SOUTH TEXAS PROJECT UNITS 1 & 2
HOUSTON LIGHTING & POWER
CALCULATION COVER SHEET

CALCULATION NUMBER: NC-6061

CALCULATION TITLE: Main Steam Line Break Doses for Alternate Plugging Criteria (UFSAR Chapter 15.1.5)

SUBJECT: Calculation of offsite doses for the Main Steam Line Break

BUILDING/AREA/SYSTEMS: N/A

DISCIPLINE: NUCLEAR

QUALITY CLASS: 4 (Safety Related)

UNIT: 9 (Units 1 & 2)

CALCULATION STATUS: Final

OBJECTIVE: To determine the offsite dose consequences of a main steamline break incident (MSLBI).

This calculation was performed to support Technical Specification Change 182 (Condition Report #95-2339 Corrective Action 1). It determines the limiting primary to secondary break flow following a MSLB which results in doses which are 90% (an administrative limit set to preserve 10% margin) of the acceptance criteria for offsite, control room and TSC doses. This break flow is used to support the alternate plugging criteria detailed in the referenced Tech. Spec.

Revision 1 changes the allowable primary to secondary leakage before the postulated steam generator break from .1 gpm to .42 gpm (150 gpd per steam generator or a total of 600 gpd). This is done to be consistent with the revised Technical Specification Change.

SCOPE: The calculation is applicable to Units 1& 2. Calculation assumes modifications 93053, and 93054, Replacement of the Target Rock Main Steam Isolation Valve Above Seat Drain Valves have been completed. If these modifications have not been completed the calculation is conservative.

RESULTS: The limiting primary to secondary break flow is ~~5.1~~ 5.0 gpm. This flow results in a TSC thyroid dose at 30 days of 27 Rem. A comprehensive summary of the results is given on the next page.

TOTAL NUMBER OF SHEETS: ~~746~~ 221

REV NO.	1		SUP. ENG.	D. E. Gore	4/3/96
PREPARER	W. M. Blumberg	W M Blumberg 4/2/96	DIV. MGR.	D.A. Leazar	4/3/96
REVIEWER	M. A. Whitley	Michael A Whitley 4/2/96	D.C. ISSUE DATE 4/3/96		

FILE: A:\NC6061\REV1 4/2/96 Approx 4:45 PM DISK: CALCULATIONS III

SOUTH TEXAS PROJECT UNITS 1 & 2
HOUSTON LIGHTING & POWER
CALCULATION COVER SHEET (Continuation)

CALCULATION NUMBER: **NC-6061, Revision 0 1**

CALCULATION TITLE: **Main Steam Line Break Doses for Alternate Plugging Criteria (UFSAR Chapter 15.1.5)**

RESULTS: The MSLBI doses **based upon a ~~5.1~~ 5.0 gpm primary to secondary break flow** are given below:

	Doses (Rem)	
Case C 5% Failed Fuel	**MSLBI Doses**	**Acceptance Criteria (Ref. 16)**
EAB (0-2hr) Thyroid Dose	1.33E+2	300
EAB (0-2hr) Whole - Body Gamma Dose	~~5.62E-1~~ 5.68E-1	25
EAB (0-2hr) Beta- Skin Dose	~~1.88E-1~~ 1.92E-1	25
LPZ (0-30 days) Thyroid Dose	1.08E+2	300
LPZ (0-30 days) Whole-Body Gamma Dose	~~2.80E-1~~ 2.85E-1	25
LPZ (0-30 days) Beta-Skin Dose	~~9.84E-2~~ 1.01E-1	25
CR (0-30 days) Thyroid Dose	1.95E+1	30
CR (0-30 days) Whole - Body Gamma Dose	~~8.08E-2~~ 9.35E-2	5
CR (0-30 days) Beta- Skin Dose	~~8.00E-1~~ 9.31E-1	30
TSC (0-30 days) Thyroid Dose	2.70E+1	30
TSC (0-30 days) Whole-Body Gamma Dose	~~5.18E-2~~ 5.96E-2	5
TSC (0-30 days) Beta-Skin Dose	~~9.01E-1~~ 1.04E+0	30

WMB 4/96 MW 4-96

INDEX TO CALCULATION REVISIONS

CALC REV	CHANGE DOC. NO.	DESCRIPTION OF CHANGES	AFFECTED SHEETS	MODIFIED SHEETS
0	-	Initial Issue.	-	-
1		Revision 1 changes the allowable primary to secondary leakage before the postulated steam generator break from .1 gpm to .42 gpm (150 gpd per steam generator or a total of 600 gpd). This is done to be consistent with the revised Technical Specification Change.	**Deleted** 2, A-1a- A-1i, A-1 - A-36, B-1a - B1i, B-1 - B-36, C-1a - C-1i, C-1 - C-34, D-1a - D-1i, D-1 -D-34 E-1a- E-1i, E-1 - E-34, F-1a - F1i, F-1 - F-34, G-1a - G-1i, G-1 - G-36, H-1a - H-1i, H-1 -H-36 I-1a- I-1i, I-1 - I-34, J-1a - J1i, J-1 - J-34, M-1a- M-1i, M-1 - M-34, O-1a - O-1i, O-1 - O-34,	**Revised** 1,3,4,5,6,7,8, 13,15,17,26, 27,31, 32,33,34,35, 36,37,38,39, 40,46 **Replaced** 41,42, 43, 44, 45

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~~E-1a - E-1i, E-1 - E-34, F-1a - F1i, F-1 - F-34, G-1a - G-1i, G-1 - G-36, H-1a - H-1i, H-1 -H-36~~
~~I-1a - I-1i, I-1 - I-34, J-1a - J1i, J-1 - J-34,~~ K-1a - K-1i, K-1 - K-36, L-1a - L-1i, L-1 -L-36
~~M-1a - M-1i, M-1 - M-34~~, N-1a - N1i, N-1 - N-34,~~ O-1a - O-1i, O-1 - O-34,~~ P-1a - P-1i,P-1 -P-34

I. Purpose

To determine the limiting primary to secondary steam generator break flow following a MSLB. The limiting flow will be calculated based upon offsite, Technical Support Center (TSC) and Control Room Doses (CR). The flow which corresponds to 90%[1] of the NRC acceptance criteria for any of these locations (See the section entitled Criteria, Codes and Standards) will be the limiting flow. Once this flow is calculated it will be used to determine the offsite, CR and TSC dose consequences utilizing the most limiting source term.

II. References

1. USNRC Standard Review Plan 15.1.5.
2. ST-HL-YB-4136, "STP Atmospheric Dispersion Factors," PFN N2.6, June 12, 1984, Dames and Moore to STP.
3. USAEC Regulatory Guide 1.25, 3-23-72.
4. Westinghouse SIP Vol 3-1, Radiation Analysis Design Manual, Rev. 4, 8/92, TPNS #14926 - 450 (1) or (2) - 002 - EWN.
5. Regulatory Guide 1.4, Revision 2, June 1974
6. K. G. Murphy and K. M. Campe, "Nuclear Power Plant Control Room Ventilation System Design for Meeting General Criterion 19," Paper presented at the 13th AEC Air Cleaning Conference, CONF-740807, Volume 1, pages 401-430, Edited March 1975.
7. Letter # ST-WN-YB-1001, dated 6/13/84, and Letter # ST-WN-YB-650, dated 5-10-84.
8. Calculation NC6020-3, "CPDS Regenerative Source Terms."
9. Letter # ST-WN-BR-1055, 11/11/77.
10. Letter # ST-WN-YB-1030, 6/25/84.
11. "NC-5110, Revision 0, Evaluation of Above Seat Main Steam Line Drain SOV's Deletion."
12. "TRACI-Version 1.0, CCVR," Signed 8/12/94, RMS Document #R16.16, Record TRACI, Revision 0.
13. "TRACI-Version 1.0, Production Computer Code Manual," RMS Document #R16.24, Record # TRACI, Revision 0, Signed 8/8/94.
14. South Texas Project UFSAR, Revision 3.
15. "NE319/2 - LOCADOSE Multi-Region Activity and Dose Calculations," Bechtel Power Corporation, Feb. 4, 1983 (Used for the DCF for Xe-137).
16. "NUREG-0781, Safety Evaluation Report related to the operation of South Texas Project, Units 1 and 2," Controlled copy #319, March 22, 1993, page 15-9.
17. NC-6007, Revision 6, "Fuel Handling Accident in Fuel Handling Building."

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[1] 90% of the acceptance criteria was selected as an administrative limit to allow for 10% margin. The 10% margin is reserved for future use.

18. NE-CE-94-07-00, "Control Room Nodalization Study," RMS STI #95000614, RMS Prefix CALC, File # D7.9.4.1.
19. NC-6013, Revision 8, "Control Room, TSC and Offsite LOCA Radiation Doses."
20. EPRI report TR-103878, "Technical Basis for Considering Uncertainties in I131 Release and Dose Limits for a Postulated Accident."
21. NUREG-1477, "Voltage-Based Interim Plugging Criteria for Steam Generator Tubes - Task Group Report."

III. Criteria, Codes and Standards

The acceptance criteria for the cases considered in this analysis is as follows:

Offsite Doses (per Reference 16)

30 Rem thyroid, 2.5 Rem whole-body and 2.5 Rem beta
The case of a MSLBI with an equilibrium iodine concentration in combination with an assumed accident-generated iodine spike.

300 Rem thyroid, 25 Rem whole-body and 25 Rem beta
The case of a pre-accident iodine spike, or for a MSLBI with the highest worth control rod stuck out of the core (5% failed fuel).

Control Room and TSC Doses (per GDC 19, see Reference 16, page 6-28)

30 Rem thyroid, 5 Rem whole body and 30 Rem beta

IV. Assumptions

1. For a pre-existing iodine spike, the activity in the reactor coolant is based upon an iodine spike which has raised the reactor coolant concentration to 60 micro Ci/gm of dose equivalent I-131. The secondary coolant activity is based on .1 micro Ci/gm of dose equivalent I-131. Noble gas activity is based on 1% failed fuel.
2. The total steam generator tube leak rate prior to the accident and until 8 hours after the start of the accident is ~~0.1~~ 0.42 gpm (approx. 600 gpd). This is conservatively divided into ~~.035~~ 0.147 gpm (35%) to the affected loop and ~~.065~~ 0.273 gpm (65%) to the unaffected loops.
3. For a concurrent iodine spike, the accident initiates an iodine spike in the RCS which increases the iodine release rate from the fuel to a value 500 times greater than the release rate corresponding to a RCS concentration of 1 micro Ci/gm dose equivalent I-131. The iodine activity released to the RCS in the duration of the accident is conservatively assumed

to mix instantaneously and uniformly in the RCS. Noble gas activity is based on 1% failed fuel.

4. No iodine spiking is assumed to occur with accident initiated fuel failures. For this case the RCS concentration is based on 5% of failed fuel for both iodines and gases. At the start of the accident the secondary activity is based upon 1% failed fuel. The activity due to failed fuel is assumed to mix instantaneously and uniformly in the RCS.
5. Following the rupture, auxiliary feedwater to the faulted loop is isolated and the steam generator is allowed to steam dry. Thus, the iodine partition factor for the affected steam generator is 1. The iodine partition factor for the unaffected steam generators is 0.01.
6. Offsite Power is lost.
7. The condensers are unavailable for steam dump.
8. All activity is released to the environment with no consideration given to radioactive decay or to cloud depletion by ground deposition during transport to the exclusion zone boundary and low population zone.
9. Eight hours after the accident, cooldown is reached and no further steam or activity is released to the environment. This is based upon the design basis calculation of record NC-6026, Revision 1.
10. Reactor coolant density is 8.33 lbs/gal.
11. The source term is based upon a power level of 4100 MW thermal, 5 w/o enrichment, and a 3 region core with equilibrium cycle core at end of life. The three regions have operated at a specific power of 39.3 MW/MTU for 509, 1018, and 1527 EFPD, respectively.
12. The X/Q for the RCB to CR/TSC intake is assumed to apply for MSLB site to the CR/TSC intake.
13. The primary to secondary leakage in the unaffected steam generator is assumed to instantaneous flash to steam.
14. The offsite, CR and TSC doses change linearly as a function of the primary to secondary break flow.
15. The Source Term data for the reactor coolant iodine activity based on 60 micro Ci/g Dose Equivalent Iodine 131 (DEI) and the Secondary Iodine Activity based upon 0.1 micro Ci/g DEI are valid for the burnups assumed in assumption 11.
16. The equilibrium secondary activity before the Steam Generator rupture is based upon a preexisting primary to secondary leakage of 1 gpm. This is conservative since Technical Specification change 182 will limit the preexisting leakage to 150 gpd per Steam Generator or 600 gpd (0.42 gpm) total.

V. Input

Input #1
Source Data

A. Reactor coolant iodine activity based on 60 micro Ci/g Dose Equivalent Iodine 131 (DEI). Taken from Reference 10.

Isotope	Concentration (micro Ci/g)
I-131	45
I-132	53
I-133	71
I-134	11
I-135	40

B. Secondary Iodine Activity based upon 0.1 micro Ci/g DEI. Taken from Reference 10.

Isotope	Concentration (micro Ci/g)
I-131	7.5e-2
I-132	8.8e-2
I-133	1.2e-1
I-134	1.8e-2
I-135	6.6e-2

C. Gap activity based on 4100 MW (See assumption 11). Taken from Table 5-10, page 5-20, Reference 4.

Isotope	Gap Activity (Ci)
I-131	1.1e+7
I-132	1.6e+7
I-133	2.3e+7
I-134	2.5e+7
I-135	2.1e+7
Xe-131m	7.7e+4
Xe-133m	3.3e+6
Xe-133	2.3e+7
Xe-135m	4.6e+6
Xe-135	6.5e+6
Xe-137	2.0e+7
Xe-138	1.9e+7
Kr-83m	1.4e+6
Kr-85m	3.0e+6
Kr-85	3.7e+5
Kr-87	5.5e+6
Kr-88	7.9e+6
Kr-89	9.7e+6

D. Reactor coolant activity based on 1% failed fuel. Taken from Table 5-15, page 5-34, Reference 4.

Isotope	Gap Activity (micro Ci/g)
I-131	2.4
I-132	2.7
I-133	3.7
I-134	0.55
I-135	2.1
Xe-131m	1.9
Xe-133m	16.0
Xe-133	240.0
Xe-135m	0.45
Xe-135	8.5
Xe-137	0.17
Xe-138	0.59
Kr-83m	0.38
Kr-85m	1.6
Kr-85	7.7
Kr-87	1.0
Kr-88	2.9
Kr-89	0.084

Input #2
Volume Of Affected and Unaffected Steam Generators and RCS

Unaffected Steam Generators is: 4.14E+5 lbm Ref. 9
Affected Steam Generator is: 1.38E+5 lbm Ref. 9
RCS is: 5.73E+5 lbm Ref. 4, pg. 5-35

Utilizing assumption #10 (8.33 lbm/gal) this converts into:

Unaffected Steam Generators: 4.97E+4 gallons
Affected Steam Generator 1.66E+4 gallons
RCS is: 6.88E+4 gallons

Input #3
Flow Rate Out the Orifices Which Replace the Target Rock Valves
Flow out of orifices which replace the Target Rock Valves
Ref. 11, pg 19

Utilizing assumption #10 the time dependent flow rates out the orifices which replace the Target Rock Valves are calculated on the next page.

For the orifices in the main steam loops with the unaffected and affected Steam Generators:

Time (hours)	Flow Rate Input #1 (lbm/sec loop)	Affected Loop Flow Rate (gpm)[2]	Unaffected Loops Flow Rate (total) (gpm)[3]
0 to 8[4]	1.93	**13.9**	**41.7**

[2] Column 2 times (1gal/ 8.33 lbm x 60 sec/min).

[3] Column 3 times 3.

[4] See assumption 9.

Input #4
Steam Releases from the Affected and Unaffected Steam Generators
Reference 7

Unaffected Steam Generator
0-2 hours 484,000 lbm or time averaged 4033 lbm/min or utilizing assumption 10: 4.84e+2 gpm
2-8 hours 1,106,000 lbm, or time averaged 3072 lbm/min or utilizing assumption 10: 3.69e+2 gpm

Affected Steam Generator
0-.5 hrs 210,000 lbm or utilizing assumption 10: 2.52e+4 gallons

Input #5
TSC HVAC Flowrates and Filtration and Volume
Reference ~~17~~ 19, pg M-13

Utilizing 1 ~~ft3~~ cubic feet (cf) = 7.48 gallons

Filtered Intake Flow	1210 cfm	
Unfiltered Flow	16.2 cfm	
Exhaust Flow	1226.2 cfm	9.17E+3 gpm
Filtered Recirc. Flow	4750 cfm	3.55E+4 gpm

Intake and Recirc. Filtration
Part/Org/Elemental .990 for all

Volume 48170 cf~~t~~ 3.60e+5 gallons

Input #6
Control Room Volume
Reference 19, page 24

274080 ft3 or **2.050E+6 Gallons**

Input #7
LPZ and EAB or EPZ Atmospheric Dispersion Factors (sec/m3)
Reference 2, Table 2.3-25

Time	EAB	LPZ
2	1.3e-4	3.8e-5
8		1.6e-5
16		1.1e-5
72		4.3e-6
624		1.2e-6

Input #8
Regulatory Guidance
Reference 5

Radioactive Inventory
91% Elemental
4% Organic
5% Particulate

Breathing Rates Offsite

Time (hr)	BR (m3/sec)
0-8	3.47e-4
8-24	1.75e-4
24- thereafter	2.32e-4

Input #9
TSC and Control Room Occupancy Factors
Reference 6, pg 413

Time (hr)	Occupancy Factor
0-24	1.0
24-96	0.60
96-720	0.40

Input #10
Atmospheric Dispersion Factors for the Control Room and TSC (sec/m3)
Containment LOCA leakage to CR/TSC intake
Reference 19, pg 17

Time (hr)	Chi/Q
0-8	1.06e-3
8-24	7.01e-4
24-96	4.44e-4
96-720	1.90e-4

VI. Method

Following a main steamline break, auxiliary feedwater to the faulted loop is isolated and the steam generator is allowed to steam dry. Thus, radionuclides carried from the primary coolant to the generator via leaking tubes are assumed to be released directly to the environment. Radionuclides released from the generators in the intact loops via the relief valves are assumed to be mixed with the secondary coolant and partitioned between the generator liquid and steam before release to the environment. Three cases are considered:

A) A preexisting iodine spike has raised the concentration in the RCS to 60 micro Ci/g DEI 131.

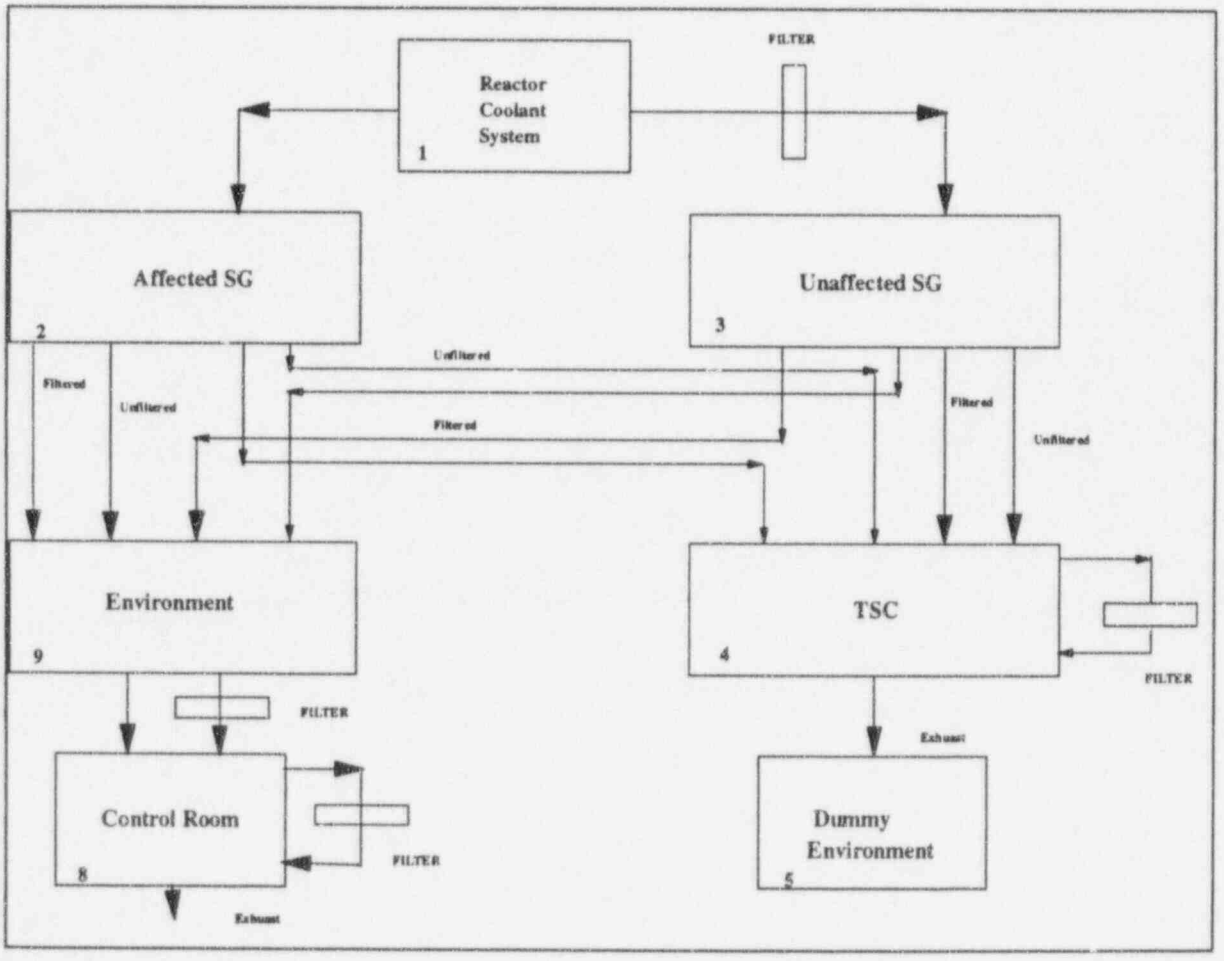
B) The main steamline break causes an iodine spike which increases the release rate to the RCS to a value 500 times greater than the release rate corresponding to an RCS iodine concentration of 1 micro Ci/g DEI 131.

