0042755

JACOBS ENGINEERING GROUP, INC.
1995

(INPUT/OUTPUT FILES)

JAN 1996
RECEIVED
EDMC

GEN II RUNS
FDEIS
11-23-95

phased implementation								
		x2.8	per yr		x2.8	per yr		
am241	3.26E-06	9.13E-06	9.13E-07	1.44E-03	4.03E-03	4.03E-04		
c14	4.00E+02	1.12E+03	1.12E+02	4.20E+02	1.18E+03	1.18E+02		
cs137	1.87E-02	5.24E-02	5.24E-03	1.04E+00	2.91E+00	2.91E-01		
pu239/240	7.90E-07	2.21E-06	2.21E-07	1.58E-03	4.42E-03	4.42E-04		
sr90	7.20E-04	2.02E-03	2.02E-04	1.60E+00	4.48E+00	4.48E-01		
tc99	9.83E-06	2.75E-05	2.75E-06	9.95E-05	2.79E-04	2.79E-05		
at 100% capacity							10 yr	
		source sep/law ✓				dose/yr	tot dose	risk
am241	3.26E-06	9.13E-06	9.13E-07		onsite pop	7.10E-03	7.10E-02	2.84E-05
c14	4.00E+02	1.12E+03	1.12E+02		onsite me	5.80E-06	5.80E-05	2.32E-08
cs137	1.87E-02	5.24E-02	5.24E-03		offsite pop	3.2	3.20E+01	0.016
pu239/240	7.90E-07	2.21E-06	2.21E-07		offsite me	9.10E-05	9.10E-04	4.55E-07
sr90	7.20E-04	2.02E-03	2.02E-04					
tc99	9.83E-06	2.75E-05	2.75E-06				4 yr	
						dose/yr	tot dose	risk
					onsite pop	7.10E-03	2.84E-02	1.14E-05
					onsite me	5.80E-06	2.32E-05	9.28E-09
					offsite pop	3.2	1.28E+01	0.0064
					offsite me	9.10E-05	3.64E-04	1.82E-07
		source sep/law/hlw ✓					6 yr	
am241	1.44E-03	4.03E-03	4.03E-04			dose/yr	tot dose	risk
c14	4.20E+02	1.18E+03	1.18E+02		onsite pop	2.50E-02	1.50E-01	0.00006
cs137	1.04E+00	2.91E+00	2.91E-01		onsite me	2.00E-05	1.20E-04	4.8E-08
pu239/240	1.58E-03	4.42E-03	4.42E-04		offsite pop	3.7	2.22E+01	0.0111
sr90	1.60E+00	4.48E+00	4.48E-01		offsite me	1.10E-04	6.60E-04	3.3E-07
tc99	9.95E-05	2.79E-04	2.79E-05					

Unit Continued Op A/Q MEI Work Public

TITLE: SOURCE FOR NONINVOLVED WORKER AND PUBLIC

10-13-95

Alternative	1.0 No Action					2.0 Long Term Management				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NOT APPLICABLE					NO EMISSIONS				
Operation										
Continued Operations	emiss1.xls	100 yr	Ground			emiss1.xls	100 yr	Ground		
	Total Alpha=2.88E-08 Ci/yr					See No Action				
	Total Beta=7.91E-07 Ci/yr					100% of current				
-Monitor SSTs, DSTs, and MUSTs	Sr-90=1.81E-05 Ci/yr									
	Cs-137=5.38E-05 Ci/yr S11					S21 = S11				
	I-129=4.6E-05 Ci/yr		100% of current							
-Operate 242A Evaporator	emit.xls	10 yr	6.7 m	10.3 cu m/s	46 C	emit.xls (periodic)	10 yr	6.7 m	10.3 cu m/s	46 C
	Tot. Alpa =2.1E-5 Ci/Y		.53 m			See No Action		.53 m		
	Tot. Beta=1.2E-5 Ci/Y S12					S22 = S12				
Retrieval		NOT APPLICABLE				Cs-137=.0007 Ci		Ground		
						I-129=.001 Ci	10 yr			
						Sr-90=.0001 Ci S23	(per memo from Colin)			
Evaporate DSTS (a)		NOT APPLICABLE				emit.xlas (continuous)	10 yr	6.7 m	10.3 cu m/s	46 C
						Tot. Alpha=1.4E-04 Ci/Y				
						Tot. Beta=8.04E-05 Ci/Y S24		.53 m		
Separations		NOT APPLICABLE					NOT APPLICABLE			
Vitrify Tank Waste (a)		NOT APPLICABLE					NOT APPLICABLE			
Process Capsules		NOT APPLICABLE					NOT APPLICABLE			
Storage and Disposal		NOT APPLICABLE					NOT APPLICABLE			
Monitoring and Maintenance		NOT APPLICABLE					NOT APPLICABLE			
Post Remediation										
Closure		NOT APPLICABLE					NOT APPLICABLE			
Monitoring of Final Waste Form		NOT APPLICABLE					NOT APPLICABLE			

(a) for gravel and fill, these emissions are based on ten times the value of current emissions per hour for 24 hours (3 days) for 22 tanks per year.

All is current

Alternative	3.0 Minimal Retrieval In Situ Vitrification					4.0 In Situ Fill and Cap				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NO EMISSIONS					NO EMISSIONS				
Operation										
Continued Operations	emiss1.xls See No Action 82% of current 531	100 yr	Ground			emiss1.xls See No Action 75% of current 541	100 yr	Ground		
-Monitor SSTs, DSTs, and MUSTs										
-Operate 242A Evaporator	emit.xls (periodic) See No Action 532	10 yr	6.7 m .53 m	10.3 cu m/s	46 C	emit.xls (periodic) See No Action 542	10 yr	6.7 m .53 m	10.3 cu m/s	46 C
Retrieval	NOT APPLICABLE					NOT APPLICABLE				
Evaporate DSTS (a)	emit.xlas (continuous) See Long Term Mgmt 533	5 yr	6.7 m .53 m	10.3 cu m/s	46 C	emit.xlas (continuous) See Long Term Mgmt 543	5 yr	6.7 m .53 m	10.3 cu m/s	46 C
Separations	NOT APPLICABLE					NOT APPLICABLE				
Vitrify Tank Waste (a)	Table D.45 534 pg. D-88 ~~534~~	9 yr	31 m .33m	4.3 cu m/s	93 oC	Total Alpha=9.83E-11 Ci/yr Total Beta=2.69E-09 Ci/yr Sr-90=2.91E-08 Ci/yr 544 Cs-137=1.81E-07 Ci/yr I-129=1.57E-07 Ci/yr	8 yr	Ground		
Process Capsules	NOT APPLICABLE					NOT APPLICABLE				
Storage and Disposal	NO EMISSIONS					NO EMISSIONS				
Monitoring and Maintenanc	NO EMISSIONS					NO EMISSIONS				
Post Remediation										
Closure	NO EMISSIONS					NO EMISSIONS				
Monitoring of Final Waste Fo	NO EMISSIONS					NO EMISSIONS				

(a) for gravel and fill, these e

Alternative	6.0 Selective Retrieval					7.0 Extensive Retrieval (Ex Situ Vit) Alternative				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NO EMISSIONS					NO EMISSIONS				
Operation										
Continued Operations	emiss1.xls See No Action 53% of current S61	~~100 yr~~ 29 yr	Ground			emiss1.xls See No Action 59% of current S71	~~100 yr~~ 29 yr	Ground		
-Monitor SSTs, DSTs, and MUSTs										
-Operate 242A Evaporator	emit.xls (periodic) See No Action S62	10 yr	6.7 m .53 m	10.3 cu m/s	46 C	emit.xls (periodic) See No Action S72	10 yr	6.7 m .53 m	10.3 cu m/s	46 C
Retrieval	Assume 50% of S73 ~~Table D.60~~ S63	26 yr	Ground			~~Table D.60~~ S73	26 yr	Ground		
Evaporate DSTS (a)	emit.xlas (continuous) See Long Term Mgmt S64	5 yr	6.7 m .53 m	10.3 cu m/s	46 C	NOT APPLICABLE				
Separations	INCLUDED IN VITRIFICATION					INCLUDED IN VITRIFICATION				
Vitrify Tank Waste (a)	Table D.54 pg. D-103 S65	24 yr	55 m .88 m	33 cu m/s	160 oC	Table D.61	24 yr	55 m	33 cu m/s	160 oC
	See insitu gravel and fill (60%) S66	~~7~~ 3 yr	Ground			S74		.88 m		
Process Capsules	NOT APPLICABLE					NOT APPLICABLE				
Storage and Disposal	NO EMISSIONS					NO EMISSIONS				
Monitoring and Maintenanc	NO EMISSIONS					NO EMISSIONS				
Post Remediation										
Closure	NO EMISSIONS					NO EMISSIONS				
Monitoring of Final Waste Fo	NO EMISSIONS					NO EMISSIONS				

