	2.41E-04



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**Correction Ratio:**

The correction ratio is the worst case X/Q divided by the X/Q used by WBNTSR-112:

	0-2 hr	2-8 hr	8-24 hr	1-4 day	4-30 days
WBNTSR-112 X/Q	1.12E-03	9.78E-04	1.21E-04	9.36E-05	7.77E-05
Correction X/Q	1.00E+00	1.00E+00	3.91E+00	3.31E+00	3.10E+00

Taking the WBNTSR-112 results and correcting them using the correct (West) intake X/Q results in the following: (note, the 720-2400 hr X/Q values are assumed to be the same as the 96-720 hr X/Q):

**Gamma Dose [rads] in Rooms not in Control Room Habitability Zone**

	0-2 hr	2-8 hr	8-24 hr	24-96 hr	96-720 hr	720-2400 hr
correction ratio	1.000E+00	1.000E+00	3.909E+00	3.312E+00	3.102E+00	3.102E+00
WBNTSR-112 Dose	8.965E+00	9.818E+00	7.646E+00	4.144E+00	1.336E+00	5.799E-02
					Total over 100 days	32.0
Corrected Total	8.965E+00	9.818E+00	2.989E+01	1.372E+01	4.144E+00	1.799E-01
					Total over 100 days	66.7

100-day Accident Beta Dose

For Control Building Rooms not in the Control Room Habitability Zone, the beta dose is determined the same as that in ref.3. From TI-RPS-198 (ref.7) COROD run R198C23A (U1 PCO control loop single failure, conventional core) which produced the highest beta dose:

- 4-30 day dose rate: 3.785 mrad/hr
- 30 day continuous occupancy dose: 1.371E3 mrad
- 30-100 day dose: 3.785 mrad/hr \* 24 hr/day \* 70 day = 6.3588E3 mrad
- total 100-day airborne+shine dose: 1.371E3 + 6.3588E3 = 7.73E3 mrad = 7.73 rads

The activity at the control room intake vent is also used to determine the beta dose rate for the control building rooms. The average intake concentrations are taken from WBNTSR-112. The formulas for determining the average beta dose rate from a semi-infinite cloud for each isotope is (ref.9):

$$D_{\text{beta}} = 0.23E(X/Q)(Q/\Delta T) * 3600 \text{ sec/hr}$$

where

D= dose rate from a semi-infinite cloud [rem/hr]

E=average gamma or beta energy for the isotope per disintegration [MeV/dis]

X/Q=Dispersion Coefficient [sec/cum]

Q/ΔT=integrated concentration of isotope over time interval ΔT [Ci/sec]

(X/Q)(Q/ΔT) = [Ci/cum] as determined by COROD, found in WBNTSR-112 (note: these concentrations are based on X/Q values that must be corrected, see gamma correction above)

The total dose rate is the summation of all dose rates from each isotope. The average energy of each isotope is taken from ref.10.





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Beta Doses in Rooms not in Control Room Habitability Zone