C) The break causes 5% fuel cladding failures.

All three cases are considered in Revision 0 of this calculation. From Revision 0, the source term for the fuel failures (Case C) yields the most limiting primary to secondary break flow. For Revision 1 only the Case C configurations will be rerun, but the calculations of the source terms for Cases A and B will be retained in the calculation.

The TRACI code (Reference 12, 13) will be utilized to perform the analysis.

A schematic of the TRACI model used for this analysis is given below. Note the radiation is transported via the node 9 (using an atmospheric dispersion factor) to the offsite dose locations, the control room (node 8) and the TSC (node 4).



Utilizing assumption #14 the maximum primary to secondary flow rate can be determined based upon the following equation:

$Q = (0.9*D_{limit} - D_{base}) / ((D_{base+10\ gpm} - D_{base}) / 10\ gpm)$ Equation 1

where:

Q = The primary to secondary flow rate which corresponds to 90% of the acceptance dose criteria

D_{limit} = The acceptance criteria dose limit (see **Criteria, Codes and Standards** section)

D_{base} = The base case dose which corresponds to equilibrium secondary activity (based upon a primary to secondary flow rate of ~~+~~ 0.42 gpm) and a ~~an existing~~ primary to secondary flow rate of ~~+~~ 0.42 gpm (same flow which created the equilibrium secondary activity).

$D_{base+10\ gpm}$ = The base case dose which corresponds to equilibrium secondary activity (based upon a primary to secondary flow rate of ~~+~~ 0.42 gpm) and a ~~an existing~~ primary to secondary flow rate of ~~+~~ 0.42 gpm plus ~~and an additional~~ 10 gpm

Once the maximum Q is calculated the doses for the offsite, TSC and CR are back calculated based upon the following equation:

$D = (Q/10 * (D_{base+10\ gpm} - D_{base})) + D_{base}$ Equation 2

VII. Calculation

Source Term Calculations

Case A Preexisting Iodine Spike

First the total iodine activity in the system is determined.

Isotope	RCS Preexisting Iodine Spike Input 1A (micro Ci/ g)	RCS Activity due to Preexisting Iodine Spike Col 2 * 2.6e+8 gm (input 2) (Ci)	Steam Generator Preexisting Iodine Spike Input 1B (micro Ci/g)	Steam Generator Activity due to Preexisting Iodine Spike Col 4 *2.5e+8 gm (input 2 tot. SG mass) (Ci)	Total Activity (Ci)
I-131	45	1.17e+4	7.5e-2	1.88e+1	1.17e+4
I-132	53	1.38e+4	8.8e-2	2.2e+1	1.38e+4
I-133	71	1.85e+4	1.2e-1	3e+1	1.85e+4
I-134	11	2.86e+3	1.8e-2	4.5	2.86e+3
I-135	40	1.04e+4	6.6e-2	1.65e+1	1.04e+4

SG Fraction = I-131 SG Activity / I-131 Total Activity = 1.61e-3

RCS Fraction = 1- SG Fraction = 1 - 1.61e-3 = 9.984e-1

Per Assumption 2
Affected SG Fraction = .35 * 1.61e-3 = 5.64e-4
Unaffected SG Fraction = .65 * 1.61e-3 = 1.05e-3

Case A Noble Gases

Isotope	Col 1 RCS Con. ntration Input 1D (micro Ci/g)	Col 2 SG Activity (Ci)	Col 3 RCS Activity (Ci)	Col 4 Total Activity (Ci)
Kr-83m	0.38	1.98e-3	9.88e+1	9.88e+1
Kr-85m	1.6	8.33e-3	4.16e+2	4.16e+2
Kr-85	7.7	4.01e-2	2.00e+3	2.00e+3
Kr-87	1.0	5.21e-3	2.6e+2	2.6e+2
Kr-88	2.9	1.51e-2	7.54e+2	7.54e+2
Kr-89	0.084	4.37e-4	2.18e+1	2.18e+1
Xe-131m	1.9	9.89e-3	4.94e+2	4.94e+2
Xe-133m	16.0	8.33e-2	4.16e+3	4.16e+3
Xe-133	240.0	1.25e+0	6.24e+4	6.24e+4
Xe-135m	0.45	2.34e-3	1.17e+2	1.17e+2
Xe-135	8.5	4.42e-2	2.21e+3	2.21e+3
Xe-137	0.17	8.85e-4	4.42e+1	4.42e+1
Xe-138	0.59	3.07e-3	1.53e+2	1.53e+2

To determine the activity in the steam generators, the methodology from Reference 8 is used:

SG Concentration = (Primary Conc * Appearance Rate)/ Flow Rate

Therefore,
Col 2 = Col 1 * 1e-6 * C * mass of all SG (Input 2) where:

mass of all SG = (4.14e+5 + 1.38e+5 lbm) * 453.6 gm/lbm = 2.5e+8 gm
From Reference 8:
C = Appearance Rate/ Flow Rate
Appearance Rate = 1.592e+5 g/hr

Flow Rate = 16,858,312 lb/hr x 453.6 g/lbm
C = 2.082e-5

Col 2 = Col 1 * 1e-6 * 2.082e-5*2.5e+8 = Col 1 * 5.205e-3
Col 3 = Col 1 * 1e-6 * mass of RCS (Input 2)
Col 3 = Col 1 * 5.73e+5 lbm * 453.6 gm/lbm = Col 1 * 2.6e+2
Col 4 = Col 2 + Col 3

SG Fraction = Col 2/Col 4

For all noble gases Col 2/ Col 4 = 2.0e-5

RCS Fraction = 1-2.0e-5 = approximately 1.0

Per Assumption 2
Affected SG Fraction = .35 * 2.0 e-5 = 7.0e-6
Unaffected SG Fraction = .65 * 2.0e-5 = 1.3e-5

Case B) Coexisting Iodine Spike

First, the iodine activity in the system is determined. From assumption #3, the release rate to the RCS is increased to a valve 500 times greater than the release rate corresponding to an RCS concentration of 1 uCi/g dose equivalent I-131.

The release rate corresponding to an RCS concentration of 1 uci/g dose equivalent I-131 can be found from Reference 4.

From Reference 4,
Iodine Appearance Rate = (Core Inventory) * FFF * ER

FFF = Failed Fuel Fraction
ER = Escape Rate Coefficient

From Reference 4, page 5-5, ER = 1.3 x 10^{-8} sec^{-1} for iodines.

Also from Reference 4, page 5-27, 1% FF is equal to 3.7 uci/g DE I-131.

For 1 uci/g DE I-131, FFF = 1%/3.7 = .01/3.7 = 0.00270
Thus, Iodine Appearance Rate = (Core Inventory) * (.00270) (1.3 X $10^{-8}sec^{-1}$)
= (Core Inventory) * 3.51 x 10^{-11} sec^{-1}

Case B) Coexisting Iodine Spike

Isotope	Column 1 Core Inventory, Ci	Column 2 0-8 Hour Release to RCS, Ci
I-131	1.1 E8	5.56 E4
I-132	1.6 E8	8.08 E4
I-133	2.3 E8	1.16 E5
I-134	2.5 E8	1.26 E5
I-135	2.1 E8	1.06 E5

Column 1 = Input 1 C/ .1 where .1 is the gap activity release fraction
Column 2 = Iodine App. Rate x 500 x 8 hrs x 3600 sec/hr =
Column 1 x 5.05 E-4

Then assuming 1% failed fuel prior to the spike, by assumption #3, the 0-8 hour release above is added to the initial RCS activity.

Isotope	Column 1 RCS (1% FF) Concentration uCi/g Input 1D	Column 2 RCS 1% FF Activity Ci	Column 3 RCS Spike Activity Ci	Column 4 SG 1% FF Activity Ci, Ref. 8	Total Activity, Ci
I-131	2.4	6.24 E2	5.56 E4	.95	5.62 E4
I-132	2.7	7.02 E2	8.08 E4	.64	8.15 E4
I-133	3.7	9.62 E2	1.16 E5	1.4	1.17 E5
I-134	.55	1.43 E2	1.26 E5	4.1 E-3	1.26 E5
I-135	2.1	5.46 E2	1.06 E5	.66	1.07 E5

Column 2 = Column 1 * RCS Vol x 1.0 E-6 Ci/micro Ci = Column 1 * 2.6E2, Column 3 from Column 2 in the table above.

Total Activity = Column 2 + Column 3 + Column 4

The SG Fraction = .95/5.62 E4 = 1.69 E-5

RCS Fraction = 1 - 1.69 E-5 = 9.9998 E-1 = approximately 1.0

Affected SG Fraction = .35 (1.69 E-5) = 5.92 E-6
Unaffected SG Fraction = .65 (1.69 E-5) = 1.10 E-5

Case C) 5% Failed Fuel Cladding

From Assumption #4, the RCS concentration is based on 5% failed fuel. The initial steam generator activity is based on 1% failed fuel.

Iodines:

Isotope	Column 1 GAP Activity Ci	Column 2 5% RCS GAP Activity Ci	Column 3 SG Activity Ci Ref. 8	Total Activity, Ci Col. 2+Col. 3	SG/Total
I-131	1.1 E7	5.5 E5	.95	5.5 E5	1.73 E-6
I-132	1.6 E7	8 E5	.64	8 E5	8.00 E-7
I-133	2.3 E7	1.15 E6	1.4	1.15 E6	1.22 E-6
I-134	2.5 E7	1.25 E6	4.1 E-3	1.25 E6	3.28 E-9
I-135	2.1 E7	1.05 E6	.66	1.05 E6	6 E-7

Column 1 = Input 1C
Column 2 = Column 1 * .05

SG Fraction = 1.73 E-6

RCS Fraction = 1 - 1.73 E-6 = approximately 1.0

Affected SG Fraction = .35 (1.73 E-6) = 6.06 E-7
Unaffected SG Fraction = .65 (1.73 E-6) = 1.12 E-6

For the Noble Gases,

Isotope	Column 1 Gap Activity Input 1C Ci	Column 2 RCS 5% Gap Activity Ci	Column 3 SG Activity Ci	Column 4 Total Activity Ci	Column 5 SG/Total
KR-83M	1.40E + 06	7.00E + 04	1.98E-03	7.00E + 04	2.83E-08
KR-85M	3.00E + 06	1.50E + 05	8.33E-03	1.50E + 05	5.55E-08
KR-85	3.70E + 05	1.85E + 04	4.01E-02	1.85E + 04	2.17E-06
KR-87	5.50E + 06	2.75E + 05	5.21E-03	2.75E + 05	1.89E-08
KR-88	7.90E + 06	3.95E + 05	1.51E-02	3.95E + 05	3.82E-08
KR-89	9.70E + 06	4.85E + 05	4.37E-04	4.85E + 05	9.01E-10
XE-131M	7.70E + 04	3.85E + 03	9.89E-03	3.85E + 03	2.57E-06
XE-133M	3.30E + 06	1.65E + 05	8.33E-02	1.65E + 05	5.05E-07
XE-133	2.30E + 07	1.15E + 06	1.25E+00	1.15E + 06	1.09E-06
XE-135M	4.60E + 06	2.30E + 05	2.34E-03	2.30E + 05	1.02E-08
XE-135	6.50E + 06	3.25E + 05	4.42E-02	3.25E + 05	1.36E-07
XE-137	2.00E + 07	1.00E + 06	8.85E-04	1.00E + 06	8.85E-10
XE-138	1.90E + 07	9.50E + 05	3.07E-03	9.50E + 05	3.23E-09

Column 2 = Column 1 x .05
Column 3 = Case A Steam Generator Noble Gas Activity.
Column 4 = Column 2 + Column 3
Column 5 = Column 3 ÷ Column 4

SG Fraction = 2.57e-6
RCS Fraction = 1 - 2.57e-6 = approx 1.0

Affected SG = .35 * 2.57e-6 = 9.00e-7

Unaffected SG = .65* 2.57e-6 = 1.67e-6

The following information summarizes the source terms in the form of TRACI input.

Case A Preexisting Iodine Spike

Iodines Only

fract_activity_node = 0.9984, 5.64e-4, 1.05e-3

activity1 = 3*1.17e+4, 3*1.38e+4, 3*1.85e+4, 3*2.86e+3, 3*1.04e+4

Noble Gases Only

fract_activity_node = 1.0, 7.0e-6, 1.3e-5

activity1 = 9.88e+1, 4.16e+2, 2.00e+3, 2.60e+2, 7.54e+2,
2.18e+1, 4.94e+2, 4.16e+3, 6.24e+4, 1.17e+2,
2.21e+3, 4.42e+1, 1.53e+2

Case B Coexisting Iodine Spike

Iodines Only

fract_activity_node = 1.0, 5.92e-6, 1.10e-5

activity1 = 3*5.62e+4, 3*8.15e+4, 3*1.17e+5, 3*1.26e+5, 3*1.07e+5

Noble Gases Only(Note these are the same as case A)

fract_activity_node = 1.0, 7.0e-6, 1.3e-5

activity1 = 9.88e+1, 4.16e+2, 2.00e+3, 2.60e+2, 7.54e+2,
2.18e+1, 4.94e+2, 4.16e+3, 6.24e+4, 1.17e+2,
2.21e+3, 4.42e+1, 1.53e+2

Case C 5% Fuel Failure

Iodines Only

fract_activity_node = 1.0, 6.06e-7, 1.12e-6

activity1 = 3*5.5e+5, 3*8.0e+5, 3*1.15e+6, 3*1.25e+6, 3*1.05e+6

Noble Gases Only

fract_activity_node = 1.0, 9.00e-7, 1.67e-6

activity1 = 7.00e+4, 1.50e+5, 1.85e+4, 2.75e+5, 3.95e+5,
4.85e+5, 3.85e+3, 1.65e+5, 1.15e+6, 2.30e+5,
3.25e+5, 1.00e+6, 9.50e+5

Partition Factor

The partition factor (assumption 5) will be modelled in TRACI as a filter removal efficiency between the reactor coolant and the steam generators in the unaffected loops. The filter removal efficiency will be equal to 1 minus the partition factor (1-.01 = .99) . This will be input into TRACI using input variable filt_flow_remove.

Steam Releases

The steam releases from the affected generator due to the primary to secondary leakage are assumed to flash to steam (Assumption 13). Therefore, from 0-8 hours (see assumption 9) the steam releases due to the primary and secondary leakage are:

For the base case (ie. ~~.1~~ 0.42 gpm total leakage, ~~.035~~ 0.147 gpm to the affected SG)
~~.035~~ 0.147 gpm x 8 hrs x 60 min/hr = ~~16.8~~ 70.6 gallons

For the base case plus ~~10.1~~ 10 gpm (ie. ~~10.1~~ 10.42 gpm total leakage, ~~10.035~~ 10.147 gpm to the affected SG)
~~10.035~~ 10.147 gpm x 8 hrs x 60 min/hr = ~~4817~~ 4870 gallons

These values must be added to the steam released from 0-30 minutes due to the SG boiling dry.

For the base case
0-.5 hrs = steam released from 0-30 min (input 4) + steam from primary to sec. leakage
= 2.52e+4 gal + .5/8 (~~16.8~~ 70.6 gal) = 2.52e+4 gal or time averaged **8.40e+2 gpm**
.5-8 hrs = steam from primary to secondary leakage
= 7.5/8 (~~16.8~~ 70.6) = ~~15.75~~ 66.2 gal or time averaged ~~**3.50e-2**~~ **1.47e-1 gpm**

For the base case + 10 gpm
0-.5 hrs = steam released from 0-30 min (input 4) + steam from primary to secondary leakage
= 2.52e+4 gal + .5/8 (~~4817~~ 4870.6 gal) = 2.55e+4 gal or time averaged **8.50e+2 gpm**
.5-8 hrs = steam from primary to secondary leakage
= 7.5/8 (~~4817~~ 4870.6) = ~~4.516e+3~~ 4.566e+3 gal or time averaged ~~**10.0**~~ **1.01e+1 gpm**

Control Room Model and TSC Model

The control room (CR) model and TSC models are taken from the Reference 19 models (flow rates). The X/Qs for the RCB to CR/TSC intake (Input 10) is assumed to apply for MSLB site to the CR/TSC intake (Assumption 12).

Per Revision 0 the worst control room HVAC thyroid configuration is 1A. Below are the filter efficiencies taken from Reference 17 for configuration 1A. Note 1A is conservative since it considers two single failures (loss of a train, ie. Standby Diesel Generator, and loss of a intake heater with no operator action to secure the failed heater train). Configuration 7 was used to calculate the worst case whole body and beta doses since it maximizes the control room intake flow (3300 cfm vs. the 1A flowrate of 2200 cfm). It is used for the cases with noble gas source terms.

~~The filter efficieneies for the CR HVAC are taken from Reference 17, page 21. Page 7 of Reference 17 gives a table of the thyroid, whole body and beta skin doses for various CR single failure assumptions. The Cases used to determine the limiting doses are those which alter only the CR single failure criteria and not the FHB single failure criteria (See the Execution Matrix in Reference 17, page 5). Cases 3,4, 6, 7, 8, and 9 were considered (case 2 was not considered since it was rerun with a more realistic assumption (see case 8). Case 8 yields the largest thyroid dose, while cases 5-7 yield the highest whole body doses and beta doses. Therefore, CR HVAC Configurations 1A and 4, 6 and 7 were considered (see Reference 17, page 21). Since CR HVAC Configurations 4, 6, and 7 all yielded the same beta and whole body doses, only one of these will be considered. Since configuration 7 has the least iodine removal capability, it will be used. Therefore, for the CR HVAC two configurations will be considered, 1A and 7. The Table below summarizes these configuration.~~

CRE HVAC Filter Efficiency Summary

	HVAC		Intake		Recirculation	
Train	Config.	~~Single Failure~~	Elemental	Organic	Elemental	Organic
3	7	~~Intake heater~~	99.	98.17	93.33	73.33
2	1A	~~Intake heater~~	98.86	94.32	95.	95.

Configuration 7

TRACI Variable	Description	Value
filt_cr	Filtered intake flow for the CR in CFM	3300
unfilt_cr	Unfiltered intake flow for the CR in CFM	10
filt_remove_cr	Intake filter efficiencies	0.9900, 0.9817, 0.990, 8*0.0
filt_recirc_cr	Recirc filter efficiencies	0.9333, 0.7333, 0.99, 8*0.0
exhaust_cr	Control room HVAC exhaust rate in CFM	3310
recirc_cr	Control room recirc flow in CFM	14250

Configuration 1A

TRACI Variable	Description	Value
filt_cr	Filtered intake flow for the CR in CFM	2200
unfilt_cr	Unfiltered intake flow for the CR in CFM	10
filt_remove_cr	Intake filter efficiencies	0.9886, 0.9432, 0.99, 8*0.0
filt_recirc_cr	Recirc filter efficiencies	2*0.950, 0.99, 8*0.0
exhaust_cr	Control room HVAC exhaust rate in CFM	2210
recirc_cr	Control room recirc flow in CFM	9500

Converted to Units of Gallons
Configuration 7

TRACI Variable	Description	Value
filt_cr	Filtered intake flow for the CR in gpm	24,684
unfilt_cr	Unfiltered intake flow for the CR in gpm	74.8
filt_remove_cr	Intake filter efficiencies	0.9900, 0.9817, 0.99,8*0.0
filt_recirc_cr	Recirc filter efficiencies	0.9333, 0.7333, 0.99, 8*0.0
exhaust_cr	Control room HVAC exhaust rate in gpm	24,758.8
recirc_cr	Control room recirc flow in gpm	1.066E+5

Configuration 1A

TRACI Variable	Description	Value
filt_cr	Filtered intake flow for the CR in gpm	16,456
unfilt_cr	Unfiltered intake flow for the CR in gpm	74.8
filt_remove_cr	Intake filter efficiencies	0.9886, 0.9432, 0.99, 8*0.0
filt_recirc_cr	Recirc filter efficiencies	2*0.950, 0.99, 8*0.0
exhaust_cr	Control room HVAC exhaust rate in gpm	16530.8
recirc_cr	Control room recirc flow in gpm	71,060

And from Input #6
The Control Room Volume is **2.050E+6 Gallons**

TSC model

The TRACI code models up to 8 nodes (rooms or groups of rooms) and can transport radioactivity to 2 offsite locations and 1 control room location utilizing a X/Q factor. In order to decrease the number of TRACI runs a TSC model will utilize node 4 which is an inner node (the control room will be modelled in node 8 as shown above). Since the TSC model requires radioactivity to be transported (utilizing a X/Q factor) to an inner node, a calculation to simulate this was performed. This calculation determines "effective" flow rates to the TSC from the affected and unaffected steam generators. This effective flow incorporates the transport of radioactivity due to the leakage from the generators, the X/Q from the steam generators to the TSC intake, and the TSC intake flows. The equation utilized to calculate the effective flow is given below:

Qeff = Qleak * X/Q * Qintake where:

Qeff = The effective flow from the SGs to the TSC
Qleak = The leakage from SGs to the environment
X/Q = The atmospheric dispersion factor from the containment to the TSC intake
Qintake = The intake flow from the TSC intake into the TSC

This methodology was successfully utilized in Reference 18, page 33 and 34.