(a) for gravel and fill, these e

Alternative	8.0 No Separations Alternative					9.0 Extensive Separations Alternative				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NO EMISSIONS					NO EMISSIONS				
Operation										
Continued Operations	emiss1.xls See No Action 69% of current 581	~~100 yr~~ 24 yr	Ground			emiss1.xls See No Action 58% of current 591	~~100 yr~~ 30 yr	Ground		
-Monitor SSTs, DSTs, and MUSTs										
-Operate 242A Evaporator	emit.xls (periodic) See No Action 582	10 yr	6.7 m .53 m	10.3 cu m/s	46 C	emit.xls (periodic) See No Action 592	10 yr	6.7 m .53 m	10.3 cu m/s	46 C
Retrieval	NO ~~Table D.60~~ 583	19 yr	Ground			NO ~~Table D.60~~ 593	23 yr	Ground		
Evaporate DSTS (a)	NOT APPLICABLE					NOT APPLICABLE				
Separations	NOT APPLICABLE									
Vitrify Tank Waste (a)	Table D.65 (change C-14 to 812 Ci or 58 Ci/Yr for calcination) 584	14 yr	55 m .88 m	33 cu m/s	160 oC	Table D.69 594	21 yr	55 m .88 m	33 cu m/s	160 C
Process Capsules	NOT APPLICABLE					NOT APPLICABLE				
Storage and Disposal	NO EMISSIONS					NO EMISSIONS				
Monitoring and Maintenanc	NO EMISSIONS					NO EMISSIONS				
Post Remediation										
Closure	NO EMISSIONS					NO EMISSIONS				
Monitoring of Final Waste Fo	NO EMISSIONS					NO EMISSIONS				

(a) for gravel and fill, these e

Alternative	*10.0 Capsule-No Action Alternative*					*11. Capsule-Onsite Storage*				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NOT APPLICABLE					NO EMISSIONS				
Operation										
Continued Operations	NOT APPLICABLE					NOT APPLICABLE				
-Monitor SSTs, DSTs, and MUSTs										
-Operate 242A Evaporator	NOT APPLICABLE					NOT APPLICABLE				
Retrieval	NOT APPLICABLE					NOT APPLICABLE				
Evaporate DSTS (a)	NOT APPLICABLE					NOT APPLICABLE				
Separations	NOT APPLICABLE					NOT APPLICABLE				
Vitrify Tank Waste (a)	NOT APPLICABLE					NOT APPLICABLE				
Process Capsules	wesfops.xls S101	10 yr	21 m	10.2 mps	20 C	wesfops.xls S111	19 yr	21 m	10.2 mps	20 C
			.53 m radius	9.2 cu m/s				.53 m radius	9.2 cu m/s	
Storage and Disposal	NOT APPLICABLE					NO EMISSIONS				
Monitoring and Maintenanc	NOT APPLICABLE					NOT APPLICABLE				
Post Remediation										
Closure	NOT APPLICABLE					NO EMISSIONS				
Monitoring of Final Waste Fo	NOT APPLICABLE					NO EMISSIONS				

(a) for gravel and fill, these e

Alternative	12.0 Capsule-Overpack and Ship					13.0 Capsule-Vitrify with Tank Waste				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NO EMISSIONS					NO EMISSIONS				
Operation										
Continued Operations	NOT APPLICABLE					NOT APPLICABLE				
-Monitor SSTs, DSTs, and MUSTs										
-Operate 242A Evaporator	NOT APPLICABLE					NOT APPLICABLE				
Retrieval	NOT APPLICABLE					NOT APPLICABLE				
Evaporate DSTS (a)	NOT APPLICABLE					NOT APPLICABLE				
Separations	NOT APPLICABLE					NOT APPLICABLE				
Vitrify Tank Waste (a)	NOT APPLICABLE					NOT APPLICABLE				
Process Capsules	wesfops.xls (S121)	19 yr	21 m	10.2 mps	20 C	wesfops.xls (S131)	19 yr	21 m	10.2 mps	20 C
			.53 m radius	9.2 cu m/s				.53 m radius	9.2 cu m/s	
Storage and Disposal	NOT APPLICABLE					NOT APPLICABLE				
Monitoring and Maintenanc	NOT APPLICABLE					NOT APPLICABLE				
Post Remediation										
Closure	NOT APPLICABLE					NOT APPLICABLE				
Monitoring of Final Waste Fo	NOT APPLICABLE					NOT APPLICABLE				

(a) for gravel and fill, these e

Request Number 88

Jacobs Engineering Group
Engineering Information Request - TWRS EIS

Requested By: Mike Harker Date: 5/23/95

Phone Number: 736-0616 Fax Number:

Request Information: Provide chemical constituents and concentrations that would be in the air emissions for the following routine operations: Tank farm, evaporator, fill and cap, In Situ vitrification, intermediate separations vit., intermediate separations vit., No separations vit, no separations calcination, extensive separations vit., extensive separations pretreatment, comb. vitrification, comb. pretreatment., comb. fill and cap., WESF basin storage, WESF retrieval and overpack, staged implementation vit, staged implementation pretreatment

Need Date: ASAP

Response: see attached

Data Source/Accuracy:

Prepared By: Colin Henderson

Date Sent/Faxed:

Concurrence:
Marc Nelson - Project Manager

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ENGINEERING INFORMATION REQUEST -88

Tank farm routine operations:
See attached spreadsheet titled Tank Farm Emissions From Current Operations. These tables provide the estimated chemical and radiological emissions from the existing tank farms. The release parameters associated with the tanks are indicated along with the type of ventilation. Passive ventilation refers to tank ventilation that occurs as a result of changes in atmospheric pressure as opposed to active ventilation where an exhauster is used to continually ventilate the tank.

Evaporator:
The operating emissions for the 232-A evaporator are provided in the attached spreadsheet for Tank Farm Emissions.

Fill and Cap:
The emissions from filling a tank with gravel were estimated using the current tank farm emissions. The emissions during the fill operation were estimated to be ten times higher on an hourly basis than routine emissions. The filling of a tank with gravel would take approximately 3 days of actual operations to complete. Estimated emissions on a tank farm by tank farm basis are provided in the attached spreadsheet titled Fill and Cap.

In Situ Vitrification:
The emissions during operations for the In Situ Vitrification alternative are provided in the attached spreadsheet titled ISV emissions.

Intermediate Separations:
The emissions are provided in the attached spreadsheet titled High Level Emissions and Lowlevel emissions. The spreadsheets identify the constituents in the stack gas from the High Level vitrification plant and the Low Level vitrification plant. The VOC emissions released from the tanks during waste retrieval operations is estimated at 3 times the annual rates provided in the spreadsheet for emissions from current operations. The emissions associated with retrieval would apply to all of the alternatives with out of tank waste treatment.

Note: this is for retrieval and transfer of the wastes from the tanks to the treatment facilities and treatment of the wastes. The emissions from pretreatment and treatment are combined in the LLW vitrification plant and released from a single stack.

No Separations (vitrification):
The routine emissions from the No Separations (vitrification) plant would be released out of an elevated stack. The chemical constituents and the concentrations are provided in the attached spreadsheet titled

No Separations (calcination):
The routine emissions from the No Separations (calcination) plant would be released out of an elevated stack. The chemical emissions from the calcination would be essentially the same except for the N0x which would be 5 times the levels reported for the No Separations (vitrification) alternative.

Extensive Separations:
The emissions from extensive separations should be in the same general levels as the emissions from the Intermediate Separations alternative. A spread sheet of the stack emissions for the extensive separations emissions based on the material balance calculations has not been performed due to lack of time. If any individual components identified in the Intermediate Separations spreadsheet tables are of interest they can be provided on an as needed basis. Table 9-5 attached from the extensive separations data package provides a summary of the non radiological emissions. Any of the emissions identified can be converted to concentrations using the formula at the bottom of the table. The Extensive Separations alternative is assumed to have a single stack where the off-gasses from the LLW, Separations, and HLW processes would be combined prior to release.