	Aver. Beta		(rem/hr)					
	Energy (E) MeV	DeltaT	0-2 hr 2	2-8 hr 6	8-24 hr 16	24-96 hr 72	96-720 hr 624	30-100 day 1680
Kr-83m	3.708E-02		1.089E-02	8.457E-03	7.747E-04	1.170E-06	4.012E-19	0.000E+00
Kr-85m	2.529E-01		1.955E-01	3.188E-01	1.488E-01	6.890E-03	1.853E-08	0.000E+00
Kr-85	2.506E-01		9.976E-03	2.969E-02	6.394E-02	1.063E-01	1.998E-01	5.027E-01
Kr-87	1.324E+00		1.361E+00	6.346E-01	1.934E-02	1.958E-06	5.480E-26	0.000E+00
Kr-88	3.750E-01		7.284E-01	8.538E-01	1.889E-01	2.006E-03	6.646E-12	0.000E+00
Kr-89	1.231E+00		1.097E-01	4.787E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Kr-90	1.197E+00		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Xe-131m	1.428E-01		5.761E-03	1.703E-02	3.600E-02	5.649E-02	5.925E-02	1.864E-02
Xe-133m	1.898E-01		4.451E-02	1.268E-01	2.415E-01	2.553E-01	3.634E-02	2.478E-02
Xe-133	1.354E-01		9.955E-01	2.915E+00	5.979E+00	8.185E+00	3.595E+00	1.201E-01
Xe-135m	9.500E-02		7.271E-02	2.848E-01	4.036E-01	1.013E-01	2.911E-05	0.000E+00
Xe-135	3.168E-01		7.911E-01	2.066E+00	2.574E+00	6.608E-01	6.259E-04	3.725E-25
Xe-137	1.642E+00		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Xe-138	6.058E-01		4.403E-01	1.416E-03	2.664E-11	0.000E+00	0.000E+00	0.000E+00
Xe-139	1.835E+00		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Xe-140	1.117E+00		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I-130	2.802E-01		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I-131	1.943E-01		1.665E-02	2.535E-03	3.303E-03	3.348E-03	2.415E-03	2.781E-04
I-132	5.143E-01		5.989E-02	2.506E-03	2.433E-04	5.838E-07	3.725E-17	0.000E+00
I-133	4.080E-01		7.155E-02	9.488E-03	9.000E-03	3.096E-03	7.319E-05	6.589E-14
I-134	6.102E-01		1.006E-01	8.006E-04	3.575E-06	4.118E-12	0.000E+00	0.000E+00
I-135	3.680E-01		6.049E-02	5.797E-03	2.735E-03	1.738E-04	2.088E-08	0.000E+00
Im-136	2.210E+00		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I-130*	2.802E-01		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
I-131*	1.943E-01		9.540E-04	3.153E-04	4.113E-04	4.171E-04	3.010E-04	3.465E-05
I-132*	5.143E-01		3.312E-03	3.112E-04	3.031E-05	7.273E-08	4.640E-18	0.000E+00
I-133*	4.080E-01		4.083E-03	1.179E-03	1.120E-03	3.855E-04	9.115E-06	8.207E-15
I-134*	6.102E-01		5.290E-03	9.870E-05	4.434E-07	5.104E-13	0.000E+00	0.000E+00
I-135*	3.680E-01		3.422E-03	7.205E-04	3.408E-04	2.166E-05	2.599E-09	0.000E+00
Im-136*	2.210E+00		0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
total			5.092E+00	7.280E+00	9.673E+00	9.382E+00	3.894E+00	6.665E-01
X/Q correction ratio			1.000E+00	1.000E+00	3.909E+00	3.312E+00	3.102E+00	3.102E+00
corrected total			5.092E+00	7.280E+00	3.781E+01	3.107E+01	1.208E+01	<u>2.067E+00</u>
							total	9.540E+01



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#### Results

The total doses [rads] were determined to be:

	El.755 Mechanical Equipment Room*	El.755 All Other Rooms	All Other Control Building Elevations (El.685.5, 729, and 708)
40 Year Gamma Normal	350.4	350.4	350.4
100-Day Gamma Accident	710.5	4.632	66.7
Gamma Total (Normal + Accident)	1060.9	355.03	417.1
100-Day Beta Accident	95.4	7.73	95.4
Gamma + Beta Total (Normal + Accident)	1156.3	362.76	512.5

\* This is the HEPA large face, which is the largest dose in the room. For locations other than the HEPA large face, the dose will be less depending on location (see WBNTSR-005).

#### Discussion and Conclusion

All rooms in the Control Building, except the El.755 Mechanical Equipment Room, have doses <1E3 rads.

#### References

1. WBNNAL3-018 R2 "Auxiliary Building Piping Source Term Data"
2. WBNNAL3-025 R6 "Normal Operation Dose For Equipment Qualification Outside the Shield Building"
3. WBNTSR-005 R4 "Dose due to the Control Building Emergency Air Cleanup Filters"
4. WBN CCD drawing 1-47W866-4 R39
5. WBNTSR-112 R6 "Shield Design Review and Equipment Qualification Study"
6. WBNAPS3-104 R2 "WBN Control Room X/Q"
7. TI-RPS-198 R23 "Dose to Control Room Personnel Due to a Regulatory Guide 1.4 Loss of Coolant Accident"
8. WBN drawing 47W200-3 RN  
WBN drawing 47W200-4 RJ  
WBN drawing 47W200-5 RM  
WBN drawing 47W200-6 RE
9. Computer Code FENCDOSE R3, code ID 262358, controlled user's manual #8
10. GENAPS3-018 R1 "NEB Isotope Library Verification"