The time dependent Qeff are developed below and put into matrices in the form of TRACI input.

	A	B	C	D	E	F	G	H	I	J	K	L	M
46		Base Case and Base Case +10 gpm Unaffected Loop - Node 3											
47		Transport of Steam to the TSC HVAC Intake											
48											Node 3 to 4	Node 3 to 4	Node 3 to 9
49					Steam Released		TSC Intake Flow		TSC Intake Flow		Effective	Effective	Total Steam
50											Flow	Flow	
51			Chi/Q	Chi/Q	SG	TR Valve	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	unfiltered
52			R18, pg 34		Input 4	Input 3	R19, pg M9	R19, pg M9			Col D*M*I	Col D*M*J	Col E+ F
53		Time (hrs)	(sec/m3)	(min/gal)	gpm	gpm	cfm	cfm	gpm	gpm	gpm	gpm	gpm
54		0-2	1.06E-03	6.69E-08	4.84E+02	41.7	1210	16.2	9050.8	121.176	3.18E-01	4.26E-03	5.26E+02
55		2-8	1.06E-03	6.69E-08	3.69E+02	41.7	1210	16.2	9050.8	121.176	2.49E-01	3.33E-03	4.11E+02
56													
57													
58		Base Case Affected Loop	Node 2										
59		Transport of Steam to the TSC HVAC Intake											
60											Node 2 to 4	Node 2 to 4	Node 2 to 9
61					Steam Released		TSC Intake Flow		TSC Intake Flow		Effective	Effective	Total Steam
62											Flow	Flow	
63			Chi/Q	Chi/Q	SG	TR Valve	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	unfiltered
64			R18, pg 34		see footnote 1	Input 3	R19, pg M9	R19, pg M9			Col D*M*I	Col D*M*J	Col E+ F
65		Time (hrs)	(sec/m3)	(min/gal)	gpm	gpm	cfm	cfm	gpm	gpm	gpm	gpm	gpm
66		0-0.5	1.06E-03	6.69E-08	8.40E+02	13.9	1210	16.2	9050.8	121.176	5.17E-01	6.92E-03	8.54E+02
67		.5-8	1.06E-03	6.69E-08	1.47E-01	13.9	1210	16.2	9050.8	121.176	8.48E-03	1.13E-04	1.40E+01
68		footnote 1 - values taken from calc section entitlted "Steam Releases"											
69													
70		Base Case + 10 gpm Affected Loop Node 2											
71		Transport of Steam to the TSC HVAC Intake											
72											Node 2 to 4	Node 2 to 4	Node 2 to 9
73					Steam Released		TSC Intake Flow		TSC Intake Flow		Effective	Effective	Total Steam
74					see footnote 1						Flow	Flow	
75			Chi/Q	Chi/Q	SG	TR Valve	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	unfiltered
76			R18, pg 34			Input 3	P19, pg M9	R19, pg M9			Col D*M*I	Col D*M*J	Col E+ F
77		Time (hrs)	(sec/m3)	(min/gal)	gpm	gpm	cfm	cfm	gpm	gpm	gpm	gpm	gpm
78		0-.5	1.06E-03	6.69E-08	8.50E+02	13.9	1210	16.2	9050.8	121.176	5.23E-01	7.00E-03	8.64E+02
79		.5-8	1.06E-03	6.69E-08	1.01E+01	13.9	1210	16.2	9050.8	121.176	1.45E-02	1.95E-04	2.40E+01

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	A	B	C	D	E	F	G	H	I	J	K	L	M
80													
81		Base Case											
82		Unfiltered Flow 0-.5 hrs.											
83													
84		To/ From	1	2	3	4	5	6	7	8			
85		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
86		2	1.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
87		3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
88		4	0.00E+00	6.92E-03	4.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
89		5	0.00E+00	0.00E+00	0.00E+00	9.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
90		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
91		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
92		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
93		9	0.00E+00	8.54E+02	5.26E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
94													
95													
96		Base Case											
97		Filtered Flow 0-.5 hours											
98													
99		To/ From	1	2	3	4	5	6	7	8			
100		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
101		2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
102		3	2.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
103		4	0.00E+00	5.17E-01	3.18E-01	3.55E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
104		5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
105		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
106		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
107		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
108		9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
109													
110													
111													
112													

	A	B	C	D	E	F	G	H	I	J	K	L	M
113													
114		Base Case			Flow Rates Between Nodes								
115		Unfiltered Flow 0.5 - 2 hrs.											
116													
117		To/ From	1	2	3	4	5	6	7	8			
118		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
119		2	1.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
120		3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
121		4	0.00E+00	1.13E-04	4.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
122		5	0.00E+00	0.00E+00	0.00E+00	9.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
123		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
124		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
125		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
126		9	0.00E+00	1.40E+01	5.26E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
127													
128													
129		Base Case											
130		Filtered Flow 0.5-2 hrs.											
131													
132		To/ From	1	2	3	4	5	6	7	8			
133		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
134		2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
135		3	2.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
136		4	0.00E+00	8.48E-03	3.18E-01	3.55E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
137		5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
138		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
139		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
140		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
141		9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
142													
143													
144													
145													

	A	B	C	D	E	F	G	H	I	J	K	L	M
146													
147													
148					Flow Rates Between Nodes								
149		Base Case											
150		Unfiltered Flow 2-8 hrs.											
151													
152		To/ From	1	2	3	4	5	6	7	8			
153		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
154		2	1.47E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
155		3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
156		4	0.00E+00	1.13E-04	3.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
157		5	0.00E+00	0.00E+00	0.00E+00	9.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
158		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
159		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
160		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
161		9	0.00E+00	1.40E+01	4.11E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
162													
163													
164		Base Case											
165		Filtered Flow 2-8 hours											
166													
167		To/ From	1	2	3	4	5	6	7	8			
168		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
169		2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
170		3	2.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
171		4	0.00E+00	8.48E-03	2.49E-01	3.55E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
172		5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
173		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
174		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
175		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
176		9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
177													
178													
179													

1

1

1

	A	B	C	D	E	F	G	H	I	J	K	L	M
180		Base Case + 10 gpm											
181		Unfiltered Flow 0-.5 hrs.											
182													
183		To/ From	1	2	3	4	5	6	7	8			
184		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
185		2	1.01E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
186		3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
187		4	0.00E+00	7.00E-03	4.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
188		5	0.00E+00	0.00E+00	0.00E+00	9.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
189		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
190		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
191		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
192		9	0.00E+00	8.64E+02	5.26E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
193													
194													
195		Base Case + 10 gpm											
196		Filtered Flow 0-.5 hours											
197													
198		To/ From	1	2	3	4	5	6	7	8			
199		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
200		2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
201		3	2.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
202		4	0.00E+00	5.23E-01	3.18E-01	3.55E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
203		5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
204		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
205		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
206		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
207		9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
208													
209													
210													

	A	B	C	D	E	F	G	H	I	J	K	L	M
211													
212													
213		Base Case + 10 gpm			Flow Rates Between Nodes								
214		Unfiltered Flow 0.5 - 2 hrs.											
215													
216		To/ From	1	2	3	4	5	6	7	8			
217		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
218		2	1.01E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
219		3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
220		4	0.00E+00	1.95E-04	4.26E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
221		5	0.00E+00	0.00E+00	0.00E+00	9.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
222		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
223		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
224		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
225		9	0.00E+00	2.40E+01	5.26E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
226													
227													
228		Base Case + 10 gpm											
229		Filtered Flow 0.5-2 hrs.											
230													
231		To/ From	1	2	3	4	5	6	7	8			
232		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
233		2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
234		3	2.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
235		4	0.00E+00	1.45E-02	3.18E-01	3.55E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
236		5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
237		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
238		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
239		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
240		9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
241													
242													
243													
244													

1

1

1

1

	A	B	C	D	E	F	G	H	I	J	K	L	M
245													
246													
247					Flow Rates Between Nodes								
248		Base Case + 10 gpm											
249		Unfiltered Flow 2-8 hrs.											
250													
251		To/ From	1	2	3	4	5	6	7	8			
252		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E-00	0.00E+00	0.00E+00			
253		2	1.01E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
254		3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
255		4	0.00E+00	1.95E-04	3.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
256		5	0.00E+00	0.00E+00	0.00E+00	9.17E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
257		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
258		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
259		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
260		9	0.00E+00	2.40E+01	4.11E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
261													
262													
263		Base Case + 10 gpm											
264		Filtered Flow 2-8 hours											
265													
266		To/ From	1	2	3	4	5	6	7	8			
267		1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
268		2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
269		3	2.73E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
270		4	0.00E+00	1.45E-02	2.49E-01	3.55E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
271		5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
272		6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E-00	0.00E+00	0.00E+00	0.00E+00			
273		7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
274		8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
275		9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
276													

The Table below was developed to describe the TRACI models developed for this calculation. ~~As previously discussed three source terms are analyses, 2 HVAC configurations, and two primary to secondary flow models (The base case and the base case + 10 gpm). In addition~~ In the table the flow models are separated into iodines and noble gases. This was done due to the limitations of the TRACI code. The code specifies the sources terms in each node based upon a single node dependent multiplier. Since the relative fractions of isotopes in each node is not a single value for these models, the isotopes are split up into iodines and noble gases. The values below in the table give the designations for each Cases and the appendix for the case input and output.

Case designator and Appendix number for the TRACI input and output

			Scenario:	C 5% Failed Fuel, No Iodine Spike	C 5% Failed Fuel, No Iodine Spike
			CR HVAC Configuration:	1A	7
DOSE CONTRIBUTION	**Base Case** Secondary side equilibrium + .42 gpm primary to secondary leakage	Iodines		C1 K	
		Noble Gases			C4 N
	Base Case + 10 gpm Secondary side equilibrium (due to .42 gpm leakage) + 10.42 gpm primary to secondary leakage	Iodines		C2 L	
		Noble Gases			C6 P

The TRACI models described in the above table are given in the Appendices. Cases ~~A1~~ C1 and ~~A2~~ C2 are representative of all the cases run with the exception of the source terms. ~~and CR HVAC configurations.~~ The references for the input for cases ~~A1~~ C1 and ~~A2~~ C2 are given in appendices K and L, respectively. ~~The different source terms and CR HVAC configurations are given for other cases in the sections calculation section on pages 25 and 29.~~ The source terms for Cases C4 and C6 are given on page 25.

The following pages present the results of the TRACI models, calculate the limiting primary to secondary flow rate to obtain 90% of the acceptance criteria doses, and use this value to calculate the resulting doses for the TSC, CR and offsite locations Below is a description of each spreadsheet and how it was generated.

TRACI results

The TRACI results for each case are taken directly from the appendices.

Offsite, TSC and Control Room Doses - Base Case

This spreadsheet determines the maximum thyroid , whole body and beta skin doses for the ~~three~~ two scenarios. These doses are based upon a secondary side equilibrium activity from ~~+~~ 0.42 gpm primary to secondary flow. In addition there is an active primary to secondary flow of ~~+~~ 0.42 gpm. These dose values are denoted as D_{base} in Equations 1 and 2.

Offsite, TSC and Control Room Doses - Base Case + 10 gpm

This spreadsheet determines the maximum thyroid, whole body and beta skin doses for the ~~three~~ two scenarios. These doses are based upon a secondary side equilibrium activity from ~~+~~ 10.42 gpm primary to secondary flow. In addition there is an active primary to secondary flow of ~~10.1~~ 10.42 gpm. These dose values are denoted as $D_{base+10\ gpm}$ in Equations 1 and 2.

Maximum Post- MSLB SG Tube Leakage

This spreadsheet utilizes the NRC "limits" (denoted as D_{limit} in equation 1) and Equation 1 to determine the maximum post MSLB SG Tube leakage. The minimum value of ~~5.128~~ 5.02 gpm is considered to be the maximum allowable tube leakage.

Offsite, TSC and Control Room Doses - Base Case + max. post MSLB Leakage

This spreadsheet uses the maximum allowable tube leakage and Equation 2 to calculate the thyroid, whole body and beta doses. The results presented in this spreadsheet are also given in the calculational cover sheet.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
15														
16				TRACI Results										
17														
18														
19	Case			EAB			LPZ			Control Room			TSC	
20		Limiting	Thyroid	Whole Body	Beta-skin	Thyroid	Whole Body	Beta-skin	Thyroid	Whole Body	Beta-skin	Thyroid	Whole Body	Beta-skin
21	C1	Iodines	.3612E+01	.1254E-01	.3454E-02	.2476E+01	.5714E-02	.1716E-02	.4247E+00	.4461E-04	.2443E-03	.5874E+00	.3590E-04	.3494E-03
22	C2	Iodines	.2616E+03	.8935E+00	.2472E+00	.2128E+03	.4579E+00	.1400E+00	.3838E+02	.3830E-02	.2129E-01	.5319E+02	.3077E-02	.3044E-01
23	C4	Noble Gases	.0000E+00	.1117E-01	.6189E-02	.0000E+00	.8084E-02	.4586E-02	.0000E+00	.1859E-01	.1906E+00	.0000E+00	.1160E-01	.2076E+00
24	C6	Noble Gases	.0000E+00	.2147E+00	.1251E+00	.0000E+00	.9612E-01	.5578E-01	.0000E+00	.1640E+00	.1645E+01	.0000E+00	.1041E+00	.1836E+01
25														

	R	S	T	U	V	W	X
36	Offsite, TSC and Control Room Doses - Base Case						
37	Equillibrium Secondary Side Activity (due to .147 gpm leak) + .147 gpm prim. to sec. leak						
38							
39							
40	Position	Thyroid		Whole Body		Beta Skin	
41		Dose	Case	Dose	Case	Dose	Case
42							
43							
44	EAB	3.612E+00	C1	2.371E-02	C1+C4	9.643E-03	C1+C4
45	LPZ	2.476E+00	C1	1.380E-02	C1+C4	6.302E-03	C1+C4
46	Control Room	4.247E-01	C1	1.863E-02	C1+C4	1.908E-01	C1+C4
47	TSC	5.874E-01	C1	1.164E-02	C1+C4	2.079E-01	C1+C4
48		*Including iodine contribution from limiting thyroid case					

	R	S	T	U	V	W	X
15							
16	Offsite, TSC and Control Room Doses - Base Case + 10 gpm						
17	Equillibrium Secondary Side Activity (due to .147 gpm leak) + 10.147 gpm prim. to sec. leak						
18							
19	Position	Thyroid		Whole Body		Beta Skir.	
20		Dose	Case	Dose	Case	Dose	Case
21	EAB	2.616E+02	C2	1.108E+00	C2+C6	3.723E-01	C2+C6
22	LPZ	2.128E+02	C2	5.540E-01	C2+C6	1.958E-01	C2+C6
23	Control Room	3.838E+01	C2	1.678E-01	C2+C6	1.666E+00	C2+C6
24	TSC	5.319E+01	C2	1.072E-01	C2+C6	1.866E+00	C2+C6
25		*Including iodine contribution from limiting thyroid case					

	Y	Z	AA	AB	AC	AD	AE
4		Maximum Post-MSLB SG Tube Leakage					
5							
6				EAB			
7	Position	Thyroid		Whole Body		Beta Skin	
8		Limit	GPM	Limit	GPM	Limit	GPM
9	EAB	3.000E+02	1.033E+01	2.500E+01	2.073E+02	2.500E+01	6.202E+02
10	LPZ	3.000E+02	1.272E+01	2.500E+01	4.163E+02	2.500E+01	1.187E+03
11	Control Room	3.000E+01	7.002E+00	5.000E+00	3.004E+02	3.000E+01	1.817E+02
12	TSC	3.000E+01	5.021E+00	5.000E+00	4.697E+02	3.000E+01	1.616E+02
13							
14		*Including iodine contribution from limiting thyroid case					

	R	S	T	U	V	W
3	Offsite, TSC and Control Room Doses - Base Case + max. post MSLB Leakage					
4	Maximum Leak =	5.021E+00	gpm primary to sec. leakage			
5						
6						
7	Position	Thyroid		Whole Body		Beta Skin
8		Dose		Dose		Dose
9	EAB	1.33E+02		5.68E-01		1.92E-01
10	LPZ	1.08E+02		2.85E-01		1.01E-01
11	Control Room	1.95E+01		9.35E-02		9.31E-01
12	TSC	2.70E+01		5.96E-02		1.04E+00
13						
14		*Including iodine contribution from limiting thyroid case				

VIII Future Margin

This analysis contains ~~a couple of~~ some key conservatisms which might be used in the future if a larger primary to secondary leakage. The first conservatism is with the flow assumed out the target rock valve. The flow from 0-15 seconds is assumed to remain constant for the 8 hours of the accident. A more realistic approach would be to take credit for the gradual decrease in flow out these valves. Reference 11 contains more realistic flow rates.

The second conservatism is the analysis which assumes 5% failed fuel. This conservatism is the result of a commitment to the NRC which is documented in the SER (Reference 16). Since plant and fuel is designed for no fuel failures as a result of a MSLB, this conservatism could potentially be removed. This change would be more difficult since it would require review by the NRC staff. This was not considered for the TS 182, since the NRC requested that this TS submittal have minimal deviation from the Byron/Braidwood submittal from which is was modelled after.

Additionally, References 20 and 21 might be utilized to gain further insight which could be applied to gaining additional dose and primary to secondary break flow margin.

~~Also please note that in the future Cases A3, A5, B3, B5, C3, and C5 do not need to be rerun. These cases are bounded by Cases A1, A2, B1, B2, C1, and C2. This is justified based upon the TRACI results.~~

Another conservatism (that overestimates the control room doses) is in the control room HVAC model utilized. It was determined after the completion of Revision 1 of this calculation that a double failure was considered in the determination of the control room doses. Configuration 1A considers failure of a control room HVAC train and failure of a HVAC heater in one of the two remaining trains. The dose analysis should determine the limiting doses from a single failure. If the heater fails an operator action to shut off the train with the failed heater could be assumed to occur at 30 minutes. A sensitivity analysis to determine which of these failures yield the most limiting doses will need to be done. The double failure now assumed is more limiting than either of these single failure cases. Changing this assumption to a single failure assumption will not change the maximum break flow. This flow is limited by the TSC doses and is independent of the control room model.

Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A K-1a

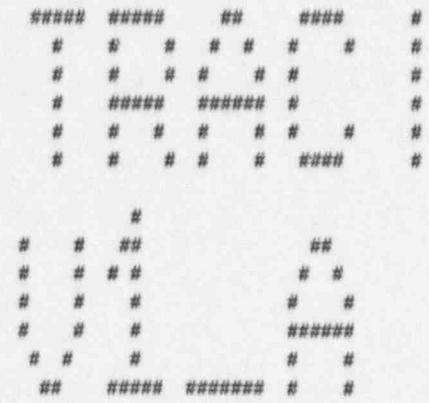
Preparer: wmb Reviewer:

```
**********************************************************************
*           INSTALLATION OPERATING ENVIRONMENT                       *
* Wed Sep 13 07:54:03 CDT 1995                                       *
*                                                                    *
* AIX nfad 2 3 000510106700                                          *
* XLFCMP.OBJ fortran compiler version 02.03.0000.0000                *
* XLFRTE.OBJ fortran runtime environment version 02.03.0000.0000     *
*                                                                    *
**********************************************************************
```

```
**********************************************************************
*           CURRENT OPERATING ENVIRONMENT                            *
* Tue Mar 26 16:50:51 CST 1996                                       *
*                                                                    *
* AIX nfad 2 3 000510106700                                          *
* XLFCMP.OBJ fortran compiler version 02.03.0000.0000                *
* XLFRTE.OBJ fortran runtime environment version 02.03.0000.0000     *
*                                                                    *
**********************************************************************
```

** RTE Verified **

Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A K-1b
Preparer: wmb Reviewer:



****
Dose Conversion Factors "dcf_input.f" were taken from the QA area
****

Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A K-1c
Preparer: wmb Reviewer:

```
#   #   #  #####   #   #   #####
#   ##  #  #    #  #   #     #
#   # # #  #    #  #   #     #
#   #  ##  #####   #   #     #
#   #   #  #       #   #     #
#   #   #  #        ###      #
```

```
$ngeneral
preparer = 'wmb',
inode8 = 2,
ioffsite =1,
calc_title = 'Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A',
page_prefix = 'K',
print_dcf = 1,
print_instantaneous_activity = 0,
print_instantaneous_dose_rate = 0,
print_instantaneous_dose =0,
print_cumulative_dose = 0,
print_summary_dose =1,
print_laserjet = 1,
idebug = 0,
sub_time_step =10.0000,
$end
$nsource_term
num_isotope= 15,
iactivity_unit=0,
num_sources=1,
fract_activity_node= 1.0, 6.06E-7, 1.12E-6, 5*0.0,  Pg 25
fract_release   = .91, 4.0E-2, 5.0E-02, 8*1.0,  2.p.18
$end
$nsource1
activity1_name='rcs  ',
activity1= 3*5.5e+5, 3*8.00e+5, 3*1.15E+6, 3*1.25e+6, 3*1.05e+6,  pg 25
activity1_unit= 'Ci         ',
activity1_mult=1.0     ,
activity1_mult_unit='         ',
activity1_mult_name='        ',
$end
$nnodes
num_nodes=5,
node_volume_unit = 3,
flow_unit = 3,
ispray_cutoff = 0,
spray_df = 11*0.0,
node_name = '  RCS     ','AFF. SG   ','UNAFF SG  ',
            '  TSC     ','DUMMY ENV ','node 66666',
            'node 77777','control rm','epz       ','ipz       ',
node_volume = 6.88e+4,1.66e+4, 4.97e+4, 3.60e+5, 1e+6, 2*0.0, 2.050e+6,  Input 2, 5 16
geometry_factor = 3*1.0,0.0,3*1.0, 0.0,
$end
$ntime_steps
num_tsteps = 6,
tstep_unit = 1,
ieq_tstep = 0,
sdtime =  0.0,
first_tstep = 00.0 ,
last_tstep = 720.,
tstep = 0,  .5, 2, 8, 24, 96,
$end
$nchi_over_q_cr
```

Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A K-1d
Preparer: wmb Reviewer:

```
chi_over_q_control_room = 3*1.06e-3, 38*0.0,      Input 10
$end
$nchi_over_q_offsite
chi_over_q_epz = 2*1.30e-4, 38*0.0,      Input 7
chi_over_q_lpz = 2*3.80e-5, 1.6e-5, 1.1e-5, 4.3e-6, 1.2e-6, 34*0.0,      Input 7
$end
$nread
 itime_step = 1, iunfilt = 1, ifilt =1, ifilt_remove = 1,1,1,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow    =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.470e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 6.920e-3, 4.260e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,      pg 32
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 8.540e+2, 5.260e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow    =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 5.170e-1, 3.180e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,      pg 32
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove1
 filt_remove1=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,      pg 26 ...
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,      Input 5
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove2
 filt_remove2=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,      pg ...
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,      Input 5
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove3
```

```
 filt_remove3=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$noccupbr
 occupancy = 10*1.0,
 br = 10*3.47e-4,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 2, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 0, ioccupancy =0, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.470e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.130e-4, 4.260e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.400e+1, 5.260e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 8.480e-3, 3.180e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 3, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 0, ioccupancy =0, icontrol = 1,
$end
$nunfilt_flow
```

```
Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A   K-1f
Preparer: wmb                     Reviewer:

unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.470e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.130e-4, 3.330e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.400e+1, 4.110e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
```

pg 34

```
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 8.480e-3, 2.490e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
```

pg 34

```
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
```

pg 34 ✓

```
$nread
 itime_step = 4, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
```

pg 34 *

```
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e-0, 0.000e+0, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
```

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* only [illegible]

```
$noccupbr
 occupancy = 10*1.0,
 br = 8*3.47e-4, 2*1.75e-4,
```

Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A K-1g
Preparer: wmb Reviewer:

```
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 5, iunfilt = 0, ifilt =0, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$noccupbr
 occupancy = 8*0.6, 2*1.0,
 br = 8*3.47e-4, 2*2.32e-4,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 6, iunfilt = 0, ifilt =0, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$noccupbr
 occupancy = 8*0.4, 2*1.0,
 br = 8*3.47e-4, 2*2.32e-4,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
```

Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A K-1h
Preparer: wmb Reviewer:

Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A K-1i
Preparer: wmb Reviewer:

**********TRACI VER. 1.0**********
Transient Radiological Assessment Code for
Isotopes
SOUTH TEXAS ELECTRIC GENERATING STATION
SEPTEMBER 24, 1992
CREATED BY WM. MARK BLUMBERG
RELOAD ENGINEERING SECTION
****

GENERAL DATA

preparer	wmb	preparer initials
inode8	2	use node 8 0=no/ 1 =yes, treat as a region, 2=yes, model as control room
ioffsite	1	calculate offsite dose 0=no/1=yes

OUTPUT OPTIONS PRINT FLAGS 0 = NO / 1 = YES

print_dcf	1	print dose conversion factors
print_instantaneous_activity	0	print inst. activity for each time step as a function of isotope and node
print_instantaneous_dose_rate	0	print inst. dose rate for each time step as a function of isotope and node
print_instantaneous_dose	0	print accumulated dose for each time step as a function of isotope and node
print_cumulative_dose	0	print cumulative dose up to the ending time of each time step as a function of isotope and node
print_summary_dose	1	print summary of cumulative dose for all time steps as a function of whole body, skin & thyroid doses
idebug	0	print namelist variables as read in
print_laserjet	1	print laserjet compressed print
sub_time_step	.100E+02	time interval of sub_time_steps (in sec) note: if = 0.0, default time steps are used

SOURCE TERM

num_isotope	15		number of isotopes (default 27, max 50)
iactivity_unit	0 : Ci		units of act. of source term 0=Ci /
			1= Ci/ml / 2 = Bq / 3 = Bq/m3
num_sources	1		number of sources at shutdown
fract_activity_node	.10E+01	.61E-06	fract. of total activity in each node
	.11E-05	.00E+00	
	.00E+00	.00E+00	
	.00E+00	.00E+00	
fract_release	.91E+00	.40E-01	fract. released from each isotope group
	.50E-01	.10E+01	
	.10E+01	.10E+01	
	.10E+01	.10E+01	
	.10E+01	.10E+01	
	.10E+01		

Note: the echo of fract_activity_node gives 8 values. Only "num_nodes" values will be used.

SOURCE #1

activity1_name	rcs	name of source and reference #
activity1	see note below	activity of source term at shutdown
activity1_unit	Ci	units of activity of source
activity1_mult	1.000	value multiplied by activity1 to get units of iactivity_unit
activity1_mult_unit		units of activity1_mult

note: values for activity1, activity2, & activity3 are given in table entitled: "calculation of initial activities"

NODES

num_nodes	5		number of nodes (max 7). Note: nodes 8,9 & 10 are reserved for cr, epz and lpz
node_volume_unit	3		unit of node vol. 1= m3/ 2=ft3 /3=gallons
flow_unit	3		unit of flow 1=cu. m/sec, 2=cfm/ 3=gpm
ispray_cutoff	0		auto. spray cutoff option 0=no/ 1=yes
spray_df	.0	.0	spray decon. factor (for each isotope grp)
	.0	.0	
	.0	.0	
	.0	.0	
	.0	.0	
	.0		

NODE VOLUMES (gal) AND GEOMETRY FACTORS (dimensionless)

NODE	1	2	3	4	5
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV
VOLUME	.6880E+05	.1660E+05	.4970E+05	.3600E+06	.1000E+07
GF*	.1000E+01	.1000E+01	.1000E+01	.3067E+02	.1000E+01

NODE	6	7	8	9	10
NODE NAME	node 66666	node 77777	control rm	epz	lpz
VOLUME	.0000E+00	.0000E+00	.2050E+07		
GF*	.1000E+01	.1000E+01	.1703E+02		

Notes: Format for echo of spray_df is f7.1, ie.
values of spray_dcf >99,999.9 will not echo properly.

* If "geometry_factor" is entered as zero or not entered a
geometry factor is calculated, otherwise the value entered is used.

TIME STEPS

num_tsteps	6	number of time steps
tstep_unit	1:hours	units of time steps 0=sec/ 1=hr. / 2=days
ieq_tstep	0	equal time step 0 = no, input times in variable "tstep"/ 1 = yes
sdtime	.0000E+00	time between shutdown and beginning of first time step
first_tstep	.0000E+00	time of beginning of first time step (units of tstep_unit)
last_tstep	.7200E+03	time of end of last time_step (units of tstep_unit)
tstep	see table below	beginning time of 6 time steps (required only if ieq_tstep=0 ie. unequal time steps are used)

TIME STEP NUMBER	BEGINNING TIME (hours)	TIME STEP NUMBER	BEGINNING TIME (hours)
1	.0000E+00	4	.8000E+01
2	.5000E+00	5	.2400E+02
3	.2000E+01	6	.9600E+02

CHI/Q (sec/cubic meter)

TIME STEP (hours)	NODE 8 CONTROL RM	NODE 9 EPZ	NODE 10 LPZ
.0000E+00 to .5000E+00	.1060E-02	.1300E-03	.3800E-04
.5000E+00 to .2000E+01	.1060E-02	.1300E-03	.3800E-04
.2000E+01 to .8000E+01	.1060E-02	.0000E+00	.1600E-04
.8000E+01 to .2400E+02	.0000E+00	.0000E+00	.1100E-04
.2400E+02 to .9600E+02	.0000E+00	.0000E+00	.4300E-05
.9600E+02 to .7200E+03	.0000E+00	.0000E+00	.1200E-05

DOSE CONVERSION FACTORS AND DECAY CONSTANTS

ISOTOPE	GROUP	DECAY CONSTANT (1/sec)	DOSE CONVERSION FACTORS THYROID (rem/Ci)	BETA SKIN (rem * cu. meter)/(Ci * sec)	WHOLE BODY (rem * cu. meter)/(Ci * sec)
I---131	1	.998E-06	.149E+07	.317E-01	.872E-01
I-- 131	2	.998E-06	.149E+07	.317E-01	.872E-01
I---131	3	.998E-06	.149E+07	.317E-01	.872E-01
I---132	1	.843E-04	.143E+05	.132E+00	.513E+00
I---132	2	.843E-04	.143E+05	.132E+00	.513E+00
I---132	3	.843E-04	.143E+05	.132E+00	.513E+00
I---133	1	.921E-05	.269E+06	.735E-01	.155E+00
I---133	2	.921E-05	.269E+06	.735E-01	.155E+00
I---133	3	.921E-05	.269E+06	.735E-01	.155E+00
I---134	1	.220E-03	.373E+04	.923E-01	.532E+00
I---134	2	.220E-03	.373E+04	.923E-01	.532E+00
I---134	3	.220E-03	.373E+04	.923E-01	.532E+00
I---135	1	.291E-04	.560E+05	.129E+00	.421E+00
I---135	2	.291E-04	.560E+05	.129E+00	.421E+00
I---135	3	.291E-04	.560E+05	.129E+00	.421E+00

CALCULATION OF INITIAL ACTIVITIES - BEFORE SHUTDOWN

SOURCE NAME			COL. 1 rcs	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7 TOTAL ACTIVITY
UNITS			Ci						Ci
NUMBER	ISOTOPE	GROUP							
1	I---131	1	.5500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.5500E+06
2	I-- 131	2	.5500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.5500E+06
3	I---131	3	.5500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.5500E+06
4	I---132	1	.8000E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.8000E+06
5	I---132	2	.8000E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.8000E+06
6	I---132	3	.8000E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.8000E+06
7	I---133	1	.1150E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1150E+07
8	I---133	2	.1150E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1150E+07
9	I---133	3	.1150E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1150E+07
10	I---134	1	.1250E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1250E+07
11	I---134	2	.1250E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1250E+07
12	I---134	3	.1250E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1250E+07
13	I---135	1	.1050E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1050E+07
14	I---135	2	.1050E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1050E+07
15	I---135	3	.1050E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1050E+07

note: col. 7 = (col. 1*col. 2 + col. 3*col.4 + col. 5*col. 6)

NODAL DISTRIBUTION OF INITIAL ACTIVITIES - BEFORE SHUTDOWN (Ci)

NODES		1	2	3	4	5	8
NODE NAME		RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm
ISOTOPE	GROUP						
I---131	1	.550E+06	.333E+00	.616E+00	.000E+00	.000E+00	.000E+00
I-- 131	2	.550E+06	.333E+00	.616E+00	.000E+00	.000E+00	.000E+00
I---131	3	.550E+06	.333E+00	.616E+00	.000E+00	.000E+00	.000E+00
I---132	1	.800E+06	.485E+00	.896E+00	.000E+00	.000E+00	.000E+00
I---132	2	.800E+06	.485E+00	.896E+00	.000E+00	.000E+00	.000E+00
I---132	3	.800E+06	.485E+00	.896E+00	.000E+00	.000E+00	.000E+00
I---133	1	.115E+07	.697E+00	.129E+01	.000E+00	.000E+00	.000E+00
I---133	2	.115E+07	.697E+00	.129E+01	.000E+00	.000E+00	.000E+00
I---133	3	.115E+07	.697E+00	.129E+01	.000E+00	.000E+00	.000E+00
I---134	1	.125E+07	.757E+00	.140E+01	.000E+00	.000E+00	.000E+00
I---134	2	.125E+07	.757E+00	.140E+01	.000E+00	.000E+00	.000E+00
I---134	3	.125E+07	.757E+00	.140E+01	.000E+00	.000E+00	.000E+00
I---135	1	.105E+07	.636E+00	.118E+01	.000E+00	.000E+00	.000E+00
I---135	2	.105E+07	.636E+00	.118E+01	.000E+00	.000E+00	.000E+00
I---135	3	.105E+07	.636E+00	.118E+01	.000E+00	.000E+00	.000E+00

calc. title: Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A preparer: wmb

ACTIVITIES - AFTER .0000E+00 hours (Ci)

NODES		1	2	3	4	5	8
NODE NAME		RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm
ISOTOPE	GROUP						
I---131	1	.500E+06	.303E+00	.561E+00	.000E+00	.000E+00	.000E+00
I-- 131	2	.220E+05	.133E-01	.246E-01	.000E+00	.000E+00	.000E+00
I---131	3	.275E+05	.167E-01	.308E-01	.000E+00	.000E+00	.000E+00
I---132	1	.728E+06	.441E+00	.815E+00	.000E+00	.000E+00	.000E+00
I---132	2	.320E+05	.194E-01	.358E-01	.000E+00	.000E+00	.000E+00
I---132	3	.400E+05	.242E-01	.448E-01	.000E+00	.000E+00	.000E+00
I---133	1	.105E+07	.634E+00	.117E+01	.000E+00	.000E+00	.000E+00
I---133	2	.460E+05	.279E-01	.515E-01	.000E+00	.000E+00	.000E+00
I---133	3	.575E+05	.348E-01	.644E-01	.000E+00	.000E+00	.000E+00
I---134	1	.114E+07	.689E+00	.127E+01	.000E+00	.000E+00	.000E+00
I---134	2	.500E+05	.303E-01	.560E-01	.000E+00	.000E+00	.000E+00
I---134	3	.625E+05	.379E-01	.700E-01	.000E+00	.000E+00	.000E+00
I---135	1	.956E+06	.579E+00	.107E+01	.000E+00	.000E+00	.000E+00
I---135	2	.420E+05	.255E-01	.470E-01	.000E+00	.000E+00	.000E+00
I---135	3	.525E+05	.318E-01	.588E-01	.000E+00	.000E+00	.000E+00

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	1	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	1 1 1 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tste_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.147E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.692E-02	.000E+00	.000E+00	.854E+03
3	.000E+00	.000E+00	.000E+00	.426E-02	.000E+00	.000E+00	.526E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.517E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.318E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

FOR: ELEM. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FOR: ORG. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

FOR: PART. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03
OCCUPANCY	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	2	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	0	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	0	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

calc. title: Case C1-nc6061, rev. 1, MSLB Accident Iodines only, .42 gpm, HVAC 1A preparer: wmb

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.147E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.113E-03	.000E+00	.000E+00	.140E+02
3	.000E+00	.000E+00	.000E+00	.426E-02	.000E+00	.000E+00	.526E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.848E-02	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.318E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	3	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	0	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	0	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.147E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.113E-03	.000E+00	.000E+00	.140E+02
3	.000E+00	.000E+00	.000E+00	.333E-02	.000E+00	.000E+00	.411E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.848E-02	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.249E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	4	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.175E-03	.175E-03
OCCUPANCY	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

[illegible]	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 5 - .2400E+02 to .9600E+02 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	5	time step which corresponds to the time dependent data
iunfilt	0	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	0	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.232E-03	.232E-03
OCCUPANCY	.600E+00	.600E+00	.600E+00	.600E+00	.600E+00	.600E+00	.100E+01	.100E+01

TIME STEP NUMBER 5 - .2400E+02 to .9600E+02 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 6 - .9600E+02 to .7200E+03 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	6	time step which corresponds to the time dependent data
iunfilt	0	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	0	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.232E-03	.232E-03
OCCUPANCY	.400E+00	.400E+00	.400E+00	.400E+00	.400E+00	.400E+00	.100E+01	.100E+01

TIME STEP NUMBER 6 - .9600E+02 to .7200E+03 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

NODE NAME: RCS

SUMMARY OF CUMULATIVE DOSE FOR NODE 1 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.2871E+10	.1095E+08	.2946E+07
.5000E+00 to .2000E+01	.1131E+11	.3482E+08	.9902E+07
.2000E+01 to .8000E+01	.4308E+11	.8415E+08	.2661E+08
.8000E+01 to .2400E+02	.1173E+12	.1396E+09	.4802E+08
.2400E+02 to .9600E+02	.2653E+12	.1837E+09	.6591E+08
.9600E-02 to .7200E+03	.5418E+12	.2315E+09	.8340E+08

NODE NAME: AFF. SG

SUMMARY OF CUMULATIVE DOSE FOR NODE 2 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)		THYROID	WHOLE BODY	BETA
.0000E+00	to .5000E+00	.3899E+06	.1444E+04	.3915E+03
.5000E+00	to .2000E+01	.6009E+07	.1668E+05	.4884E+04
.2000E+01	to .8000E+01	.8982E+08	.1375E+06	.4651E+05
.8000E+01	to .2400E+02	.4061E+09	.3737E+06	.1377E+06
.2400E+02	to .9600E+02	.1036E+10	.5616E+06	.2139E+06
.9600E+02	to .7200E+03	.2214E+10	.7649E+06	.2884E+06

NODE NAME: UNAFF SG

SUMMARY OF CUMULATIVE DOSE FOR NODE 3 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.6826E+04	.2576E+02	.6951E+01
.5000E+00 to .2000E+01	.5464E+05	.1569E+03	.4550E+02
.2000E+01 to .8000E+01	.6229E+06	.9814E+03	.3292E+03
.8000E+01 to .2400E+02	.2697E+07	.2530E+04	.9269E+03
.2400E+02 to .9600E+02	.6828E+07	.3762E+04	.1427E+04
.9600E+02 to .7200E+03	.1455E+08	.5096E+04	.1915E+04

NODE NAME: TSC

SUMMARY OF CUMULATIVE DOSE FOR NODE 4 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.6509E-01	.7789E-05	.6492E-04
.5000E+00 to .2000E+01	.1354E+00	.1484E-04	.1265E-03
.2000E+01 to .8000E+01	.5723E+00	.3535E-04	.3433E-03
.8000E+01 to .2400E+02	.5874E+00	.3590E-04	.3494E-03
.2400E+02 to .9600E+02	.5874E+00	.3590E-04	.3494E-03
.9600E+02 to .7200E+03	.5874E+00	.3590E-04	.3494E-03

NODE NAME: DUMMY ENV

SUMMARY OF CUMULATIVE DOSE FOR NODE 5 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)		THYROID	WHOLE BODY	BETA
.0000E+00	to .5000E+00	.5156E-02	.1870E-04	.5099E-05
.5000E+00	to .2000E+01	.9771E-01	.2765E-03	.8054E-04
.2000E+01	to .8000E+01	.1084E+01	.1680E-02	.5654E-03
.8000E+01	to .2400E+02	.5585E+01	.5041E-02	.1863E-02
.2400E+02	to .9600E+02	.1455E+02	.7715E-02	.2948E-02
.9600E+02	to .7200E+03	.3132E+02	.1061E-01	.4008E-02

NODE NAME: control rm

SUMMARY OF CUMULATIVE DOSE FOR NODE 8 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.2439E-01	.5235E-05	.2426E-04
.5000E+00 to .2000E+01	.9182E-01	.1719E-04	.8254E-04
.2000E+01 to .8000E+01	.3928E+00	.4258E-04	.2317E-03
.8000E+01 to .2400E+02	.4247E+00	.4461E-04	.2443E-03
.2400E+02 to .9600E+02	.4247E+00	.4461E-04	.2443E-03
.9600E+02 to .7200E+03	.4247E+00	.4461E-04	.2443E-03