In Situ/ Ex Situ Combination:
(comb. fill and cap, comb. vitrification, and comb. pretreatment)

This alternative is a combination of the Fill and Cap alternative for those tanks left in place and Intermediate Separations alternative for those wastes retrieved. The chemical constituents and concentrations released during operations should be similar to the two above mentioned alternatives.

WESF Storage Basin:
The emissions data provided for the WESF capsule storage basins was limited to radionuclides. No chemical emissions were reported and the nature of the activities associated with continued storage of the cesium and strontium capsules in water filled basins should result in minimal chemical emissions.

WESF Retrieval and Overpack:
Retrieval of the cesium and strontium capsules from the water basins and overpacking into canisters would result in negligible chemical emissions.

Staged Implementation (pretreatment and vitrification)
This alternative consists of building two Low Activity waste processing plants (20 mt/day capacity) and one HLW waste treatment facility (one mt/day capacity) to process approximately 10% of the tank waste. The waste types identified to date for retrieval and treatment during this phase are liquid DST wastes. These wastes are fairly well characterized and are considered the easiest wastes to process. The chemical constituents and concentrations released during operations of this alternative would be similar in type and concentration to the Intermediate Separations alternative.

TPA STACK STREAMS

SEPARATIONS AND LLW VITRIFICATION

STREAMS
907=702+706+434+522+645+903
917=911+914
factor=(200 mt/day/3.87E5)*91.8583lb/hr=4.747E-2

	702	706	434	522	645	903	sum of streams	907
MT gas	1.39E+04	0	2.78E+06	0	2.61E+05	0		3.05E+06
MT solid	0	0	1.94E-03	0	1.55E-04	0		1.05E-06
Total MT	1.39E+04	0.00E+00	2.78E+06	0.00E+00	2.61E+05	0.00E+00	3.05E+06	3.05E+06
Factor	4.75E-02	4.75E-02	4.75E-02	4.75E-02	4.75E-02	4.75E-02		4.75E-02
mass flow rate (lb/hr)	659.833	0	131968.6	0	12389.67	0		144783.5
molecular weight	27.63	28.26	28.76	28.76	37.61			29.5
temperature deg F	177	130	438	442	150			420.4278
flow scfm	153.187		29433.64	0	2113.125		31699.95	31482.25

HLW STREAMS

TPA HLW STREAMS	702	706	340	522	645	903		907
MT gas	7.19E+02	0	1.80E+05	0	2.09E+04	0		2.02E+05
MT solid	0	0	1.28E-04	0	9.89E-06	0		6.78E-08
Total MT	7.19E+02	0.00E+00	1.80E+05	0.00E+00	2.09E+04	0.00E+00	2.02E+05	2.02E+05
Factor	7.32E-02	7.32E-02	7.32E-02	7.32E-02	7.32E-02	7.32E-02		7.32E-02
mass flow rate (lb/hr)	52.6308	0	13176	0	1529.68	0		14786.4
molecular weight	27.63	28.26	28.75	28.75	38.13			29.66229
Temperature deg F	180	130	447	447	150			423.7172
flow scfm	12.21878	0	2939.778	0	257.3708		3209.367	3197.618

Note: the 150 deg F temp for streams 917 (both HLW and LLW) is a best estimate, no data was provided

TPA STACK STREAMS

SEPARATIONS AND LLW VITRIFICATION

STREAMS
907=702+706+434+522+645+903
917=911+914
factor=(200 mt/day/3.87E5)*91.8583lb/hr=4.747E-2

	911	914	917	total flow 907+917 scfm	total flow acfm
MT gas	0	4.87E+05	4.87E+05		
MT solid	0	3.92E+02	1.96E-01		
Total MT	0.00E+00	4.87E+05	4.87E+05		
Factor	4.75E-02	4.75E-02	4.75E-02		
mass flow rate (lb/hr)	0	23136.5	23117.9	167901.40	
molecular weight	29	29	29		
temperature deg F			150	382.64	
flow scfm		5117.624	5113.51	36595.76	58404

TPA HLW STREAMS	911	914	917		
MT gas	0	3.16E+04	3.16E+04		
MT solid	0	2.54E+01	1.27E-02		
Total MT	0.00E+00	3.16E+04	3.16E+04		
Factor	7.32E-02	7.32E-02	7.32E-02		
mass flow rate (lb/hr)	0	2314.979	2313.121	17099.52	
molecular weight	29	29	29		
Temperature deg F			150	385.98	
flow scfm	0	512.06	511.65	3709.26	5943

TPA HLW stack flows								
LIQUID COMPONENTS								
	Regulated	stream						
		907	917	totals mt	ANNUAL AVE	24 hour avg.	peak hourly	peak conc.
VOLUME					TOTAL/23 year	ann ave/219	(daily ave/24)x2.6	peak hrly/stack flow
SP. GRAVITY				metric tons	kg/year	kg/ 24 hr	kg/hr	grams / cubic meter
Cs and Ba,(MCi)								
Sr and Y, (MCi)								
Tc, (MCi)								
Am, (MCi)								
Np, (MCi)								
Pu-239, (MCi)								
Pu-240, (MCi)								
Pu-241, (MCi)								
TRU, (MCi)								
Total MCi								
Total Mass Flow,(MT)		2.02E+05	3.16E+04	233600	1.02E+07	4.64E+04	5.02E+03	4.98E+02
Total Cr, (MT)								
Total Na, (MT)	WAC-460-160							
Total Si,(MT)	PP							
Total P, (MT)								
Total NO2-, (MT)								
Total NO3-, (MT)								
Ag+	WAC-460-130							
Al(OH)4-	WAC-460							
Am+3								
As+5	WAC-460							
B+3								
Ba+2	WAC-460 ?							
Be+2	40CFR/WAC460							
Bi+3								
C 14				4.54E-04	1.97E-02	9.01E-05	9.76E-06	9.67E-07
Ca+2								
Cd+2	WAC-460-130							
Ce+3								

HIGH LEVEL Emissions

Cl-									
Cl2	WAC-460-160	4.17E+00		4.17	1.81E+02	8.28E-01	8.97E-02	8.88E-03	← 4.4E-5 following treatment.
CO	WAC-460-160	2.03E+02		203	8.83E+03	4.03E+01	4.37E+00	4.32E-01	
CO2	WAC-460-160	1.69E+04		16900	7.35E+05	3.36E+03	3.63E+02	3.60E+01	
CO3-2	WAC-460-160								
Cr(OH)4-	WAC-460-160								
Cs+									
Cu+2	WAC-460-160								
F-									
F2	WAC-460-160	6.21E+01		62.1	2.70E+03	1.23E+01	1.34E+00	1.32E-01	← 6.6E-04 following treatment
Fe+3									
H2									
H2O		3.14E+03		3140	1.37E+05	6.23E+02	6.75E+01	6.69E+00	
H2S	WAC								
Hg	WAC-460-160								
Hg+2	WAC								
I-									
I2	WAC-460	2.14E+01		21.4	9.30E+02	4.25E+00	4.60E-01	4.56E-02	
K+									
Kerosene									
La+3									
Li+									
Mg+2									
MnO2	WAC-460-160								
Mo+6									
N2		1.42E+05	2.50E+04	167000	7.26E+06	3.32E+04	3.59E+03	3.56E+02	
Na+									
NH3	WAC-460-160	1.83E+01		18.3	7.96E+02	3.63E+00	3.94E-01	3.90E-02	
Ni+3	WAC-460-130								
NO	PP	9.98E-02		0.0998	4.34E+00	1.98E-02	2.15E-03	2.13E-04	
NO2	PP	4.28E+00		4.28	1.86E+02	8.50E-01	9.21E-02	9.12E-03	
NO2-									
NO3-									
Np+4									
O2		3.95E+04	6.63E+03	46130	2.01E+06	9.16E+03	9.92E+02	9.82E+01	
OH-									
Pb+4	WAC/40CFR								