NODE NAME: epz

SUMMARY OF CUMULATIVE DOSE FOR NODE 9 (REM) AS A FUNCTION OF TIME

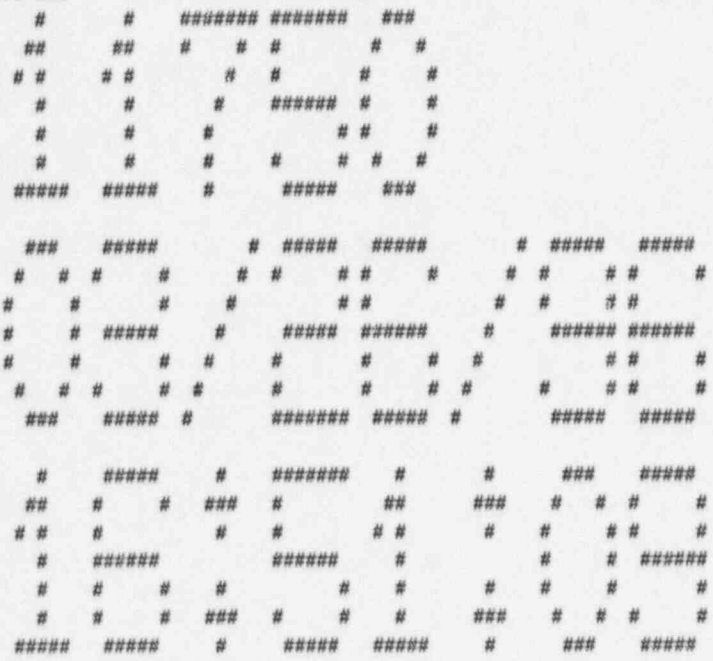
TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.2761E+01	.1022E-01	.2772E-02
.5000E+00 to .2000E+01	.3612E+01	.1254E-01	.3454E-02
.2000E+01 to .8000E+01	.3612E+01	.1254E-01	.3454E-02
.8000E+01 to .2400E+02	.3612E+01	.1254E-01	.3454E-02
.2400E+02 to .9600E+02	.3612E+01	.1254E-01	.3454E-02
.9600E+02 to .7200E+03	.3612E+01	.1254E-01	.3454E-02

NODE NAME: lpz

SUMMARY OF CUMULATIVE DOSE FOR NODE 10 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.8069E+00	.2988E-02	.8103E-03
.5000E+00 to .2000E+01	.1056E+01	.3665E-02	.1010E-02
.2000E+01 to .8000E+01	.2476E+01	.5714E-02	.1716E-02
.8000E+01 to .2400E+02	.2476E+01	.5714E-02	.1716E-02
.2400E+02 to .9600E+02	.2476E+01	.5714E-02	.1716E-02
.9600E+02 to .7200E+03	.2476E+01	.5714E-02	.1716E-02

Preparer: wmb Reviewer:



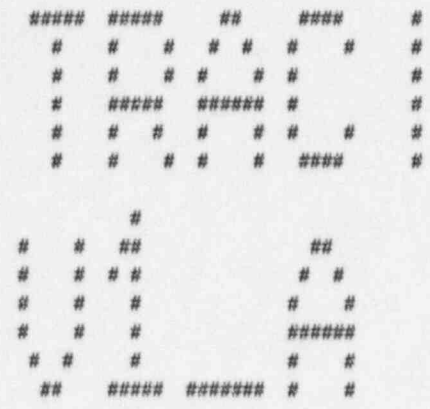
Input References
Are the Same As for
Case C1 except
As Noted

```
**********************************************************************
*           INSTALLATION OPERATING ENVIRONMENT                       *
* Wed Sep 13 07:54:03 CDT 1995                                       *
*                                                                    *
* AIX nfad 2 3 000510106700                                          *
* XLFCMP.OBJ fortran compiler version 02.03.0000.0000                *
* XLFRTE.OBJ fortran runtime environment version 02.03.0000.0000     *
*                                                                    *
**********************************************************************
```

```
**********************************************************************
*           CURRENT OPERATING ENVIRONMENT                            *
* Tue Mar 26 16:51:09 CST 1996                                       *
*                                                                    *
* AIX nfad 2 3 000510106700                                          *
* XLFCMP.OBJ fortran compiler version 02.03.0000.0000                *
* XLFRTE.OBJ fortran runtime environment version 02.03.0000.0000     *
*                                                                    *
**********************************************************************
```

** RTE Verified **

Preparer: wmb Reviewer:



****
Dose Conversion Factors "dcf_input.f" were taken from the QA area
****

```
 Case C2-nc6061, rev. 1, MSLB Accident Iodines only, 10.42 gpm, HVAC 1A   L-1c
Preparer: wmb                    Reviewer:

          #   #   #  #####   #   #   #####
          #   ##  #  #    #  #   #     #
          #   # # #  #    #  #   #     #
          #   #  # #  #####   #   #     #
          #   #   ##  #       #   #     #
          #   #    #  #        ####     #

$ngeneral
preparer = 'wmb',
inode8 = 2,
ioffsite =1,
calc_title = 'Case C2-nc6061, rev. 1, MSLB Accident Iodines only, 10.42 gpm, HVAC 1A',
page_prefix = 'L',
print_dcf = 1,
print_instantaneous_activity = 0,
print_instantaneous_dose_rate = 0,
print_instantaneous_dose =0,
print_cumulative_dose = 0,
print_summary_dose =1,
print_laserjet = 1,
idebug = 0,
sub_time_step =10.0000,
$end
$nsource_term
num_isotope= 15,
iactivity_unit=0,
num_sources=1,
fract_activity_node= 1.0, 6.06E-7, 1.12E-6,  5*0.0,
fract_release   =  .91, 4.0E-2, 5.0E-02, 8*1.0,
$end
$nsource1
activity1_name='rcs  ',
activity1= 3*5.5e+5, 3*8.00e+5, 3*1.15E+6, 3*1.25e+6, 3*1.05e+6,
activity1_unit= 'Ci         ',
activity1_mult=1.0     ,
activity1_mult_unit='         ',
activity1_mult_name='        ',
$end
$nnodes
num_nodes=5,
node_volume_unit = 3,
flow_unit = 3,
ispray_cutoff = 0,
spray_df = 11*0.0,
node_name = '  RCS     ','AFF. SG   ','UNAFF SG  ',
            '  TSC     ','DUMMY ENV ','node 66666',
            'node 77777','control rm','epz       ','lpz       ',
node_volume = 6.88e+4,1.66e+4, 4.97e+4, 3.60e+5, 1e+6, 2*0.0, 2.050e+6,
geometry_factor = 3*1.0,0.0,3*1.0, 0.0,
$end
$ntime_steps
num_tsteps = 6,
tstep_unit = 1,
ieq_tstep = 0,
sdtime =  0.0,
first_tstep = 00.0 ,
last_tstep = 720.,
tstep = 0,  .5, 2, 8, 24, 96,
$end
$nchi_over_q_cr
```

```
chi_over_q_control_room = 3*1.06e-3, 38*0.0,
$end
$nchi_over_q_offsite
chi_over_q_epz = 2*1.30e-4, 38*0.0,
chi_over_q_lpz = 2*3.80e-5, 1.6e-5, 1.1e-5, 4.3e-6, 1.2e-6, 34*0.0,
$end
$nread
 itime_step = 1, iunfilt = 1, ifilt =1, ifilt_remove = 1,1,1,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.010e+1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 7.000e-3, 4.260e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 8.640e+2, 5.260e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 5.230e-1, 3.180e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
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0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove1
 filt_remove1=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
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0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove2
 filt_remove2=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
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0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove3
```

```
 filt_remove3=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$noccupbr
 occupancy = 10*1.0,
 br = 10*3.47e-4,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 2, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 0, ioccupancy =0, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.010e+1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.950e-4, 4.260e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
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0.000e+0, 2.400e+1, 5.260e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.450e-2, 3.180e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 3, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 0, ioccupancy =0, icontrol = 1,
$end
$nunfilt_flow
```

Pg 36

Pg 36

Case C2-nc6061, rev. 1, MSLB Accident iodines only, 10.42 gpm, HVAC 1A L-1f
Preparer: wmb Reviewer:

```
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.010e+1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.950e-4, 3.330e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,     pg 37
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 2.400e+1, 4.110e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.450e-2, 2.490e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,     pg 37
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 4, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e-0, 0.000e+0, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$noccupbr
 occupancy = 10*1.0,
 br = 8*3.47e-4, 2*1.75e-4,
```

```
 Case C2-nc6061, rev. 1, MSLB Accident Iodines only, 10.42 gpm, HVAC 1A   L-1g
Preparer: mb                    Reviewer:


$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 5, iunfilt = 0, ifilt =0, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$noccupbr
 occupancy = 8*0.6, 2*1.0,
 br = 8*3.47e-4, 2*2.32e-4,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
$nread
 itime_step = 6, iunfilt = 0, ifilt =0, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$noccupbr
 occupancy = 8*0.4, 2*1.0,
 br = 8*3.47e-4, 2*2.32e-4,
$end
$ncontrol
 filt_cr = 16456.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9886, 0.9432, 0.99, 8*0.0,
 filt_recirc_cr = 0.9500, 0.9500, 0.99, 8*0.0,
 exhaust_cr =  16530.8, recirc_cr= 71060.0,
$end
```

Case C2-nc6061, rev. 1, MSLB Accident Iodines only, 10.42 gpm, HVAC 1A L-1h
Preparer: wmb Reviewer:

Case C2-nc6061, rev. 1, MSLB Accident Iodines only, 10.42 gpm, HVAC 1A L-1i
Preparer: wmb Reviewer:

**********TRACI VER. 1.0**********
Transient Radiological Assessment Code for
Isotopes
SOUTH TEXAS ELECTRIC GENERATING STATION
SEPTEMBER 24, 1992
CREATED BY WM. MARK BLUMBERG
RELOAD ENGINEERING SECTION
****

GENERAL DATA

preparer	wmb	preparer initials
inode8	2	use node 8 0=no/ 1 =yes, treat as a region, 2=yes, model as control room
ioffsite	1	calculate offsite dose 0=no/1=yes

OUTPUT OPTIONS PRINT FLAGS 0 = NO / 1 = YES

print_dcf	1	print dose conversion factors
print_instantaneous_activity	0	print inst. activity for each time step as a function of isotope and node
print_instantaneous_dose_rate	0	print inst. dose rate for each time step as a function of isotope and node
print_instantaneous_dose	0	print accumulated dose for each time step as a function of isotope and node
print_cumulative_dose	0	print cumulative dose up to the ending time of each time step as a function of isotope and node
print_summary_dose	1	print summary of cumulative dose for all time steps as a function of whole body, skin & thyroid doses
idebug	0	print namelist variables as read in
print_laserjet	1	print laserjet compressed print
sub_time_step	.100E+02	time interval of sub_time_steps (in sec) note: if = 0.0, default time steps are used

SOURCE TERM

num_isotope	15		number of isotopes (default 27, max 50)
iactivity_unit	0 : Ci		units of act. of source term 0=Ci /
			1= Ci/ml / 2 = Bq / 3 = Bq/m3
num_sources	1		number of sources at shutdown
fract_activity_node	.10E+01	.61E-06	fract. of total activity in each node
	.11E-05	.00E+00	
	.00E+00	.00E+00	
	.00E+00	.00E+00	
fract_release	.91E+00	.40E-01	fract. released from each isotope group
	.50E-01	.10E+01	
	.10E+01	.10E+01	
	.10E+01	.10E+01	
	.10E+01	.10E+01	
	.10E+01		

Note: the echo of fract_activity_node gives 8 values. Only "num_nodes" values will be used.

SOURCE #1

activity1_name	rcs	name of source and reference #
activity1	see note below	activity of source term at shutdown
activity1_unit	Ci	units of activity of source
activity1_mult	1.000	value multiplied by activity1 to get units of iactivity_unit
activity1_mult_unit		units of activity1_mult

note: values for activity1, activity2, & activity3 are given in table entitled: "calculation of initial activities"

NODES

num_nodes	5		number of nodes (max 7). Note: nodes 8,9 & 10 re reserved for cr, epz and lpz
node_volume_unit	3		unit of node vol. 1= m3/ 2=ft3 /3=gallons
flow_unit	3		unit of flow 1=cu. m/sec, 2=cfm/ 3=gpm
ispray_cutoff	0		auto. spray cutoff option 0=no/ 1=yes
spray_df	.0	.0	spray decon. facto` (for each isotope grp)
	.0	.0	
	.0	.0	
	.0	.0	
	.0	.0	
	.0		

NODE VOLUMES (gal) AND GEOMETRY FACTORS (dimensionless)

NODE	1	2	3	4	5
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV
VOLUME	.6880E+05	.1660E+05	.4970E+05	.3600E+06	.1000E+07
GF*	.1000E+01	.1000E+01	.1000E+01	.3067E+02	.1000E+01

NODE	6	7	8	9	10
NODE NAME	node 66666	node 77777	control rm	epz	lpz
VOLUME	.0000E+00	.0000E+00	.2050E+07		
GF*	.1000E+01	.1000E+01	.1703E+02		

Notes: Format for echo of spray_df is f7.1, ie.
values of spray_dcf >99,999.9 will not echo properly.

* If "geometry_factor" is entered as zero or not entered a
geometry factor is calculated, otherwise the value entered is used.

TIME STEPS

num_tsteps	6	number of time steps
tstep_unit	1:hours	units of time steps 0=sec/ 1=hr. / 2=days
ieq_tstep	0	equal time step 0 = no, input times in variable "tstep"/ 1 = yes
sdtime	.0000E+00	time between shutdown and beginning of first time step
first_tstep	.0000E+00	time of beginning of first time step (units of tstep_unit)
last_tstep	.7200E+03	time of end of last time_step (units of tstep_unit)
tstep	see table below	beginning time of 6 time steps (required only if ieq_tstep=0 ie. unequal time steps are used)

TIME STEP NUMBER	BEGINNING TIME (hours)	TIME STEP NUMBER	BEGINNING TIME (hours)
1	.0000E+00	4	.8000E+01
2	.5000E+00	5	.2400E+02
3	.2000E+01	6	.9600E+02

CHI/Q (sec/cubic meter)

TIME STEP (hours)	NODE 8 CONTROL RM	NODE 9 EPZ	NODE 10 LPZ
.0000E+00 to .5000E+00	.1060E-02	.1300E-03	.3800E-04
.5000E+00 to .2000E+01	.1060E-02	.1300E-03	.3800E-04
.2000E+01 to .8000E+01	.1060E-02	.0000E+00	.1600E-04
.8000E+01 to .2400E+02	.0000E+00	.0000E+00	.1100E-04
.2400E+02 to .9600E+02	.0000E+00	.0000E+00	.4300E-05
.9600E+02 to .7200E+03	.0000E+00	.0000E+00	.1200E-05

DOSE CONVERSION FACTORS AND DECAY CONSTANTS

ISOTOPE	GROUP	DECAY CONSTANT (1/sec)	DOSE CONVERSION FACTORS THYROID (rem/Ci)	BETA SKIN (rem * cu. meter)/(Ci * sec)	WHOLE BODY (rem * cu. meter)/(Ci * sec)
I---131	1	.998E-06	.149E+07	.317E-01	.872E-01
I-- 131	2	.998E-06	.149E+07	.317E-01	.872E-01
I---131	3	.998E-06	.149E+07	.317E-01	.872E-01
I---132	1	.843E-04	.143E+05	.132E+00	.513E+00
I---132	2	.843E-04	.143E+05	.132E+00	.513E+00
I---132	3	.843E-04	.143E+05	.132E+00	.513E+00
I---133	1	.921E-05	.269E+06	.735E-01	.155E+00
I---133	2	.921E-05	.269E+06	.735E-01	.155E+00
I---133	3	.921E-05	.269E+06	.735E-01	.155E+00
I---134	1	.220E-03	.373E+04	.923E-01	.532E+00
I---134	2	.220E-03	.373E+04	.923E-01	.532E+00
I---134	3	.220E-03	.373E+04	.923E-01	.532E+00
I---135	1	.291E-04	.560E+05	.129E+00	.421E+00
I---135	2	.291E-04	.560E+05	.129E+00	.421E+00
I---135	3	.291E-04	.560E+05	.129E+00	.421E+00

CALCULATION OF INITIAL ACTIVITIES - BEFORE SHUTDOWN

			COL. 1	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7
SOURCE NAME			rcs						TOTAL ACTIVITY
UNITS			Ci						Ci
NUMBER	ISOTOPE	GROUP							
1	I---131	1	.5500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.5500E+06
2	I-- 131	2	.5500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.5500E+06
3	I---131	3	.5500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.5500E+06
4	I---132	1	.8000E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.8000E+06
5	I---132	2	.8000E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.8000E+06
6	I---132	3	.8000E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.8000E+06
7	I---133	1	.1150E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1150E+07
8	I---133	2	.1150E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1150E+07
9	I---133	3	.1150E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1150E+07
10	I---134	1	.1250E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1250E+07
11	I---134	2	.1250E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1250E+07
12	I---134	3	.1250E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1250E+07
13	I---135	1	.1050E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1050E+07
14	I---135	2	.1050E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1050E+07
15	I---135	3	.1050E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1050E+07

note: col. 7 = (col. 1*col. 2 + col. 3*col.4 + col. 5*col. 6)

NODAL DISTRIBUTION OF INITIAL ACTIVITIES - BEFORE SHUTDOWN (Ci)

NODES		1	2	3	4	5	8
NODE NAME		RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm
ISOTOPE	GROUP						
I---131	1	.55CE+06	.333E+00	.616E+00	.000E+00	.000E+00	.000E+00
I-- 131	2	.550E+06	.333E+00	.616E+00	.000E+00	.000E+00	.000E+00
I---131	3	.550E+06	.333E+00	.616E+00	.000E+00	.000E+00	.000E+00
I---132	1	.800E+06	.485E+00	.896E+00	.000E+00	.000E+00	.000E+00
I---132	2	.800E+06	.485E+00	.896E+00	.000E+00	.000E+00	.000E+00
I---132	3	.800E+06	.485E+00	.896E+00	.000E+00	.000E+00	.000E+00
I---133	1	.115E+07	.697E+00	.129E+01	.000E+00	.000E+00	.000E+00
I---133	2	.115E+07	.697E+00	.129E+01	.000E+00	.000E+00	.000E+00
I---133	3	.115E+07	.697E+00	.129E+01	.000E+00	.000E+00	.000E+00
I---134	1	.125E+07	.757E+00	.140E+01	.000E+00	.000E+00	.000E+00
I---134	2	.125E+07	.757E+00	.140E+01	.000E+00	.000E+00	.000E+00
I---134	3	.125E+07	.757E+00	.140E+01	.000E+00	.000E+00	.000E+00
I---135	1	.105E+07	.636E+00	.118E+01	.000E+00	.000E+00	.000E+00
I---135	2	.105E+07	.636E+00	.118E+01	.000E+00	.000E+00	.000E+00
I---135	3	.105E+07	.636E+00	.118E+01	.000E+00	.000E+00	.000E+00

ACTIVITIES - AFTER .0000E+00 hours (Ci)

NODES		1	2	3	4	5	8
NODE NAME		RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm
ISOTOPE	GROUP						
I---131	1	.500E+06	.303E+00	.561E+00	.000E+00	.000E+00	.000E+00
I-- 131	2	.220E+05	.133E-01	.246E-01	.000E+00	.000E+00	.000E+00
I---131	3	.275E+05	.167E-01	.308E-01	.000E+00	.000E+00	.000E+00
I---132	1	.728E+06	.441E+00	.815E+00	.000E+00	.000E+00	.000E+00
I---132	2	.320E+05	.194E-01	.358E-01	.000E+00	.000E+00	.000E+00
I---132	3	.400E+05	.242E-01	.448E-01	.000E+00	.000E+00	.000E+00
I---133	1	.105E+07	.634E+00	.117E+01	.000E+00	.000E+00	.000E+00
I---133	2	.460E+05	.279E-01	.515E-01	.000E+00	.000E+00	.000E+00
I---133	3	.575E+05	.348E-01	.644E-01	.000E+00	.000E+00	.000E+00
I---134	1	.114E+07	.689E+00	.127E+01	.000E+00	.000E+00	.000E+00
I---134	2	.500E+05	.303E-01	.560E-01	.000E+00	.000E+00	.000E+00
I---134	3	.625E+05	.379E-01	.700E-01	.000E+00	.000E+00	.000E+00
I---135	1	.956E+06	.579E+00	.107E+01	.000E+00	.000E+00	.000E+00
I---135	2	.420E+05	.255E-01	.470E-01	.000E+00	.000E+00	.000E+00
I---135	3	.525E+05	.318E-01	.588E-01	.000E+00	.000E+00	.000E+00

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	1	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	1 1 1 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.101E+02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.700E-02	.000E+00	.000E+00	.864E+03
3	.000E+00	.000E+00	.000E+00	.426E-02	.000E+00	.000E+00	.526E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.523E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.318E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

FOR: ELEM. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FOR: ORG. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