PO4-3								
POLY								
Pu+4								
S								
Si+4								
SO2	PP	4.60E+00		4.6	2.00E+02	9.13E-01	9.89E-02	9.80E-03
SO4-2								
Sr+2								
S								
TcO2								
TcO4-								
TOC								
UO2+2	WAC-460							
V+5								
W+6	WAC460							
ZN+2								
Zr=4								
ZRO2:2H2O								
SOLIDS COMPONENTS								
Cs and Ba,(MCI)		1.69E-10	3.41E-05	3.41E-05	1.48E-03	6.77E-06	7.33E-07	7.26E-08
Sr and Y, (MCI)		2.64E-10	5.33E-05	5.33E-05	2.32E-03	1.06E-05	1.15E-06	1.14E-07
Tc, (MCI)		1.48E-14	2.99E-09	2.99E-09	1.30E-07	5.94E-10	6.43E-11	6.37E-12
Am, (MCI)		2.38E-13	4.81E-08	4.81E-08	2.09E-06	9.55E-09	1.03E-09	1.02E-10
Np, (MCI)		2.32E-16	4.70E-11	4.7E-11	2.04E-09	9.33E-12	1.01E-12	1.00E-13
Pu-239, (MCI)		6.17E-14	1.25E-08	1.25E-08	5.43E-07	2.48E-09	2.69E-10	2.66E-11
Pu-240, (MCI)		1.57E-14	3.18E-09	3.18E-09	1.38E-07	6.31E-10	6.84E-11	6.77E-12
Pu-241, (MCI)		1.83E-13	3.71E-08	3.71E-08	1.61E-06	7.37E-09	7.98E-10	7.90E-11
TRU, (MCI)		4.99E-13	1.01E-07	1.01E-07	4.39E-06	2.01E-08	2.17E-09	2.15E-10
Total MCI		4.33E-10	8.75E-05	8.75E-05	3.80E-03	1.74E-05	1.88E-06	1.86E-07
Total Mass Flow,(MT)		6.78E-08	1.27E-02	0.0127	5.52E-01	2.52E-03	2.73E-04	2.70E-05
Total Cr, (MT)		9.91E-11	2.00E-05	2E-05	8.70E-04	3.97E-06	4.30E-07	4.26E-08
Total Na, (MT)	WAC-460-160	6.29E-09	1.18E-03	0.00118	5.13E-02	2.34E-04	2.54E-05	2.51E-06
Total Si,(MT)	PP	1.57E-08	2.95E-03	0.00295	1.28E-01	5.86E-04	6.34E-05	6.28E-06
Total P, (MT)		7.33E-10	1.37E-04	0.000137	5.96E-03	2.72E-05	2.95E-06	2.92E-07
Total NO2-, (MT)								
Total NO3-, (MT)								

Ag+								
Ag2O		3.70E-12	7.48E-07	7.48E-07	3.25E-05	1.49E-07	1.61E-08	1.59E-09
Al+3								
Al2O3		4.68E-09	8.76E-04	0.000876	3.81E-02	1.74E-04	1.88E-05	1.87E-06
Am+3								
Am2O3		7.62E-14	1.54E-08	1.54E-08	6.70E-07	3.06E-09	3.31E-10	3.28E-11
As+5	WAC							
As2O5		1.92E-12	3.88E-07	3.88E-07	1.69E-05	7.70E-08	8.34E-09	8.26E-10
B+3								
B2O3	WAC-460-160	4.75E-09	8.89E-04	0.000889	3.87E-02	1.76E-04	1.91E-05	1.89E-06
Ba+2	?							
BaO	WAC	8.63E-12	1.76E-06	1.76E-06	7.65E-05	3.49E-07	3.79E-08	3.75E-09
Be+2	40CFR/WAC							
BeO		5.40E-14	1.09E-08	1.09E-08	4.74E-07	2.16E-09	2.34E-10	2.32E-11
Bi+3								
Bi2O3		5.47E-10	1.11E-04	0.000111	4.83E-03	2.20E-05	2.39E-06	2.36E-07
C 14								
Ca+2								
CANCRINITE								
CaO	WAC-460-160	5.11E-10	9.57E-05	9.57E-05	4.16E-03	1.90E-05	2.06E-06	2.04E-07
Cd+2	WAC-460-130							
CdO		2.27E-11	4.58E-06	4.58E-06	1.99E-04	9.09E-07	9.85E-08	9.75E-09
Ce+3								
Ce2O3		7.44E-10	1.39E-04	0.000139	6.04E-03	2.76E-05	2.99E-06	2.96E-07
Cl-								
CO3-2								
Cr+3	WAC-460-160							
Cr2O3		1.45E-10	2.93E-05	2.93E-05	1.27E-03	5.82E-06	6.30E-07	6.24E-08
Cs+								
Cs2O		2.40E-12	4.84E-07	4.84E-07	2.10E-05	9.61E-08	1.04E-08	1.03E-09
Cu	WAC-460-160							
Cu+2	WAC-460-160							
CuO		2.34E-12	4.72E-07	4.72E-07	2.05E-05	9.37E-08	1.02E-08	1.01E-09
CuSO4								
F-	WAC							
Fe+3								
Fe2O3	WAC-460-160	3.27E-09	6.13E-04	0.000613	2.67E-02	1.22E-04	1.32E-05	1.31E-06

Hg+2	WAC-460-160							
I-	WAC ?							
K+								
K2O		6.32E-11	1.28E-05	1.28E-05	5.57E-04	2.54E-06	2.75E-07	2.73E-08
La+3								
La2O3		6.16E-11	1.25E-05	1.25E-05	5.43E-04	2.48E-06	2.69E-07	2.66E-08
Li+								
Li2O		1.36E-09	2.54E-04	0.000254	1.10E-02	5.04E-05	5.46E-06	5.41E-07
Mg+2								
MgO	WAC-460-160	4.70E-11	9.51E-06	9.51E-06	4.13E-04	1.89E-06	2.05E-07	2.03E-08
MnO2	WAC-460-160	5.64E-10	1.06E-04	0.000106	4.61E-03	2.10E-05	2.28E-06	2.26E-07
Mo+6								
MoO3		3.04E-12	6.16E-07	6.16E-07	2.68E-05	1.22E-07	1.32E-08	1.31E-09
Na+								
Na20		8.48E-09	1.59E-03	0.00159	6.91E-02	3.16E-04	3.42E-05	3.39E-06
Ni+3	WAC-460-160							
Ni2FeCN6								
Ni2O3		2.32E-11	4.69E-06	4.69E-06	2.04E-04	9.31E-07	1.01E-07	9.99E-09
NiO		6.12E-10	1.15E-04	0.000115	5.00E-03	2.28E-05	2.47E-06	2.45E-07
NO2-								
NO3-								
Np+4								
NpO2		3.74E-13	7.56E-08	7.56E-08	3.29E-06	1.50E-08	1.63E-09	1.61E-10
OH-								
P2O5		1.68E-09	3.14E-04	0.000314	1.37E-02	6.23E-05	6.75E-06	6.69E-07
P2O5:24H2O								
Pb+4	PP/WAC							
Pb02	WAC	9.48E-12	1.92E-06	1.92E-06	8.35E-05	3.81E-07	4.13E-08	4.09E-09
PO4-3								
Pu+4								
PuO2		1.21E-12	2.45E-06	2.45E-06	1.07E-04	4.86E-07	5.27E-08	5.22E-09
Si+4								
SiO2		3.37E-08	6.31E-03	0.00631	2.74E-01	1.25E-03	1.36E-04	1.34E-05
SO4-2								
Sr+2								
SrO		1.07E-10	2.17E-05	2.17E-05	9.43E-04	4.31E-06	4.67E-07	4.62E-08
Tc2O7		1.36E-12	2.76E-07	2.76E-07	1.20E-05	5.48E-08	5.94E-09	5.88E-10

TcO4-								
TOC								
UO2+2	WAC-460							
UO3	WAC-460	4.52E-09	8.46E-04	0.000846	3.68E-02	1.68E-04	1.82E-05	1.80E-06
V+5								
V2O5	WAC-460-160	8.39E-13	1.70E-07	1.7E-07	7.39E-06	3.38E-08	3.66E-09	3.62E-10
WO2		1.10E-12	2.23E-07	2.23E-07	9.70E-06	4.43E-08	4.80E-09	4.75E-10
WO3		5.16E-15	1.04E-09	1.04E-09	4.52E-08	2.06E-10	2.24E-11	2.22E-12
ZN+2	WAC-460-160							
ZNO	WAC-460-160	2.97E-12	6.00E-07	6E-07	2.61E-05	1.19E-07	1.29E-08	1.28E-09
Zr+4								
ZRO2	WAC-460-160	1.86E-09	3.49E-04	0.000349	1.52E-02	6.93E-05	7.51E-06	7.43E-07
ZRO2:2H2O								
material balance based on TPA data package Rev B revcd. 3/16/95								
annual ave based on 23 year operations period								
24 hour ave. based on annual ave/number of operating days per year (365 days@60% OE=219 days)								
peak hourly rate based on plant capacity of 20 mt/operating day								