FOR: PART. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03
OCCUPANCY	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	2	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	0	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	0	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.101E+02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.195E-03	.000E+00	.000E+00	.240E+02
3	.000E+00	.000E+00	.000E+00	.426E-02	.000E+00	.000E+00	.526E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.145E-01	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.318E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	3	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	0	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	0	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

calc. title: Case C2-nc6061, rev. 1, MSLB Accident Iodines only, 10.42 gpm, HVAC 1A preparer: wmb

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.101E+02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.195E-03	.000E+00	.000E+00	.240E+02
3	.000E+00	.000E+00	.000E+00	.333E-02	.000E+00	.000E+00	.411E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.145E-01	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.249E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1[illegible]3E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	4	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.175E-03	.175E-03
OCCUPANCY	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 5 - .2400E+02 to .9600E+02 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	5	time step which corresponds to the time dependent data
iunfilt	0	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	0	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.232E-03	.232E-03
OCCUPANCY	.600E+00	.600E+00	.600E+00	.600E+00	.600E+00	.600E+00	.100E+01	.100E+01

TIME STEP NUMBER 5 - .2400E+02 to .9600E+02 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 6 - .9600E+02 to .7200E+03 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	6	time step which corresponds to the time dependent data
iunfilt	0	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	0	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.232E-03	.232E-03
OCCUPANCY	.400E+00	.400E+00	.400E+00	.400E+00	.400E+00	.400E+00	.100E+01	.100E+01

TIME STEP NUMBER 6 - .9600E+02 to .7200E+03 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.1646E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.7106E+05	recirculation rate
exhaust_cr	.1653E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9886E+00	.9500E+00
ORG. I	.9432E+00	.9500E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

NODE NAME: RCS

SUMMARY OF CUMULATIVE DOSE FOR NODE 1 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.2865E+10	.1093E+08	.2940E+07
.5000E+00 to .2000E+01	.1122E+11	.3455E+08	.9823E+07
.2000E+01 to .8000E+01	.4165E+11	.8195E+08	.2587E+08
.8000E+01 to .2400E+02	.1109E+12	.1337E+09	.4584E+08
.2400E+02 to .9600E+02	.2490E+12	.1749E+09	.6253E+08
.9600E+02 to .7200E+03	.5070E+12	.2194E+09	.7886E+08

NODE NAME: AFF. SG

SUMMARY OF CUMULATIVE DOSE FOR NODE 2 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.2626E+08	.9720E+05	.2636E+05
.5000E+00 to .2000E+01	.4086E+09	.1134E+07	.3321E+06
.2000E+01 to .8000E+01	.6025E+10	.9239E+07	.3124E+07
.8000E+01 to .2400E+02	.2701E+11	.2491E+08	.9172E+07
.2400E+02 to .9600E+02	.6880E+11	.3737E+08	.1423E+08
.9600E+02 to .7200E+03	.1469E+12	.5086E+08	.1917E+08

NODE NAME: UNAFF SG

SUMMARY OF CUMULATIVE DOSE FOR NODE 3 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.6823E+04	.2575E+02	.6947E+01
.5000E+00 to .2000E+01	.5442E+05	.1564E+03	.4533E+02
.2000E+01 to .8000E+01	.6104E+06	.9641E+03	.3232E+03
.8000E+01 to .2400E+02	.2618E+07	.2463E+04	.9018E+03
.2400E+02 to .9600E+02	.6617E+07	.3656E+04	.1385E+04
.9600E+02 to .7200E+03	.1409E+08	.4947E+04	.1858E+04

NODE NAME: TSC

SUMMARY OF CUMULATIVE DOSE FOR NODE 4 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.4365E+01	.5220E-03	.4351E-02
.5000E+00 to .2000E+01	.9735E+01	.1052E-02	.9001E-02
.2000E+01 to .8000E+01	.5175E+02	.3025E-02	.2985E-01
.8000E+01 to .2400E+02	.5319E+02	.3077E-02	.3044E-01
.2400E+02 to .9600E+02	.5319E+02	.3077E-02	.3044E-01
.9600E+02 to .7200E+03	.5319E+02	.3077E-02	.3044E-01

NODE NAME: DUMMY ENV

SUMMARY OF CUMULATIVE DOSE FOR NODE 5 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)		THYROID	WHOLE BODY	BETA
.0000E+00	to .5000E+00	.3413E+00	.1237E-02	.3374E-03
.5000E+00	to .2000E+01	.6756E+01	.1906E-01	.5557E-02
.2000E+01	to .8000E+01	.9156E+02	.1383E+00	.4688E-01
.8000E+01	to .2400E+02	.5007E+03	.4439E+00	.1648E+00
.2400E+02	to .9600E+02	.1316E+04	.6871E+00	.2634E+00
.9600E+02	to .7200E+03	.2840E+04	.9502E+00	.3599E+00

NODE NAME: control rm

SUMMARY OF CUMULATIVE DOSE FOR NODE 8 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)		THYROID	WHOLE BODY	BETA
.0000E+00	to .5000E+00	.1630E+01	.3497E-03	.1621E-02
.5000E+00	to .2000E+01	.6516E+01	.1208E-02	.5817E-02
.2000E+01	to .8000E+01	.3533E+02	.3636E-02	.2008E-01
.8000E+01	to .2400E+02	.3838E+02	.3830E-02	.2129E-01
.2400E+02	to .9600E+02	.3838E+02	.3830E-02	.2129E-01
.9600E+02	to .7200E+03	.3838E+02	.3830E-02	.2129E-01

NODE NAME: epz

SUMMARY OF CUMULATIVE DOSE FOR NODE 9 (REM) AS A FUNCTION OF TIME

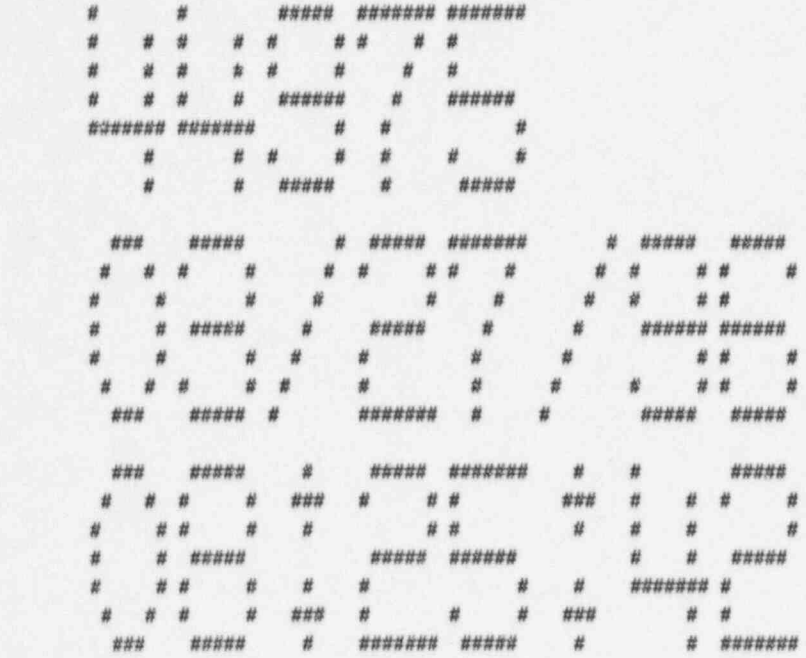
TIME STEP (hours)		THYROID	WHOLE BODY	BETA
.0000E+00 to	.5000E+00	.1861E+03	.6889E+00	.1868E+00
.5000E+00 to	.2000E+01	.2616E+03	.8935E+00	.2472E+00
.2000E+01 to	.8000E+01	.2616E+03	.8935E+00	.2472E+00
.8000E+01 to	.2400E+02	.2616E+03	.8935E+00	.2472E+00
.2400E+02 to	.9600E+02	.2616E+03	.8935E+00	.2472E+00
.9600E+02 to	.7200E+03	.2616E+03	.8935E+00	.2472E+00

NODE NAME: lpz

SUMMARY OF CUMULATIVE DOSE FOR NODE 10 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.5441E+02	.2014E+00	.5461E-01
.5000E+00 to .2000E+01	.7647E+02	.2612E+00	.7225E-01
.2000E+01 to .8000E+01	.2128E+03	.4579E+00	.1400E+00
.8000E+01 to .2400E+02	.2128E+03	.4579E+00	.1400E+00
.2400E+02 to .9600E+02	.2128E+03	.4579E+00	.1400E+00
.9600E+02 to .7200E+03	.2128E+03	.4579E+00	.1400E+00

Case C4-nc6061, rev. 1, MSLB Accident Nobles only, .42 gpm, HVAC 7 N-1a
Preparer: wmb Reviewer:

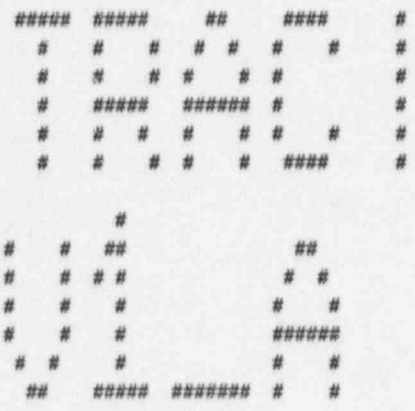


```
**********************************************************************
*          INSTALLATION OPERATING ENVIRONMENT                        *
* Wed Sep 13 07:54:03 CDT 1995                                       *
*                                                                    *
* AIX nfad 2 3 000510106700                                          *
* XLFCMP.OBJ fortran compiler version 02.03.0000.0000                *
* XLFRTE.OBJ fortran runtime environment version 02.03.0000.0000     *
*                                                                    *
**********************************************************************
```

```
**********************************************************************
*          CURRENT OPERATING ENVIRONMENT                             *
* Wed Mar 27 08:25:43 CST 1996                                       *
*                                                                    *
* AIX nfad 2 3 000510106700                                          *
* XLFCMP.OBJ fortran compiler version 02.03.0000.0000                *
* XLFRTE.OBJ fortran runtime environment version 02.03.0000.0000     *
*                                                                    *
**********************************************************************
```

** RTE Verified **

Case C4-nc6061, rev. 1, MSLB Accident Nobles only, .42 gpm, HVAC 7 N-1b
Preparer: wmb Reviewer:



****
Dose Conversion Factors "dcf_input.f" were User supplied
****

```
 Case C4-nc6061, rev. 1, MSLB Accident Nobles only, .42 gpm, HVAC 7   N-1c
Preparer: wmb                  Reviewer:

          #    #    #  #####   #    #   #####
          #    ##   #  #    #  #    #     #
          #    # #  #  #    #  #    #     #
          #    #  # #  #####   #    #     #
          #    #   ##  #       #    #     #
          #    #    #  #        ####      #

$ngeneral
preparer = 'wmb',
inode8 = 2,
ioffsite =1,
calc_title = 'Case C4-nc6061, rev. 1, MSLB Accident Nobles only, .42 gpm, HVAC 7',
page_prefix = 'N',
print_dcf = 1,
print_instantaneous_activity = 0,
print_instantaneous_dose_rate = 0,
print_instantaneous_dose =0,
print_cumulative_dose = 0,
print_summary_dose =1,
print_laserjet = 1,
idebug = 0,
sub_time_step =10.0000,
$end
$nsource_term
num_isotope= 13,
iactivity_unit=0,
num_sources=1,
fract_activity_node= 1.0, 9.00e-7, 1.67e-6,  5*0.0,
fract_release   =  .91, 4.0E-2, 5.0E-02, 8*1.0,
$end
$nsource1
activity1_name='rcs  ',
activity1= 7.00e+4, 1.50e+5, 1.85e+4, 2.75e+5, 3.95e+5,
           4.85e+5, 3.85e+3, 1.65e+5, 1.15e+6, 2.30e+5,
           3.25e+5, 1.00e+6, 9.50e+5,
activity1_unit= 'Ci          ',
activity1_mult=1.0     ,
activity1_mult_unit='         ',
activity1_mult_name='         ',
$end
$nnodes
num_nodes=5,
node_volume_unit = 3,
flow_unit = 3,
ispray_cutoff = 0,
spray_df = 11*0.0,
node_name = '  RCS     ','AFF. SG   ','UNAFF SG  ',
            '  TSC     ','DUMMY ENV ','node 66666',
            'node 77777','control rm','epz       ','lpz       ',
node_volume = 6.88e+4,1.66e+4, 4.97e+4, 3.60e+5, 1e+6, 2*0.0, 2.050e+6,
geometry_factor = 3*1.0,0.0,3*1.0, 0.0,
$end
$ntime_steps
num_tsteps = 5,
tstep_unit = 1,
ieq_tstep = 0,
sdtime =  0.0,
first_tstep = 00.0 ,
last_tstep = 96.,
tstep = 0,  .5, 2, 8, 24, 96,
```

```
Case C4-nc6061, rev. 1, MSLB Accident Nobles only, .42 gpm, HVAC 7   N-1d
Preparer: wmb                    Reviewer:


$end
$nchi_over_q_cr
chi_over_q_control_room = 3*1.06e-3, 38*0.0,
$end
$nchi_over_q_offsite
chi_over_q_epz = 2*1.30e-4, 38*0.0,
chi_over_q_lpz = 2*3.80e-5, 1.6e-5, 1.1e-5, 4.3e-6, 1.2e-6, 34*0.0,
$end
$nread
 itime_step = 1, iunfilt = 1, ifilt =1, ifilt_remove = 1,1,1,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.470e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 6.920e-3, 4.260e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 8.540e+2, 5.260e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 5.170e-1, 3.180e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
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0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove1
 filt_remove1=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
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0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove2
 filt_remove2=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
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0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
```

```
$end
$nfilt_remove3
 filt_remove3=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$noccupbr
 occupancy = 10*1.0,
 br = 10*3.47e-4,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 2, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 0, ioccupancy =0, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.470e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.130e-4, 4.260e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
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0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.400e+1, 5.260e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 8.480e-3, 3.180e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 3, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 0, ioccupancy =0, icontrol = 1,
```

```
$end
$nunfilt_flow
unfilt_flow    =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.470e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.130e-4, 3.330e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.400e+1, 4.110e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow    =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 8.480e-3, 2.490e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0. 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 4, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow    =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow    =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e-0, 0.000e+0, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$noccupbr
```

```
 occupancy = 10*1.0,
 br = 8*3.47e-4, 2*1.75e-4,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 5, iunfilt = 0, ifilt =0, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$noccupbr
 occupancy = 8*0.6, 2*1.0,
 br = 8*3.47e-4, 2*2.32e-4,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 6, iunfilt = 0, ifilt =0, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$noccupbr
 occupancy = 8*0.4, 2*1.0,
 br = 8*3.47e-4, 2*2.32e-4,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
```

Case C4-nc6061, rev. 1, MSLB Accident Nobles only, .42 gpm, HVAC 7 N-1h
Preparer: wmb Reviewer:

Case C4-nc6061, rev. 1, MSLB Accident Nobles only, .42 gpm, HVAC 7 N-1i
Preparer: wmb Reviewer:

**********TRACI VER. 1.0**********
Transient Radiological Assessment Code for
Isotopes
SOUTH TEXAS ELECTRIC GENERATING STATION
SEPTEMBER 24, 1992
CREATED BY WM. MARK BLUMBERG
RELOAD ENGINEERING SECTION
****

calc. title: Case C4-nc6061, rev. 1, MSLB Accident Nobles only, .42 gpm, HVAC 7 preparer: wmb

GENERAL DATA

preparer	wmb	preparer initials
inode8	2	use node 8 0=no/ 1 =yes, treat as a region, 2=yes, model as control room
ioffsite	1	calculate offsite dose 0=no/1=yes

OUTPUT OPTIONS PRINT FLAGS 0 = NO / 1 = YES

print_dcf	1	print dose conversion factors
print_instantaneous_activity	0	print inst. activity for each time step as a function of isotope and node
print_instantaneous_dose_rate	0	print inst. dose rate for each time step as a function of isotope and node
print_instantaneous_dose	0	print accumulated dose for each time step as a function of isotope and node
print_cumulative_dose	0	print cumulative dose up to the ending time of each time step as a function of isotope and node
print_summary_dose	1	print summary of cumulative dose for all time steps as a function of whole body, skin & thyroid doses
idebug	0	print namelist variables as read in
print_laserjet	1	print laserjet compressed print
sub_time_step	.100E+02	time interval of sub_time_steps (in sec) note: if = 0.0, default time steps are used

SOURCE TERM

num_isotope	13		number of isotopes (default 27, max 50)
iactivity_unit	0 : Ci		units of act. of source term 0=Ci /
			1= Ci/ml / 2 = Bq / 3 = Bq/m3
num_sources	1		number of sources at shutdown
fract_activity_node	.10E+01	.90E-06	fract. of total activity in each node
	.17E-05	.00E+00	
	.00E+00	.00E+00	
	.00E+00	.00E+00	
fract_release	.91E+00	.40E-01	fract. released from each isotope group
	.50E-01	.10E+01	
	.10E+01	.10E+01	
	.10E+01	.10E+01	
	.10E+01	.10E+01	
	.10E+01		

Note: the echo of fract_activity_node gives 8 values. Only "num_nodes" values will be used.

SOURCE #1

activity1_name	rcs	name of source and reference #
activity1	see note below	activity of source term at shutdown
activity1_unit	Ci	units of activity of source
activity1_mult	1.000	value multiplied by activity1 to get units of iactivity_unit
activity1_mult_unit		units of activity1_mult

note: values for activity1, activity2, & activity3 are given in table entitled: "calculation of initial activities"

NODES

num_nodes	5		number of nodes (max 7). Note: nodes 8,9 & 10 are reserved for cr, epz and lpz
node_volume_unit	3		unit of node vol. 1= m3/ 2=ft3 /3=gallons
flow_unit	3		unit of flow 1=cu. m/sec, 2=cfm/ 3=gpm
ispray_cutoff	0		auto. spray cutoff option 0=no/ 1=yes
spray_df	.0	.0	spray decon. factor (for each isotope grp)
	.0	.0	
	.0	.0	
	.0	.0	
	.0	.0	
	.0		

NODE VOLUMES (gal) AND GEOMETRY FACTORS (dimensionless)

NODE	1	2	3	4	5
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV
VOLUME	.6880E+05	.1660E+05	.4970E+05	.3600E+06	.1000E+07
GF*	.1000E+01	.1000E+01	.1000E+01	.3067E+02	.1000E+01

NODE	6	7	8	9	10
NODE NAME	node 66666	node 77777	control rm	epz	lpz
VOLUME	.0000E+00	.0000E+00	.2050E+07		
GF*	.1000E+01	.1000E+01	.1703E+02		

Notes: Format for echo of spray_df is f7.1, ie.
values of spray_dcf >99,999.9 will not echo properly.

* If "geometry_factor" is entered as zero or not entered a
geometry factor is calculated, otherwise the value entered is used.