TPA LLW stack flows								
LIQUID COMPONENTS								
	Regulated	stream						
		907	917	totals mt	ANNUAL AVE	24 hour avg.	peak hourly	peak conc.
VOLUME					TOTAL/19	ann ave/219	(daily ave/24)x1.3	peak hourly/stack flow
SP. GRAVITY				metric tons	kg/year	kg/ 24 hr	kg/hr	grams/cubic meter
MASS FLOW MT		3.05E+06	4.87E+05	3.54E+06	1.86E+08	8.50E+05	4.60E+04	4.64E+02
Total Cr	WAC-460							
Total Na								
Total Si								
Total P	WAC-460-160							
Total NO2-,(MT)	PP							
Total NO3-, (MT)		2.05E+01		2.05E+01	1.08E+03	4.93E+00	2.67E-01	2.69E-03
Cs and Ba, (MCi)								
Sr and Y, (MCi)								
Tc, (MCi)								
Am, (MCi)								
Np, (MCi)								
Pu-239,(MCi)								
Pu-240,(MCi)								
Pu-241,(MCi)								
Total TRU, (MCi)								
Total (MCi)								
Ag+	WAC-460-130							
Al+3	WAC-460							
Am+3								
As+5	WAC-460							
B+3								
Ba+2	WAC-460 ?							
Be+2	40CFR/WAC460							
Bi+3								
C 14				7.46E-04	3.93E-02	1.79E-04	9.71E-06	9.79E-08
Ca+2								
Cd+2	WAC-460-130							
Ce+3								

Cl-									
Cl2	WAC-460-160	3.10E+02		3.10E+02	1.63E+04	7.45E+01	4.04E+00	4.07E-02	← 2.0E-4 following treatment
Cm+3									
CO	WAC-460-160	2.35E+03		2.35E+03	1.24E+05	5.65E+02	3.06E+01	3.08E-01	
CO2		1.89E+05		1.89E+05	9.95E+06	4.54E+04	2.46E+03	2.48E+01	
CO3-2	WAC-460-160								
Cr(OH)4-	?								
Cs+									
Cu+2	WAC-460-160								
DPCD									
F-									
F2	WAC-460-160	1.12E+03		1.12E+03	5.89E+04	2.69E+02	1.46E+01	1.47E-01	7.35E-4 following treatment
Fe+3									
H+		3.33E-01		3.33E-01	1.75E+01	8.00E-02	4.33E-03	4.37E-05	
H2									
H2O		5.83E+04		5.83E+04	3.07E+06	1.40E+04	7.59E+02	7.65E+00	
H2S	WAC								
Hg	WAC-460-160								
Hg+2	WAC								
I-									
I2	WAC-460	5.45E+02		5.45E+02	2.87E+04	1.31E+02	7.09E+00	7.15E-02	
K+									
Kerosene									
La+3									
Li+									
Mg+2									
MnO2	WAC-460-160								
Mo+6									
N2		2.21E+06	3.85E+05	2.60E+06	1.37E+08	6.24E+05	3.38E+04	3.40E+02	
Na+									
Nb+5									
NH3	WAC-460-160	1.63E+01		1.63E+01	8.58E+02	3.92E+00	2.12E-01	2.14E-03	
Ni+3	WAC-460-130	9.66E-02		9.66E-02	5.08E+00	2.32E-02	1.26E-03	1.27E-05	
NO	PP	3.11E+00		3.11E+00	1.64E+02	7.47E-01	4.05E-02	4.08E-04	
NO2	PP	1.39E+02		1.39E+02	7.32E+03	3.34E+01	1.81E+00	1.82E-02	
NO2-									
NO3-		2.05E+01		2.05E+01	1.08E+03	4.93E+00	2.67E-01	2.69E-03	

Np+4								
O2		5.95E+05	1.02E+05	6.97E+05	3.67E+07	1.68E+05	9.07E+03	9.14E+01
OH-								
OLIGIMER								
Pb+4	WAC/40CFR							
PO4-3								
POLY								
Pu+4								
Si+4								
SO2	PP	2.09E+02		2.09E+02	1.10E+04	5.02E+01	2.72E+00	2.74E-02
SO4-2								
Sr+2								
S								
TcO2								
TcO4-								
TOC								
UO2+2	WAC-460							
V+5								
W+6	WAC460							
ZN+2								
Zr+4								
ZRO2:2H2O								
SOLIDS COMPONENTS								
Cs and Ba, (MCI)		1.23E-12	2.49E-07	2.49E-07	1.31E-05	5.98E-08	3.24E-09	3.27E-11
Sr and Y, (MCI)		4.74E-12	9.59E-07	9.59E-07	5.05E-05	2.30E-07	1.25E-08	1.26E-10
Tc, (MCI)		6.48E-14	1.31E-08	1.31E-08	6.89E-07	3.15E-09	1.71E-10	1.72E-12
Am, (MCI)		2.15E-14	4.35E-09	4.35E-09	2.29E-07	1.05E-09	5.66E-11	5.71E-13
Np, (MCI)		2.58E-17	5.21E-12	5.21E-12	2.74E-10	1.25E-12	6.78E-14	6.83E-16
Pu-239, (MCI)		4.17E-17	8.43E-10	8.43E-10	4.44E-08	2.03E-10	1.10E-11	1.11E-13
Pu-240, (MCI)		1.03E-15	2.09E-10	2.09E-10	1.10E-08	5.02E-11	2.72E-12	2.74E-14
Pu-241,(MCI)		3.71E-15		3.71E-15	1.95E-13	8.92E-16	4.83E-17	4.87E-19
Total TRU,(MCI)		3.04E-14	5.41E-09	5.41E-09	2.85E-07	1.30E-09	7.04E-11	7.10E-13
Total MCI		6.07E-12	1.23E-06	1.23E-06	6.47E-05	2.96E-07	1.60E-08	1.61E-10
Total Mass Flow (MT)		1.05E-06	1.96E-01	1.96E-01	1.03E+01	4.71E-02	2.55E-03	2.57E-05
Total Cr (MT)	WAC460-160	3.89E-10	7.28E-05	7.28E-05	3.83E-03	1.75E-05	9.48E-07	9.55E-09
Total Na (MT)		1.94E-07	3.63E-02	3.63E-02	1.91E+00	8.72E-03	4.73E-04	4.76E-06

Total Si (MT)		2.89E-07	5.41E-02	5.41E-02	2.85E+00	1.30E-02	7.04E-04	7.10E-06
Total P (MT)	WAC460-160	3.65E-09	6.83E-04	6.83E-04	3.59E-02	1.64E-04	8.89E-06	8.96E-08
Total NO2-, (MT)	PP							
Total NO3-, (MT)								
Ag+	WAC460-160							
Ag2O	WAC460-160	8.79E-13	1.78E-07	1.78E-07	9.37E-06	4.28E-08	2.32E-09	2.33E-11
Al+3								
Al2O3		5.23E-08	9.79E-03	9.79E-03	5.15E-01	2.35E-03	1.27E-04	1.28E-06
Am+3								
Am2O3		6.89E-15	1.39E-09	1.39E-09	7.32E-08	3.34E-10	1.81E-11	1.82E-13
As+5	WAC							
As2O5		2.95E-12	5.96E-07	5.96E-07	3.14E-05	1.43E-07	7.76E-09	7.82E-11
B+3								
B2O3	WAC-460-160	4.17E-12	8.43E-07	8.43E-07	4.44E-05	2.03E-07	1.10E-08	1.11E-10
Ba+2	?							
BaO	WAC	2.20E-12	4.46E-07	4.46E-07	2.35E-05	1.07E-07	5.81E-09	5.85E-11
Be+2	40CFR/WAC							
BeO		5.67E-13	1.15E-07	1.15E-07	6.05E-06	2.76E-08	1.50E-09	1.51E-11
Bi+3								
Bi2O3		1.88E-10	3.80E-05	3.80E-05	2.00E-03	9.13E-06	4.95E-07	4.98E-09
C 14								
Ca+2								
CANCRINITE								
CaO	WAC-460-160	1.05E-07	1.96E-02	1.96E-02	1.03E+00	4.71E-03	2.55E-04	2.57E-06
Cd+2	WAC-460-130							
CdO		5.95E-12	1.20E-06	1.20E-06	6.32E-05	2.88E-07	1.56E-08	1.57E-10
Ce+3								
Ce2O3		6.97E-12	1.41E-06	1.41E-06	7.42E-05	3.39E-07	1.84E-08	1.85E-10
Cl-								
Co3-2								
Cr+3	WAC-460-160							
Cr2O3		5.68E-10	1.06E-04	1.06E-04	5.58E-03	2.55E-05	1.38E-06	1.39E-08
Cs+								
Cs2O		1.71E-14	3.45E-09	3.45E-09	1.82E-07	8.29E-10	4.49E-11	4.53E-13
Cu	WAC-460-160							
Cu+2	WAC-460-160							
CuO		5.53E-13	1.12E-07	1.12E-07	5.89E-06	2.69E-08	1.46E-09	1.47E-11

CuSO4								
F-	WAC							
Fe+3								
Fe2O3	WAC-460-160	5.14E-11	1.04E-05	1.04E-05	5.47E-04	2.50E-06	1.35E-07	1.36E-09
Hg+2	WAC-460-160							
I-	WAC ?							
K+								
K2O		6.62E-13	1.43E-07	1.43E-07	7.53E-06	3.44E-08	1.86E-09	1.88E-11
La+3								
La2O3		6.45E-13	1.30E-07	1.30E-07	6.84E-06	3.12E-08	1.69E-09	1.71E-11
Li+								
Li2O		3.10E-14	6.27E-09	6.27E-09	3.30E-07	1.51E-09	8.16E-11	8.22E-13
Mg+2								
MgO	WAC-460-160	4.00E-12	8.08E-07	8.08E-07	4.25E-05	1.94E-07	1.05E-08	1.06E-10
MnO2	WAC-460-160	5.41E-11	1.09E-05	1.09E-05	5.74E-04	2.62E-06	1.42E-07	1.43E-09
Mo+6								
MoO3		1.82E-11	3.69E-06	3.69E-06	1.94E-04	8.87E-07	4.80E-08	4.84E-10
Na+								
Na20		2.62E-07	4.90E-02	4.90E-02	2.58E+00	1.18E-02	6.38E-04	6.43E-06
Ni+3	WAC-460-160							
Ni2FeCN6								
Ni2O3		1.43E-11	2.89E-06	2.89E-06	1.52E-04	6.95E-07	3.76E-08	3.79E-10
NiO		3.74E-14	7.57E-09	7.57E-09	3.98E-07	1.82E-09	9.85E-11	9.93E-13
NO2-								
NO3-								
Np+4								
NpO2		4.15E-14	8.38E-09	8.38E-09	4.41E-07	2.01E-09	1.09E-10	1.10E-12
OH-								
P2O5		8.35E-09	1.56E-03	1.56E-03	8.21E-02	3.75E-04	2.03E-05	2.05E-07
P2O5:24H2O								
Pb+4	PP/WAC							
Pb02	WAC	5.65E-12	1.14E-06	1.14E-06	6.00E-05	2.74E-07	1.48E-08	1.50E-10
PO4-3								
Pu+4								
PuO2		8.15E-14	1.65E-08	1.65E-08	8.68E-07	3.97E-09	2.15E-10	2.16E-12
S								
Si+4								

SiO2		6.18E-07	1.16E-01	1.16E-01	6.11E+00	2.79E-02	1.51E-03	1.52E-05
SO4-2								
Sr+2								
SrO		1.00E-12	2.02E-07	2.02E-07	1.06E-05	4.85E-08	2.63E-09	2.65E-11
Tc2O7		5.98E-12	1.21E-06	1.21E-06	6.37E-05	2.91E-07	1.58E-08	1.59E-10
TcO4-								
TOC								
UO2+2	WAC-460							
UO3	WAC-460	2.26E-10	4.56E-05	4.56E-05	2.40E-03	1.10E-05	5.94E-07	5.98E-09
V+5								
V2O5	WAC-460-160	2.76E-13	5.59E-08	5.59E-08	2.94E-06	1.34E-08	7.28E-10	7.33E-12
WO2		7.27E-17		7.27E-17	3.83E-15	1.75E-17	9.46E-19	9.54E-21
WO3		2.35E-12	4.75E-07	4.75E-07	2.50E-05	1.14E-07	6.18E-09	6.23E-11
ZN+2	WAC-460-160							
ZNO	WAC-460-160	1.12E-11	2.25E-06	2.25E-06	1.18E-04	5.41E-07	2.93E-08	2.95E-10
Zr+4								
ZRO2	WAC-460-160	3.25E-09	3.28E-07	3.31E-07	1.74E-05	7.96E-08	4.31E-09	4.35E-11
ZRO2:2H2O								
material balance based on TPA data package Rev B recvd 3/16/95								
annual average based on 19 year operations period								
24 hour ave. based on annual ave/number of operationg days per year (365 days @ 60% OE=219 days)								
peak hourly rate based on plant capacity of 200 mt /operating day								

ISV.EMM

ISV Emissions

	Operating Emissions			
Component	Total Emission	Annual Emissions	Average Hourly	Peak Hourly
	Curies	based on 5 yrs of ISV		
		Curies/year	Ci/hr	Ci/hr
Am-241	1.00E-06	2.00E-07	4.57E-12	6.85E-12
C-14	5.30E+03	1.06E+03	2.42E-02	3.63E-02
Cs-137	3.50E-04	7.00E-05	1.60E-09	2.40E-09
I-129	1.60E+01	3.20E+00	7.31E-05	1.10E-04
Pu-239,240	3.30E-07	6.60E-08	1.51E-12	2.26E-12
Ru-106	3.80E-13	7.60E-14	1.74E-18	2.60E-18
Sm-151	6.30E-06	1.26E-06	2.88E-11	4.32E-11
Sr-90	5.40E-04	1.08E-04	2.47E-09	3.70E-09
Tc-99	3.20E-07	6.40E-08	1.46E-12	2.19E-12
Zr-93	3.90E-08	7.80E-09	1.78E-13	2.67E-13
	kg	kilograms/year		
Particulate	6.00E+04	1.20E+04	2.74E-01	4.11E-01
S0x	0	0.00E+00	0.00E+00	0.00E+00
CO	0	0.00E+00	0.00E+00	0.00E+00
Hydrocarbons	11	2.20E+00	5.02E-05	7.53E-05
N0x	3.60E+05	7.20E+04	1.64E+00	2.47E+00
Aldehydes	N/A		0.00E+00	0.00E+00
Organic Acids	N/A		0.00E+00	0.00E+00
NH3	5.60E+04	1.12E+04	2.56E-01	3.84E-01
Assumptions: Each tank farm will have a confinement facility				
	There will be 4 vitrification systems in place with at least two in operation at all times			
	One stack for each Tank Farm Confinement Facility (may be conservative)			
	May have two systems operating in one tank farm or may vitrify tanks in			
	different tank farms at the same time resulting in emissions from two stacks.			
	The WHC data package does not address this issue.			
	The radiological emissions are 100% PM10			
	Average hourly emissions based on 5 yrs operations @ 24 hrs per day			
		with two ISV systems in operation		
	Peak hourly emissions based on 3 ISV systems in opertions simultaneously			
Reference WHC-SD-WM-EV-101 In Situ Rev 0 (Public Release)				

No Separations Stack Flows								
LIQUID COMPONENTS								
	Regulated	stream						
		907	917	totals mt	ANNUAL AVE	24 hour avg.	peak hourly	peak hourly concentration
VOLUME					TOTAL/14 year	ann ave/219	(daily ave/24)x1.7	peak hourly/stack flow rate
SP. GRAVITY				metric tons	kg/year	kg/ 24 hr	kg/hr	grams/ cubic meter
MASS FLOW MT		2.88E+06	4.63E+05	3.34E+06	2.39E+08	1.09E+06	7.72E+04	2.07E+03
Al	WAC-460-160							
Fe								
Cr	WAC-460							
Na								
Si								
P	WAC-460-160							
NO2, NO3	PP							
Cs and Ba								
Sr and Y								
Tc								
TRU								
Total MCi								
Ag+	WAC-460-130							
Al+3	WAC-460							
Am+3								
As+5	WAC-460							
B+3								
Ba+2	WAC-460 ?							
Be+2	40CFR/WAC460							
Bi+3								
C 14								
Ca+2								
Cd+2	WAC-460-130							
Ce+3								
Cl-								
Cl2	WAC-460-160	4.87E+02		4.87E+02	3.48E+04	1.59E+02	1.13E+01	3.02E-01
Cm+3								
CO	WAC-460-160	2.30E+03		2.30E+03	1.64E+05	7.50E+02	5.31E+01	1.43E+00

UNMITIGATED
1.5E-03
FOLLOWING
OFF GAS
Treatment.