TIME STEPS

num_tsteps	5	number of time steps
tstep_unit	1:hours	units of time steps 0=sec/ 1=hr. / 2=days
ieq_tstep	0	equal time step 0 = no, input times in variable "tstep"/ 1 = yes
sdtime	.0000E+00	time between shutdown and beginning of first time step
first_tstep	.0000E+00	time of beginning of first time step (units of tstep_unit)
last_tstep	.9600E+02	time of end of last time_step (units of tstep_unit)
tstep	see table below	beginning time of 5 time steps (required only if ieq_tstep=0 ie. unequal time steps are used)

TIME STEP NUMBER	BEGINNING TIME (hours)	TIME STEP NUMBER	BEGINNING TIME (hours)
1	.0000E+00	3	.2000E+01
2	.5000E+00	4	.8000E+01
5	.2400E+02		

CHI/Q (sec/cubic meter)

TIME STEP (hours)	NODE 8 CONTROL RM	NODE 9 EPZ	NODE 10 LPZ
.0000E+00 to .5000E+00	.1060E-02	.1300E-03	.3800E-04
.5000E+00 to .2000E+01	.1060E-02	.1300E-03	.3800E-04
.2000E+01 to .8000E+01	.1060E-02	.0000E+00	.1600E-04
.8000E+01 to .2400E+02	.0000E+00	.0000E+00	.1100E-04
.2400E+02 to .9600E+02	.0000E+00	.0000E+00	.4300E-05

DOSE CONVERSION FACTORS AND DECAY CONSTANTS

ISOTOPE	GROUP	DECAY CONSTANT (1/sec)	DOSE CONVERSION FACTORS THYROID (rem/Ci)	BETA SKIN (rem * cu. meter)/(Ci * sec)	WHOLE BODY (rem * cu. meter)/(Ci * sec)
Kr--83m	4	.105E-03	.000E+00	.000E+00	.240E-05
Kr--85m	4	.430E-04	.000E+00	.463E-01	.371E-01
Kr---85	4	.205E-08	.000E+00	.425E-01	.510E-03
Kr---87	4	.151E-03	.000E+00	.308E+00	.188E+00
Kr---88	4	.673E-04	.000E+00	.751E-01	.466E+00
Kr---89	4	.363E-02	.000E+00	.320E+00	.526E+00
Xe-131m	4	.682E-06	.000E+00	.151E-01	.290E-02
Xe-133m	4	.366E-05	.000E+00	.315E-01	.795E-02
Xe--133	4	.153E-05	.000E+00	.970E-02	.932E-02
Xe-135m	4	.738E-03	.000E+00	.225E-01	.989E-01
Xe--135	4	.211E-04	.000E+00	.589E-01	.538E-01
Xe--137	4	.302E-02	.000E+00	.387E+00	.450E-01
Xe--138	4	.815E-03	.000E+00	.131E+00	.280E+00

CALCULATION OF INITIAL ACTIVITIES - BEFORE SHUTDOWN

SOURCE NAME			COL. 1 rcs	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7 TOTAL ACTIVITY
UNITS			Ci						Ci
NUMBER	ISOTOPE	GROUP							
1	Kr--83m	4	.7000E+05	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.7000E+05
2	Kr--85m	4	.1500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1500E+06
3	Kr---85	4	.1850E+05	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1850E+05
4	Kr---87	4	.2750E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.2750E+06
5	Kr---88	4	.3950E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.3950E+06
6	Kr---89	4	.4850E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.4850E+06
7	Xe-131m	4	.3850E+04	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.3850E+04
8	Xe-133m	4	.1650E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1650E+06
9	Xe--133	4	.1150E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1150E+07
10	Xe-135m	4	.2300E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.2300E+06
11	Xe--135	4	.3250E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.3250E+06
12	Xe--137	4	.1000E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1000E+07
13	Xe--138	4	.9500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.9500E+06

note: col. 7 = (col. 1*col. 2 + col. 3*col.4 + col. 5*col. 6)

NODAL DISTRIBUTION OF INITIAL ACTIVITIES - BEFORE SHUTDOWN (Ci)

NODES		1	2	3	4	5	8
NODE NAME		RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm
ISOTOPE	GROUP						
Kr--83m	4	.700E+05	.630E-01	.117E+00	.000E+00	.000E+00	.000E+00
Kr--85m	4	.150E+06	.135E+00	.250E+00	.000E+00	.000E+00	.000E+00
Kr---85	4	.185E+05	.166E-01	.309E-01	.000E+00	.000E+00	.000E+00
Kr---87	4	.275E+06	.247E+00	.459E+00	.000E+00	.000E+00	.000E+00
Kr---88	4	.395E+06	.355E+00	.660E+00	.000E+00	.000E+00	.000E+00
Kr---89	4	.485E+06	.436E+00	.810E+00	.000E+00	.000E+00	.000E+00
Xe-131m	4	.385E+04	.346E-02	.643E-02	.000E+00	.000E+00	.000E+00
Xe-133m	4	.165E+06	.148E+00	.276E+00	.000E+00	.000E+00	.000E+00
Xe--133	4	.115E+07	.103E+01	.192E+01	.000E+00	.000E+00	.000E+00
Xe-135m	4	.230E+06	.207E+00	.384E+00	.000E+00	.000E+00	.000E+00
Xe--135	4	.325E+06	.292E+00	.543E+00	.000E+00	.000E+00	.000E+00
Xe--137	4	.100E+07	.900E+00	.167E+01	.000E+00	.000E+00	.000E+00
Xe--138	4	.950E+06	.855E+00	.159E+01	.000E+00	.000E+00	.000E+00

ACTIVITIES - AFTER .0000E+00 hours (Ci)

NODES		1	2	3	4	5	8
NODE NAME		RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm
ISOTOPE	GROUP						
Kr--83m	4	.700E+05	.630E-01	.117E+00	.000E+00	.000E+00	.000E+00
Kr--85m	4	.150E+06	.135E+00	.250E+00	.000E+00	.000E+00	.000E+00
Kr---85	4	.185E+05	.166E-01	.309E-01	.000E+00	.000E+00	.000E+00
Kr---87	4	.275E+06	.247E+00	.459E+00	.000E+00	.000E+00	.000E+00
Kr---88	4	.395E+06	.355E+00	.660E+00	.000E+00	.000E+00	.000E+00
Kr---89	4	.485E+06	.436E+00	.810E+00	.000E+00	.000E+00	.000E+00
Xe-131m	4	.385E+04	.346E-02	.643E-02	.000E+00	.000E+00	.000E+00
Xe-133m	4	.165E+06	.148E+00	.276E+00	.000E+00	.000E+00	.000E+00
Xe--133	4	.115E+07	.103E+01	.192E+01	.000E+00	.000E+00	.000E+00
Xe-135m	4	.230E+06	.207E+00	.384E+00	.000E+00	.000E+00	.000E+00
Xe--135	4	.325E+06	.292E+00	.543E+00	.000E+00	.000E+00	.000E+00
Xe--137	4	.100E+07	.900E+00	.167E+01	.000E+00	.000E+00	.000E+00
Xe--138	4	.950E+06	.855E+00	.159E+01	.000E+00	.000E+00	.000E+00

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	1	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	1 1 1 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.147E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.692E-02	.000E+00	.000E+00	.854E+03
3	.000E+00	.000E+00	.000E+00	.426E-02	.000E+00	.000E+00	.526E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.517E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.318E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

FOR: PART. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03
OCCUPANCY	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	2	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	0	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	0	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.147E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.113E-03	.000E+00	.000E+00	.140E+02
3	.000E+00	.000E+00	.000E+00	.426E-02	.000E+00	.000E+00	.526E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.848E-02	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.318E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	3	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupanc,	0	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	0	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.147E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.113E-03	.000E+00	.000E+00	.140E+02
3	.000E+00	.000E+00	.000E+00	.333E-02	.000E+00	.000E+00	.411E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.848E-02	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.249E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	4	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.175E-03	.175E-03
OCCUPANCY	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 5 - .2400E+02 to .9600E+02 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	5	time step which corresponds to the time dependent data
iunfilt	0	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	0	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.232E-03	.232E-03
OCCUPANCY	.600E+00	.600E+00	.600E+00	.600E+00	.600E+00	.600E+00	.100E+01	.100E+01

TIME STEP NUMBER 5 - .2400E+02 to .9600E+02 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

NODE NAME: RCS

SUMMARY OF CUMULATIVE DOSE FOR NODE 1 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)			THYROID	WHOLE BODY	BETA
.0000E+00	to	.5000E+00	.0000E+00	.3114E+07	.2111E+07
.5000E+00	to	.2000E+01	.0000E+00	.7489E+07	.4456E+07
.2000E+01	to	.8000E+01	.0000E+00	.1504E+08	.8688E+07
.8000E+01	to	.2400E+02	.0000E+00	.2028E+08	.1381E+08
.2400E+02	to	.9600E+02	.0000E+00	.2561E+08	.2092E+08

NODE NAME: AFF. SG

SUMMARY OF CUMULATIVE DOSE FOR NODE 2 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.3604E+03	.2154E+03
.5000E+00 to .2000E+01	.0000E+00	.3112E+04	.1686E+04
.2000E+01 to .8000E+01	.0000E+00	.2088E+05	.1192E+05
.8000E+01 to .2400E+02	.0000E+00	.4319E+05	.3376E+05
.2400E+02 to .9600E+02	.0000E+00	.6588E+05	.6402E+05

NODE NAME: UNAFF SG

SUMMARY OF CUMULATIVE DOSE FOR NODE 3 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)			THYROID	WHOLE BODY	BETA
.0000E+00	to	.5000E+00	.0000E+00	.2236E+03	.1337E+03
.5000E+00	to	.2000E+01	.0000E+00	.1930E+04	.1046E+04
.2000E+01	to	.8000E+01	.0000E+00	.1294E+05	.7390E+04
.8000E+01	to	.2400E+02	.0000E+00	.2677E+05	.2092E+05
.2400E+02	to	.9600E+02	.0000E+00	.4082E+05	.3967E+05

NODE NAME: TSC

SUMMARY OF CUMULATIVE DOSE FOR NODE 4 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.1870E-03	.3275E-02
.5000E+00 to .2000E+01	.0000E+00	.1612E-02	.2663E-01
.2000E+01 to .8000E+01	.0000E+00	.1067E-01	.1871E+00
.8000E+01 to .2400E+02	.0000E+00	.1160E-01	.2076E+00
.2400E+02 to .9600E+02	.0000E+00	.1160E-01	.2076E+00

NODE NAME: DUMMY ENV

SUMMARY OF CUMULATIVE DOSE FOR NODE 5 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.3987E-03	.2225E-03
.5000E+00 to .2000E+01	.0000E+00	.1703E-01	.9089E-02
.2000E+01 to .8000E+01	.0000E+00	.3997E+00	.2358E+00
.8000E+01 to .2400E+02	.0000E+00	.1300E+01	.1119E+01
.2400E+02 to .9600E+02	.0000E+00	.2226E+01	.2354E+01

NODE NAME: control rm

SUMMARY OF CUMULATIVE DOSE FOR NODE 8 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.1747E-03	.1696E-02
.5000E+00 to .2000E+01	.0000E+00	.1882E-02	.1723E-01
.2000E+01 to .8000E+01	.0000E+00	.1565E-01	.1533E+00
.8000E+01 to .2400E+02	.0000E+00	.1859E-01	.1906E+00
.2400E+02 to .9600E+02	.0000E+00	.1859E-01	.1906E+00

NODE NAME: epz

SUMMARY OF CUMULATIVE DOSE FOR NODE 9 (REM) AS A FUNCTION OF TIME

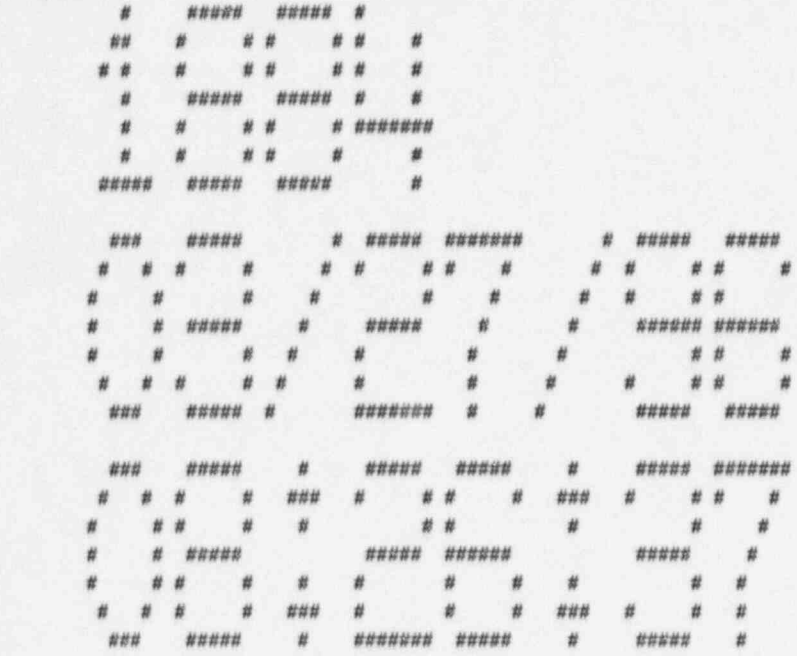
TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.3489E-02	.2086E-02
.5000E+00 to .2000E+01	.0000E+00	.1117E-01	.6189E-02
.2000E+01 to .8000E+01	.0000E+00	.1117E-01	.6189E-02
.8000E+01 to .2400E+02	.0000E+00	.1117E-01	.6189E-02
.2400E+02 to .9600E+02	.0000E+00	.1117E-01	.6189E-02

NODE NAME: lpz

SUMMARY OF CUMULATIVE DOSE FOR NODE 10 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.1020E-02	.6096E-03
.5000E+00 to .2000E+01	.0000E+00	.3264E-02	.1809E-02
.2000E+01 to .8000E+01	.0000E+00	.8084E-02	.4586E-02
.8000E+01 to .2400E+02	.0000E+00	.8084E-02	.4586E-02
.2400E+02 to .9600E+02	.0000E+00	.8084E-02	.4586E-02

Preparer: wmb Reviewer:



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* Wed Sep 13 07:54:03 CDT 1995                                       *
*                                                                    *
* AIX nfad 2 3 000510106700                                          *
* XLFCMP.OBJ fortran compiler version 02.03.0000.0000                *
* XLFRTE.OBJ fortran runtime environment version 02.03.0000.0000     *
*                                                                    *
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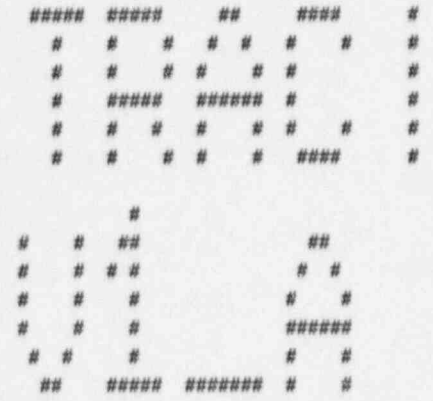
*          CURRENT OPERATING ENVIRONMENT                             *
* Wed Mar 27 08:26:37 CST 1996                                       *
*                                                                    *
* AIX nfad 2 3 000510106700                                          *
* XLFCMP.OBJ fortran compiler version 02.03.0000.0000                *
* XLFRTE.OBJ fortran runtime environment version 02.03.0000.0000     *
*                                                                    *
**********************************************************************
```

** RTE Verified **

Preparer: wmb Reviewer:



****
Dose Conversion Factors "dcf_input.f" were User supplied
****

```
 Case C6-nc6061, rev. 1, MSLB Accident Nobles only, 10.42 gpm, HVAC 7   P-1c
Preparer: wmb                    Reviewer:

          #   #   #  #####   #   #   #####
          #   ##  #  #    #  #   #     #
          #   # # #  #    #  #   #     #
          #   #  ##  #####   #   #     #
          #   #   #  #       #   #     #
          #   #   #  #        ###      #

$ngeneral
preparer = 'wmb',
inode8 = 2,
ioffsite =1,
calc_title = 'Case C6-nc6061, rev. 1, MSLB Accident Nobles only, 10.42 gpm, HVAC 7',
page_prefix = 'P',
print_dcf = 1,
print_instantaneous_activity = 0,
print_instantaneous_dose_rate = 0,
print_instantaneous_dose =0,
print_cumulative_dose = 0,
print_summary_dose =1,
print_laserjet = 1,
idebug = 0,
sub_time_step =10.0000,
$end
$nsource_term
num_isotope= 13,
iactivity_unit=0,
num_sources=1,
fract_activity_node= 1.0, 9.00e-7, 1.67e-6,  5*0.0,
fract_release   =  .91, 4.0E-2, 5.0E-02, 8*1.0,
$end
$nsource1
activity1_name='rcs  ',
activity1= 7.00e+4, 1.50e+5, 1.85e+4, 2.75e+5, 3.95e+5,
          4.85e+5, 3.85e+3, 1.65e+5, 1.15e+6, 2.30e+5,
          3.25e+5, 1.00e+6, 9.50e+5,
activity1_unit= 'Ci          ',
activity1_mult=1.0     ,
activity1_mult_unit='          ',
activity1_mult_name='          .
$end
$nnodes
num_nodes=5,
node_volume_unit = 3,
flow_unit = 3,
ispray_cutoff = 0,
spray_df = 11*0.0,
node_name = '  RCS     ','AFF. SG   ','UNAFF SG  ',
            '  TSC     ','DUMMY ENV ','node 66666',
            'node 77777','control rm','epz       ','lpz       ',
node_volume = 6.88e+4,1.66e+4, 4.97e+4, 3.60e+5, 1e+6, 2*0.0, 2.050e+6,
geometry_factor = 3*1.0,0.0,3*1.0, 0.0,
$end
$ntime_steps
num_tsteps = 5,
tstep_unit = 1,
ieq_tstep = 0,
sdtime =  0.0,
first_tstep = 00.0 ,
last_tstep = 96.,
tstep = 0,  .5, 2, 8, 24, 96,
```

```
$end
$nchi_over_q_cr
chi_over_q_control_room = 3*1.06e-3, 38*0.0,
$end
$nchi_over_q_offsite
chi_over_q_epz = 2*1.30e-4, 38*0.0,
chi_over_q_lpz = 2*3.80e-5, 1.6e-5, 1.1e-5, 4.3e-6, 1.2e-6, 34*0.0,
$end
$nread
 itime_step = 1, iunfilt = 1, ifilt =1, ifilt_remove = 1,1,1,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.010e+1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 7.000e-3, 4.260e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 8.640e+2, 5.260e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 5.230e-1, 3.180e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove1
 filt_remove1=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_remove2
 filt_remove2=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
```

```
$end
$nfilt_remove3
 filt_remove3=
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 9.900e-1, 9.900e-1, 9.900e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$noccupbr
 occupancy = 10*1.0,
 br = 10*3.47e-4,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 2, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 0, ioccupancy =0, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.010e+1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.950e-4, 4.260e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 2.400e+1, 5.260e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.450e-2, 3.180e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 3, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 0, ioccupancy =0, icontrol = 1,
```

```
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
1.010e+1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.950e-4, 3.330e-3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 2.400e+1, 4.110e+2, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
2.730e-1, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 1.450e-2, 2.490e-1, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 4, iunfilt = 1, ifilt =1, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$nunfilt_flow
unfilt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 9.170e+3, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$nfilt_flow
  filt_flow     =
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e-0, 0.000e+0, 3.550e+4, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0, 0.000e+0,
$end
$noccupbr
```