CO+3	WAC-460-160							
CO2	WAC-460-160	1.82E+05		1.82E+05	1.30E+07	5.94E+04	4.20E+03	1.13E+02
CO3-2	WAC-460-160							
Cr+3	WAC-460-160							
Cs+								
Cu+2	WAC-460-160							
F-								
F2	WAC-460-160	1.17E+03		1.17E+03	8.36E+04	3.82E+02	2.70E+01	7.25E-01
Fe+3								
FeCn6-3								
H+								
H2								
H2O		4.81E+04		4.81E+04	3.44E+06	1.57E+04	1.11E+03	2.98E+01
H2S	WAC							
Hg	WAC-460-160							
Hg+2	WAC							
I-								
I2	WAC-460	2.36E-01		2.36E-01	1.69E+01	7.70E-02	5.45E-03	1.46E-04
K+								
Kerosene								
La+3								
Li+								
Mg+2								
MnO2	WAC-460-160							
Mo+6								
N2		2.10E+06	3.66E+05	2.47E+06	1.76E+08	8.04E+05	5.70E+04	1.53E+03
Na+								
Nb+5								
NH3	WAC-460-160	1.87E+01		1.87E+01	1.34E+03	6.10E+00	4.32E-01	1.16E-02
Ni+3	WAC-460-130							
NO	PP	3.52E+02		3.52E+02	2.51E+04	1.15E+02	8.13E+00	2.18E-01
NO2	PP	1.40E+02		1.40E+02	1.00E+04	4.57E+01	3.23E+00	8.68E-02
NO3-								
Np+4								
O2		5.48E+05	9.72E+04	6.45E+05	4.61E+07	2.10E+05	1.49E+04	4.00E+02
OH-								
Pb+4	WAC/40CFR							

Unmitigated 3.6E-03 following off-gas treatment.

Rb+								
Re+7								
Rh+3	WAC							
Ru+3								
Sb+5	WAC-460-160							
Se+6	WAC							
Si+4								
Sm+3								
Sn+4	WAC-460							
SO2	PP	1.27E+03		1.27E+03	9.07E+04	4.14E+02	2.93E+01	7.87E-01
SO4-2								
Sr+2								
S								
TcO2								
TcO4-								
Te+6	WAC-460-160							
Th+4								
Ti+4								
Ti+3								
TOC								
UO2+2	WAC-460							
V+5								
W+6	WAC460							
ZN+2								
ZRO2:2H2O								
SOLIDS COMPONENTS								
Total Mass Flow		9.94E-07	1.86E-01	1.86E-01	1.33E+01	6.07E-02	4.30E-03	1.15E-04
Al (summary)	WAC460-160	1.31E-08	2.45E-03	2.45E-03	1.75E-01	7.99E-04	5.66E-05	1.52E-06
Fe (summary)		2.21E-09	4.13E-04	4.13E-04	2.95E-02	1.35E-04	9.54E-06	2.56E-07
Cr (summary)	WAC460-160	4.45E-10	8.33E-05	8.33E-05	5.95E-03	2.72E-05	1.92E-06	5.16E-08
Na (summary)		1.84E-07	3.45E-02	3.45E-02	2.46E+00	1.13E-02	7.97E-04	2.14E-05
Si (summary)		2.49E-07	4.65E-02	4.65E-02	3.32E+00	1.52E-02	1.07E-03	2.88E-05
P (summary)	WAC460-160	5.09E-09	9.52E-04	9.52E-04	6.80E-02	3.11E-04	2.20E-05	5.90E-07
NO2, NO3	PP							
Cs and Ba (MCi)		2.50E-10	5.05E-05	5.05E-05	3.61E-03	1.65E-05	1.17E-06	3.13E-08
Sr and Y (MCi)		3.48E-10	7.03E-05	7.03E-05	5.02E-03	2.29E-05	1.62E-06	4.36E-08
Tc (MCi)		9.91E-14	2.00E-08	2.00E-08	1.43E-06	6.52E-09	4.62E-10	1.24E-11

TRU (MCi)		5.10E-13	1.03E-07	1.03E-07	7.36E-06	3.36E-08	2.38E-09	6.39E-11
Total MCi		6.11E-10	1.24E-04	1.24E-04	8.86E-03	4.04E-05	2.86E-06	7.69E-08
Ag+	WAC460-160							
Ag2O	WAC460-160	1.19E-12	2.40E-07	2.40E-07	1.71E-05	7.83E-08	5.54E-09	1.49E-10
Al+3								
Al2O3		2.47E-08	4.62E-03	4.62E-03	3.30E-01	1.51E-03	1.07E-04	2.86E-06
Am+3								
Am2O3		1.17E-13	2.36E-08	2.36E-08	1.69E-06	7.70E-09	5.45E-10	1.46E-11
As+5	WAC							
As2O5		3.23E-12	6.52E-07	6.52E-07	4.66E-05	2.13E-07	1.51E-08	4.04E-10
B+3								
B2O3	WAC-460-160	1.06E-07	1.98E-02	1.98E-02	1.41E+00	6.46E-03	4.57E-04	1.23E-05
Ba+2	?							
BaO	WAC	6.56E-12	1.33E-06	1.33E-06	9.50E-05	4.34E-07	3.07E-08	8.25E-10
Be+2	40CFR/WAC							
BeO		6.90E-14	1.40E-08	1.40E-08	1.00E-06	4.57E-09	3.23E-10	8.68E-12
Bi+3								
Bi2O3		7.86E-10	1.47E-04	1.47E-04	1.05E-02	4.79E-05	3.40E-06	9.11E-08
C 14								
Ca+2								
CANCRINITE								
CaO	WAC-460-160	8.17E-09	1.53E-03	1.53E-03	1.09E-01	4.99E-04	3.53E-05	9.49E-07
Cd+2	WAC-460-130							
CdO		3.02E-11	6.11E-06	6.11E-06	4.36E-04	1.99E-06	1.41E-07	3.79E-09
Ce+3								
Ce2O3		7.48E-10	1.40E-04	1.40E-04	1.00E-02	4.57E-05	3.23E-06	8.68E-08
Cl-								
Cm+3								
Cm2O3		6.51E-17		6.51E-17	4.65E-15	2.12E-17	1.50E-18	4.04E-20
Co+3								
Co2O3		2.86E-12	5.79E-07	5.79E-07	4.14E-05	1.89E-07	1.34E-08	3.59E-10
Co3-2								
Cr+3	WAC-460-160							
Cr2O3		6.51E-10	1.22E-04	1.22E-04	8.71E-03	3.98E-05	2.82E-06	7.56E-08
Cs+								
Cs2O		3.22E-12	6.52E-07	6.52E-07	4.66E-05	2.13E-07	1.51E-08	4.04E-10
Cu	WAC-460-160							