```
 occupancy = 10*1.0,
 br = 8*3.47e-4, 2*1.75e-4,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 5, iunfilt = 0, ifilt =0, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$noccupbr
 occupancy = 8*0.6, 2*1.0,
 br = 8*3.47e-4, 2*2.32e-4,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
$nread
 itime_step = 6, iunfilt = 0, ifilt =0, ifilt_remove = 0,0,0,0,7*0,
 iremove = 0, ibreath_rate = 1, ioccupancy =1, icontrol = 1,
$end
$noccupbr
 occupancy = 8*0.4, 2*1.0,
 br = 8*3.47e-4, 2*2.32e-4,
$end
$ncontrol
 filt_cr = 24684.0, unfilt_cr = 74.8,
 filt_remove_cr = 0.9900, 0.9817, 0.99, 8*0.0,
 filt_recirc_cr = 0.9333, 0.7333, 0.99, 8*0.0,
 exhaust_cr =  24758.8, recirc_cr= 1.066e+5,
$end
```

Case C6-nc6061, rev. 1, MSLB Accident Nobles only, 10.42 gpm, HVAC 7 P-1h
Preparer: wmb Reviewer:

Preparer: wmb Reviewer:

**********TRACI VER. 1.0**********
Transient Radiological Assessment Code for
Isotopes
SOUTH TEXAS ELECTRIC GENERATING STATION
SEPTEMBER 24, 1992
CREATED BY WM. MARK BLUMBERG
RELOAD ENGINEERING SECTION
****

GENERAL DATA

preparer	wmb	preparer initials
inode8	2	use node 8 0=no/ 1 =yes, treat as a region, 2=yes, model as control room
ioffsite	1	calculate offsite dose 0=no/1=yes

OUTPUT OPTIONS PRINT FLAGS 0 = NO / 1 = YES

print_dcf	1	print dose conversion factors
print_instantaneous_activity	0	print inst. activity for each time step as a function of isotope and node
print_instantaneous_dose_rate	0	print inst. dose rate for each time step as a function of isotope and node
print_instantaneous_dose	0	print accumulated dose for each time step as a function of isotope and node
print_cumulative_dose	0	print cumulative dose up to the ending time of each time step as a function of isotope and node
print_summary_dose	1	print summary of cumulative dose for all time steps as a function of whole body, skin & thyroid doses
idebug	0	print namelist variables as read in
print_laserjet	1	print laserjet compressed print
sub_time_step	.100E+02	time interval of sub_time_steps (in sec) note: if = 0.0, default time steps are used

SOURCE TERM

num_isotope	13		number of isotopes (default 27, max 50)
iactivity_unit	0 : Ci		units of act. of source term 0=Ci /
			1= Ci/ml / 2 = Bq / 3 = Bq/m3
num_sources	1		number of sources at shutdown
fract_activity_node	.10E+01	.90E-06	fract. of total activity in each node
	.17E-05	.00E+00	
	.00E+00	.00E+00	
	.00E+00	.00E+00	
fract_release	.91E+00	.40E-01	fract. released from each isotope group
	.50E-01	.10E+01	
	.10E+01	.10E+01	
	.10E+01	.10E+01	
	.10E+01	.10E+01	
	.10E+01		

Note: the echo of fract_activity_node gives 8 values. Only "num_nodes" values will be used.

SOURCE #1

activity1_name	rcs	name of source and reference #
activity1	see note below	activity of source term at shutdown
activity1_unit	Ci	units of activity of source
activity1_mult	1.000	value multiplied by activity1 to get units of iactivity_unit
activity1_mult_unit		units of activity1_mult

note: values for activity1, activity2, & activity3 are given in table entitled: "calculation of initial activities"

NODES

num_nodes	5		number of nodes (max 7). Note: nodes 8,9 & 10 are reserved for cr, epz and lpz
node_volume_unit	3		unit of node vol. 1= m3/ 2=ft3 /3=gallons
flow_unit	3		unit of flow 1=cu. m/sec, 2=cfm/ 3=gpm
ispray_cutoff	0		auto. spray cutoff option 0=no/ 1=yes
spray_df	.0	.0	spray decon. factor (for each isotope grp)
	.0	.0	
	.0	.0	
	.0	.0	
	.0	.0	
	.0		

NODE VOLUMES (gal) AND GEOMETRY FACTORS (dimensionless)

NODE	1	2	3	4	5
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV
VOLUME	.6880E+05	.1660E+05	.4970E+05	.3600E+06	.1000E+07
GF*	.1000E+01	.1000E+01	.1000E+01	.3067E+02	.1000E+01

NODE	6	7	8	9	10
NODE NAME	node 66666	node 77777	control rm	epz	lpz
VOLUME	.0000E+00	.0000E+00	.2050E+07		
GF*	.1000E+01	.1000E+01	.1703E+02		

Notes: Format for echo of spray_df is f7.1, ie.
values of spray_dcf >99,999.9 will not echo properly.

* If "geometry_factor" is entered as zero or not entered a
geometry factor is calculated, otherwise the value entered is used.

TIME STEPS

num_tsteps	5	number of time steps
tstep_unit	1:hours	units of time steps 0=sec/ 1=hr. / 2=days
ieq_tstep	0	equal time step 0 = no, input times in variable "tstep"/ 1 = yes
sdtime	.0000E+00	time between shutdown and beginning of first time step
first_tstep	.0000E+00	time of beginning of first time step (units of tstep_unit)
last_tstep	.9600E+02	time of end of last time_step (units of tstep_unit)
tstep	see table below	beginning time of 5 time steps (required only if ieq_tstep=0 ie. unequal time steps are used)

TIME STEP NUMBER	BEGINNING TIME (hours)	TIME STEP NUMBER	BEGINNING TIME (hours)
1	.0000E+00	3	.2000E+01
2	.5000E+00	4	.8000E+01
5	.2400E+02		

CHI/Q (sec/cubic meter)

TIME STEP (hours)	NODE 8 CONTROL RM	NODE 9 EPZ	NODE 10 LPZ
.0000E+00 to .5000E+00	.1060E-02	.1300E-03	.3800E-04
.5000E+00 to .2000E+01	.1060E-02	.1300E-03	.3800E-04
.2000E+01 to .8000E+01	.1060E-02	.0000E+00	.1600E-04
.8000E+01 to .2400E+02	.0000E+00	.0000E+00	.1100E-04
.2400E+02 to .9600E+02	.0000E+00	.0000E+00	.4300E-05

DOSE CONVERSION FACTORS AND DECAY CONSTANTS

ISOTOPE	GROUP	DECAY CONSTANT (1/sec)	DOSE CONVERSION FACTORS THYROID (rem/Ci)	BETA SKIN (rem * cu. meter)/(Ci * sec)	WHOLE BODY
Kr--83m	4	.105E-03	.000E+00	.000E+00	.240E-05
Kr--85m	4	.430E-04	.000E+00	.463E-01	.371E-01
Kr---85	4	.205E-08	.000E+00	.425E-01	.510E-03
Kr---87	4	.151E-03	.000E+00	.308E+00	.188E+00
Kr---88	4	.673E-04	.000E+00	.751E-01	.466E+00
Kr---89	4	.363E-02	.000E+00	.320E+00	.526E+00
Xe-131m	4	.682E-06	.000E+00	.151E-01	.290E-02
Xe-133m	4	.366E-05	.000E+00	.315E-01	.795E-02
Xe--133	4	.153E-05	.000E+00	.970E-02	.932E-02
Xe-135m	4	.738E-03	.000E+00	.225E-01	.989E-01
Xe--135	4	.211E-04	.000E+00	.589E-01	.538E-01
Xe--137	4	.302E-02	.000E+00	.387E+00	.450E-01
Xe--138	4	.815E-03	.000E+00	.131E+00	.280E+00

CALCULATION OF INITIAL ACTIVITIES - BEFORE SHUTDOWN

SOURCE NAME			COL. 1 rcs	COL. 2	COL. 3	COL. 4	COL. 5	COL. 6	COL. 7 TOTAL ACTIVITY
UNITS			Ci						Ci
NUMBER	ISOTOPE	GROUP							
1	Kr--83m	4	.7000E+05	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.7000E+05
2	Kr--85m	4	.1500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1500E+06
3	Kr---85	4	.1850E+05	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1850E+05
4	Kr---87	4	.2750E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.2750E+06
5	Kr---88	4	.3950E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.3950E+06
6	Kr---89	4	.4850E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.4850E+06
7	Xe-131m	4	.3850E+04	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.3850E+04
8	Xe-133m	4	.1650E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1650E+06
9	Xe--133	4	.1150E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1150E+07
10	Xe-135m	4	.2300E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.2300E+06
11	Xe--135	4	.3250E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.3250E+06
12	Xe--137	4	.1000E+07	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.1000E+07
13	Xe--138	4	.9500E+06	.1000E+01	.0000E+00	.0000E+00	.0000E+00	.0000E+00	.9500E+06

note: col. 7 = (col. 1*col. 2 + col. 3*col.4 + col. 5*col. 6)

NODAL DISTRIBUTION OF INITIAL ACTIVITIES - BEFORE SHUTDOWN (Ci)

NODES		1	2	3	4	5	8
NODE NAME		RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm
ISOTOPE	GROUP						
Kr--83m	4	.700E+05	.630E-01	.117E+00	.000E+00	.000E+00	.000E+00
Kr--85m	4	.150E+06	.135E+00	.250E+00	.000E+00	.000E+00	.000E+00
Kr---85	4	.185E+05	.166E-01	.309E-01	.000E+00	.000E+00	.000E+00
Kr---87	4	.275E+06	.247E+00	.459E+00	.000E+00	.000E+00	.000E+00
Kr---88	4	.395E+06	.355E+00	.660E+00	.000E+00	.000E+00	.000E+00
Kr---89	4	.485E+06	.436E+00	.810E+00	.000E+00	.000E+00	.000E+00
Xe-131m	4	.385E+04	.346E-02	.643E-02	.000E+00	.000E+00	.000E+00
Xe-133m	4	.165E+06	.148E+00	.276E+00	.000E+00	.000E+00	.000E+00
Xe--133	4	.115E+07	.103E+01	.192E+01	.000E+00	.000E+00	.000E+00
Xe-135m	4	.230E+06	.207E+00	.384E+00	.000E+00	.000E+00	.000E+00
Xe--135	4	.325E+06	.292E+00	.543E+00	.000E+00	.000E+00	.000E+00
Xe--137	4	.100E+07	.900E+00	.167E+01	.000E+00	.000E+00	.000E+00
Xe--138	4	.950E+06	.855E+00	.159E+01	.000E+00	.000E+00	.000E+00

ACTIVITIES - AFTER .0000E+00 hours (Ci)

NODES		1	2	3	4	5	8
NODE NAME		RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm
ISOTOPE	GROUP						
Kr--83m	4	.700E+05	.630E-01	.117E+00	.000E+00	.000E+00	.000E+00
Kr--85m	4	.150E+06	.135E+00	.250E+00	.000E+00	.000E+00	.000E+00
Kr---85	4	.185E+05	.166E-01	.309E-01	.000E+00	.000E+00	.000E+00
Kr---87	4	.275E+06	.247E+00	.459E+00	.000E+00	.000E+00	.000E+00
Kr---88	4	.395E+06	.355E+00	.660E+00	.000E+00	.000E+00	.000E+00
Kr---89	4	.485E+06	.436E+00	.810E+00	.000E+00	.000E+00	.000E+00
Xe-131m	4	.385E+04	.346E-02	.643E-02	.000E+00	.000E+00	.000E+00
Xe-133m	4	.165E+06	.148E+00	.276E+00	.000E+00	.000E+00	.000E+00
Xe--133	4	.115E+07	.103E+01	.192E+01	.000E+00	.000E+00	.000E+00
Xe-135m	4	.230E+06	.207E+00	.384E+00	.000E+00	.000E+00	.000E+00
Xe--135	4	.325E+06	.292E+00	.543E+00	.000E+00	.000E+00	.000E+00
Xe--137	4	.100E+07	.900E+00	.167E+01	.000E+00	.000E+00	.000E+00
Xe--138	4	.950E+06	.855E+00	.159E+01	.000E+00	.000E+00	.000E+00

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	1	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	1 1 1 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

calc. title: Case C6-nc6061, rev. 1, MSLB Accident Nobles only, 10.42 gpm, HVAC 7 preparer: wmb

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.101E+02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.700E-02	.000E+00	.000E+00	.864E+03
3	.000E+00	.000E+00	.000E+00	.426E-02	.000E+00	.000E+00	.526E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.523E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.318E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

FOR: ELEM. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FOR: ORG. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

FOR: PART. I
FILTERED REMOVAL EFFICIENCY BETWEEN NODES "FILT_FLOW_REMOVE" (IN EFFICIENCY FRACTION)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.990E+00	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03
OCCUPANCY	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01

TIME STEP NUMBER 1 - .0000E+00 to .5000E+00 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	2	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	0	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	0	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.101E+02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.195E-03	.000E+00	.000E+00	.240E+02
3	.000E+00	.000E+00	.000E+00	.426E-02	.000E+00	.000E+00	.526E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.145E-01	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.318E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 2 - .5000E+00 to .2000E+01 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	3	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	0	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	0	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

calc. title: Case C6-nc6061, rev. 1, MSLB Accident Nobles only, 10.42 gpm, HVAC 7 preparer: wmb

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.101E+02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.195E-03	.000E+00	.000E+00	.240E+02
3	.000E+00	.000E+00	.000E+00	.333E-02	.000E+00	.000E+00	.411E+03
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.273E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.145E-01	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.249E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

TIME STEP NUMBER 3 - .2000E+01 to .8000E+01 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

fiit_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	4	time step which corresponds to the time dependent data
iunfilt	1	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	1	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0 0 0 0 0 0 0	read in filter removal effic. for each isotope group for this time step. 0 = no / 1= yes ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

UNFILTERED FLOW RATE BETWEEN NODES - VARIABLE "UNFILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.000E+00	.917E+04	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

FILTERED FLOW RATE BETWEEN NODES - VARIABLE "FILT_FLOW" (gpm)

TO NODES	1	2	3	4	5	8	
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	environment
FROM NODE							
1	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
3	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
4	.000E+00	.000E+00	.000E+00	.355E+05	.000E+00	.000E+00	.000E+00
5	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
8	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

note: a flow rate from node x to node x represents recirculation flow

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.175E-03	.175E-03
OCCUPANCY	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01	.100E+01

TIME STEP NUMBER 4 - .8000E+01 to .2400E+02 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

TIME STEP NUMBER 5 - .2400E+02 to .9600E+02 (hours)

TIME DEPENDENT INPUT
(REPEATED FOR EACH TIME STEP)

itime_step	5	time step which corresponds to the time dependent data
iunfilt	0	read in unfiltered flow data for this time step 0 = no / 1 = yes
ifilt	0	read in filtered flow data for this time step 0 = no / 1 = yes
ifilt_remove	0 0 0 0 0	read in filter removal effic. for each isotope
	0 0 0 0 0	group for this time step. 0 = no / 1= yes
	0	ie. (ifilt_remove(1)=1 : read in group 1 data)
iremove	0	read in removal constants for this time step 0 = no/ 1 = yes (in units "1/tstep_unit") (1/hours)
ioccupancy	1	read in occupancy factors for this time step 0 = no/ 1 = yes (in units of %/day)
ibreath_rate	1	read in breathing rates for this time step 0 = no/ 1 = yes (in units of m3/sec)
icontrol	1	read in control room data 0 = no/ 1 = yes

BREATHING RATE (M3/SEC), OCCUPANCY FACTORS (%/TIME STEP)

NODES	1	2	3	4	5	8	9	10
NODE NAME	RCS	AFF. SG	UNAFF SG	TSC	DUMMY ENV	control rm	epz	lpz
BREATH. RATE	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.347E-03	.232E-03	.232E-03
OCCUPANCY	.600E+00	.600E+00	.600E+00	.600E+00	.600E+00	.600E+00	.100E+01	.100E+01

TIME STEP NUMBER 5 - .2400E+02 to .9600E+02 (hours)

CONTROL ROOM FILTER EFFICIENCY FRACTION AND FLOW (gpm) - MODEL 2

filt_cr	.2468E+05	filtered intake rate
unfilt_cr	.7480E+02	unfiltered intake rate
recirc_cr	.1066E+06	recirculation rate
exhaust_cr	.2476E+05	exhaust rate from control room

ISOTOPE GROUP	FILTER EFFICIENCY FRACTION	
	INTAKE	RECIRCULATION
ELEM. I	.9900E+00	.9333E+00
ORG. I	.9817E+00	.7333E+00
PART. I	.9900E+00	.9900E+00
NOB. GAS	.0000E+00	.0000E+00
Cs, Rb	.0000E+00	.0000E+00
Te, Se	.0000E+00	.0000E+00
Sr, Ba	.0000E+00	.0000E+00
NOB. MET.	.0000E+00	.0000E+00
RARE EARTH	.0000E+00	.0000E+00
MISC.	.0000E+00	.0000E+00
HALOGENS	.0000E+00	.0000E+00

NODE NAME: RCS

SUMMARY OF CUMULATIVE DOSE FOR NODE 1 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.3108E+07	.2108E+07
.5000E+00 to .2000E+01	.0000E+00	.7438E+07	.4429E+07
.2000E+01 to .8000E+01	.0000E+00	.1471E+08	.8497E+07
.8000E+01 to .2400E+02	.0000E+00	.1960E+08	.1328E+08
.2400E+02 to .9600E+02	.0000E+00	.2456E+08	.1991E+08

NODE NAME: AFF. SG

SUMMARY OF CUMULATIVE DOSE FOR NODE 2 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.2394E+05	.1425E+05
.5000E+00 to .2000E+01	.0000E+00	.2108E+06	.1141E+06
.2000E+01 to .8000E+01	.0000E+00	.1403E+07	.8006E+06
.8000E+01 to .2400E+02	.0000E+00	.2882E+07	.2248E+07
.2400E+02 to .9600E+02	.0000E+00	.4387E+07	.4255E+07

NODE NAME: UNAFF SG

SUMMARY OF CUMULATIVE DOSE FOR NODE 3 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.2233E+03	.1335E+03
.5000E+00 to .2000E+01	.0000E+00	.1920E+04	.1040E+04
.2000E+01 to .8000E+01	.0000E+00	.1269E+05	.7244E+04
.8000E+01 to .2400E+02	.0000E+00	.2605E+05	.2031E+05
.2400E+02 to .9600E+02	.0000E+00	.3963E+05	.3843E+05

NODE NAME: TSC

SUMMARY OF CUMULATIVE DOSE FOR NODE 4 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.9069E-02	.1585E+00
.5000E+00 to .2000E+01	.0000E+00	.3475E-01	.5814E+00
.2000E+01 to .8000E+01	.0000E+00	.9769E-01	.1696E+01
.8000E+01 to .2400E+02	.0000E+00	.1041E+00	.1836E+01
.2400E+02 to .9600E+02	.0000E+00	.1041E+00	.1836E+01

NODE NAME: DUMMY ENV

SUMMARY OF CUMULATIVE DOSE FOR NODE 5 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.1910E-01	.1065E-01
.5000E+00 to .2000E+01	.0000E+00	.4846E+00	.2595E+00
.2000E+01 to .8000E+01	.0000E+00	.3968E+01	.2296E+01
.8000E+01 to .2400E+02	.0000E+00	.1075E+02	.8954E+01
.2400E+02 to .9600E+02	.0000E+00	.1772E+02	.1825E+02

NODE NAME: control rm

SUMMARY OF CUMULATIVE DOSE FOR NODE 8 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.8462E-02	.8198E-01
.5000E+00 to .2000E+01	.0000E+00	.4331E-01	.4004E+00
.2000E+01 to .8000E+01	.0000E+00	.1438E+00	.1389E+01
.8000E+01 to .2400E+02	.0000E+00	.1640E+00	.1645E+01
.2400E+02 to .9600E+02	.0000E+00	.1640E+00	.1645E+01

NODE NAME: epz

SUMMARY OF CUMULATIVE DOSE FOR NODE 9 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.1706E+00	.1016E+00
.5000E+00 to .2000E+01	.0000E+00	.2147E+00	.1251E+00
.2000E+01 to .8000E+01	.0000E+00	.2147E+00	.1251E+00
.8000E+01 to .2400E+02	.0000E+00	.2147E+00	.1251E+00
.2400E+02 to .9600E+02	.0000E+00	.2147E+00	.1251E+00

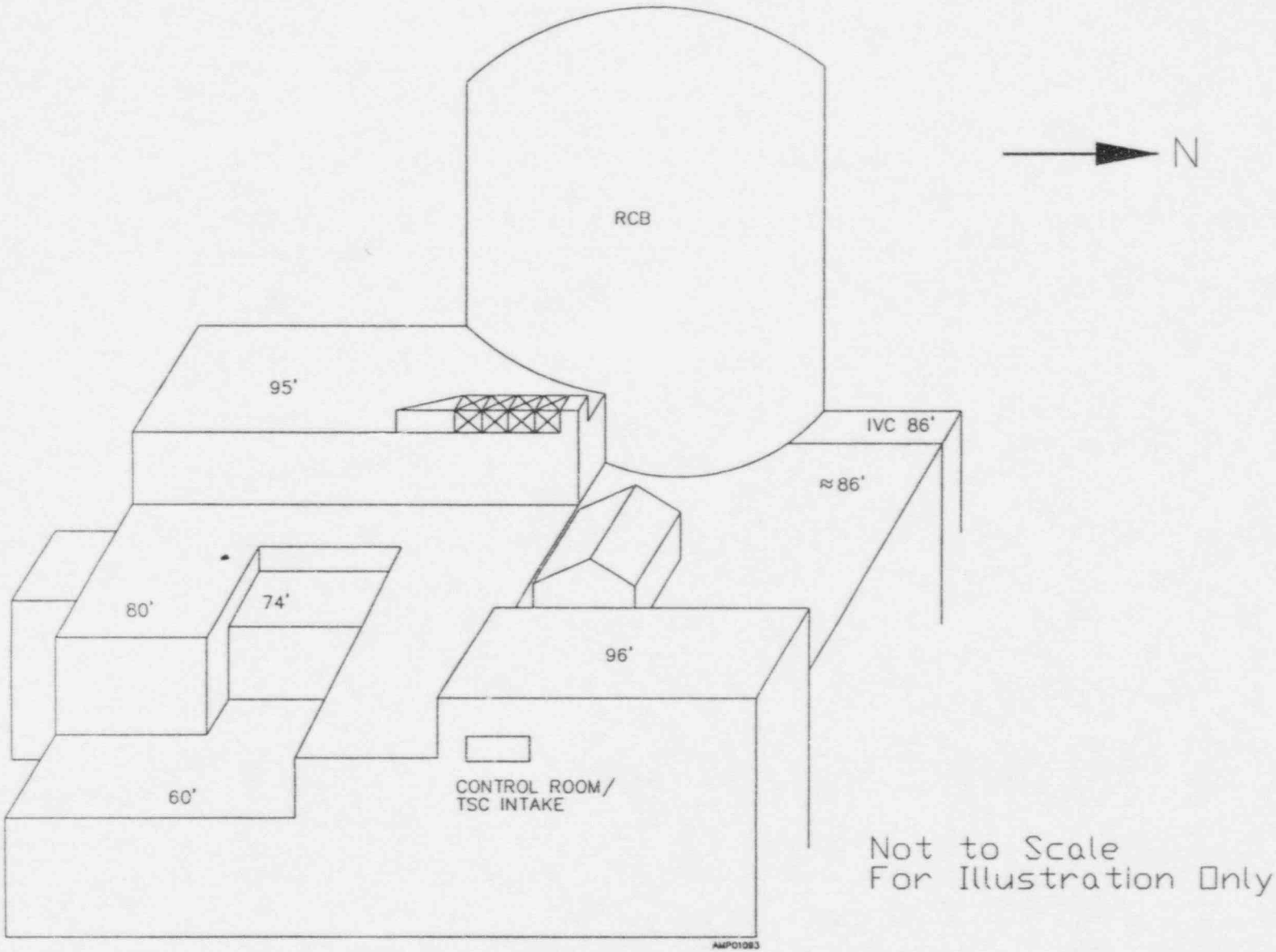
NODE NAME: lpz

SUMMARY OF CUMULATIVE DOSE FOR NODE 10 (REM) AS A FUNCTION OF TIME

TIME STEP (hours)	THYROID	WHOLE BODY	BETA
.0000E+00 to .5000E+00	.0000E+00	.4988E-01	.2969E-01
.5000E+00 to .2000E+01	.0000E+00	.6277E-01	.3658E-01
.2000E+01 to .8000E+01	.0000E+00	.9612E-01	.5578E-01
.8000E+01 to .2400E+02	.0000E+00	.9612E-01	.5578E-01
.2400E+02 to .9600E+02	.0000E+00	.9612E-01	.5578E-01

ATTACHMENT 4

PLANT GENERAL ARRANGEMENT DRAWINGS


RCB
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CONTROL ROOM/
TSC INTAKE
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