Cu+2	WAC-460-160							
CuO		3.07E-12	6.22E-07	6.22E-07	4.44E-05	2.03E-07	1.44E-08	3.86E-10
CuSO4								
F-	WAC							
Fe+3								
Fe2O3	WAC-460-160	3.16E-09	5.91E-04	5.91E-04	4.22E-02	1.93E-04	1.37E-05	3.66E-07
H+								
Hg+2	WAC-460-160							
I-	WAC ?							
K+								
K2O		4.32E-09	8.74E-04	8.74E-04	6.24E-02	2.85E-04	2.02E-05	5.42E-07
La+3								
La2O3		1.14E-10	2.30E-05	2.30E-05	1.64E-03	7.50E-06	5.31E-07	1.43E-08
Li+								
Li2O		3.78E-08	7.07E-03	7.07E-03	5.05E-01	2.31E-03	1.63E-04	4.38E-06
Mg+2								
MgO	WAC-460-160	7.58E-09	1.42E-03	1.42E-03	1.01E-01	4.63E-04	3.28E-05	8.80E-07
MnO2	WAC-460-160	5.75E-10	1.08E-04	1.08E-04	7.71E-03	3.52E-05	2.50E-06	6.70E-08
Mo+6								
MoO3		3.16E-11	6.39E-06	6.39E-06	4.56E-04	2.08E-06	1.48E-07	3.96E-09
Na+								
Na20		2.49E-07	4.65E-02	4.65E-02	3.32E+00	1.52E-02	1.07E-03	2.88E-05
Nb+5								
Nb2O5		2.39E-18		2.39E-18	1.71E-16	7.80E-19	5.52E-20	1.48E-21
Ni+3	WAC-460-160							
Ni2FeCN6								
Ni2O3		3.72E-11	7.52E-06	7.52E-06	5.37E-04	2.45E-06	1.74E-07	4.66E-09
NiO		6.10E-10	1.14E-04	1.14E-04	8.14E-03	3.72E-05	2.63E-06	7.07E-08
NO2-								
NO3-								
Np+4								
NpO2		1.35E-13	2.73E-08	2.73E-08	1.95E-06	8.90E-09	6.31E-10	1.69E-11
OH-								
P2O5		1.16E-08	2.18E-03	2.18E-03	1.56E-01	7.11E-04	5.04E-05	1.35E-06
P2O5:24H2O								
Pb+4	PP/WAC							
Pb02	WAC	9.23E-11	1.87E-05	1.87E-05	1.34E-03	6.10E-06	4.32E-07	1.16E-08

PO4-3								
Pu+4								
PuO2		7.26E-13	1.47E-07	1.47E-07	1.05E-05	4.79E-08	3.40E-09	9.11E-11
Rb+								
RbO2		2.23E-13	4.50E-08	4.50E-08	3.21E-06	1.47E-08	1.04E-09	2.79E-11
Re+7								
Re2O7		1.40E-13	2.83E-08	2.83E-08	2.02E-06	9.23E-09	6.54E-10	1.75E-11
Rh+3								
Rh2O3		1.36E-12	2.75E-07	2.75E-07	1.96E-05	8.97E-08	6.35E-09	1.70E-10
Ru+3								
Ru2O3		1.71E-12	3.46E-07	3.46E-07	2.47E-05	1.13E-07	7.99E-09	2.15E-10
Sb+5								
Sb2O5		6.20E-12	1.25E-06	1.25E-06	8.93E-05	4.08E-07	2.89E-08	7.75E-10
Se+6								
SeO3		9.56E-12	1.93E-06	1.93E-06	1.38E-04	6.29E-07	4.46E-08	1.20E-09
Si+4								
SiO2		5.32E-07	9.95E-02	9.95E-02	7.11E+00	3.25E-02	2.30E-03	6.17E-05
Sm+3								
Sm2O3		9.35E-14	1.89E-08	1.89E-08	1.35E-06	6.16E-09	4.37E-10	1.17E-11
Sn+4	WAC-460-160							
SnO2		6.19E-14	1.25E-08	1.25E-08	8.93E-07	4.08E-09	2.89E-10	7.75E-12
SO4-2								
Sr+2								
SrO		1.10E-10	2.22E-05	2.22E-05	1.59E-03	7.24E-06	5.13E-07	1.38E-08
Tc2O7		9.14E-12	1.85E-06	1.85E-06	1.32E-04	6.03E-07	4.27E-08	1.15E-09
TcO4-								
Te+6	WAC-460-160							
TeO3	WAC-460-160	8.63E-13	1.75E-07	1.75E-07	1.25E-05	5.71E-08	4.04E-09	1.08E-10
Th+4								
ThO2		3.89E-11	7.87E-06	7.87E-06	5.62E-04	2.57E-06	1.82E-07	4.88E-09
Ti+4								
TiO2		1.86E-12	3.76E-07	3.76E-07	2.69E-05	1.23E-07	8.69E-09	2.33E-10
Ti+3								
Ti2O3		1.54E-11	3.11E-06	3.11E-06	2.22E-04	1.01E-06	7.19E-08	1.93E-09
TOC								
UO2+2	WAC-460							
UO3	WAC-460	4.41E-09	8.26E-04	8.26E-04	5.90E-02	2.69E-04	1.91E-05	5.12E-07

V+5								
V2O5	WAC-460-160	2.15E-13	4.34E-08	4.34E-08	3.10E-06	1.42E-08	1.00E-09	2.69E-11
WO2		4.26E-11	8.61E-06	8.61E-06	6.15E-04	2.81E-06	1.99E-07	5.34E-09
WO3		1.03E-11	2.09E-06	2.09E-06	1.49E-04	6.82E-07	4.83E-08	1.30E-09
ZN+2	WAC-460-160							
ZNO	WAC-460-160	7.30E-12	1.48E-06	1.48E-06	1.06E-04	4.83E-07	3.42E-08	9.18E-10
ZRO2	WAC-460-160	2.06E-09	3.86E-04	3.86E-04	2.76E-02	1.26E-04	8.92E-06	2.39E-07
ZRO2:2H2O								
		material balance based on data package recvd. 11/8/94						
		annual ave based on 14 year operations period						
		24 hour ave. based on annual ave/number of operating days per year (365 days @ 60% OE)						
		peak hourly rate based on plant capacity of 200 mt /operting day						

Ex Situ Intermediate Separations (TPA)
Waste Treatment Facility Construction Emissions

Pollutant	Unit	As Reported in Data pkg	Reduction Factor	Modified TPA Emission	Selective Retrieval Emission	Selective Retrieval annual emissions
Particulate	kg	1.30E+05	0.58	6.90E+04	34500	3833
S0x	kg	1.60E+04	0.92	1.29E+04	6450	717
CO	kg	3.20E+07	0.3	1.00E+07	5000000	555556
Hydrocarbons	kg	1.60E+06	0.34	5.50E+05	275000	30556
N0x	kg	1.90E+06	0.56	9.50E+05	475000	52778
Aldehydes as HCHO	kg	5.60E+04	0.0091	5.10E+02	255	28
Organic Acids	kg	n/a				
Thermal Releases	J	8.00E+14				
Fugitive Dust	metric ton	840		497	248.5	28

note: the 497 metric tons of fugitive dust taken from the data pkg appendix. The 840 t number appears in error.

Construction duration is 9 years for the main facilities. The construction of the LLW disposal vaults would begin following construction of the LLW vitrification plant and would continue as required through the operations period as required.

Request Number 81

Jacobs Engineering Group
Engineering Information Request - TWRS EIS

Requested By: John Kuhn Date: 09/13/95

Phone Number: (904) 332-3318 Fax Number: (904) 333-6631

Requested Information: Data for the selective retrieval alternative. Please refer to the attached sheets for detailed information.

Need Date: 09/22/95

Response:

Data Source/Accuracy:

Prepared By: Date Sent/Faxed:

Concurrence:
Marc Nelson - Deputy Project Manager

Selective Retrieval

Reference	Required Item
4.1.1	Location of transfer annexes, and waste storage/sampling facility. Will locations be the same as for the ex-situ alternatives (TA1W, TA2E, TA1W, etc)?
4.1.1	Emissions from construction of transfer annexes and storage sampling facility. If a simple scaling of the emissions is being done, providing the scale factor is sufficient.
4.1.2	Will the location of the pretreatment facility be the same as ST-L? If not, please provide the location of the pretreatment facility.
4.1.2	Emissions from construction of pretreatment facility. I am assuming that these emissions would occur within the area source (ST-L) and would be combined with the emissions from the construction of the LLW vitrification facility and the support facilities. Please confirm. If emissions are to be scaled from previously determined emissions from TPA, providing scale factor would suffice.
4.1.3	Please identify the tanks that will have contents retrieved, and those that will be "filled and capped".
4.1.3	Will the location of the HLW vit facility correspond to source ST-H? If not, please give location.
4.1.4	I am assuming that these emissions will be accounted for in the emissions from construction of the HLW vit plant. Please confirm
4.1.5	I am assuming that these emissions will be accounted for in the emissions from construction of the LLW vit plant.
4.2.2	Previously, we have data only for emissions of radionuclides from the retrieval portion of the extensive retrieval alternatives. The assumptions were that the non-radiological pollutant releases from these operations are negligible. We propose to use the same radionuclide emissions from the "selective retrieval" retrieval operations as was used for the ex-situ scenarios, and to continue to assume that the emissions of non-radiological pollutants from retrieval operations are negligible. Please confirm.
4.2.4	Need emissions of radionuclide and non-radiological components during RF drying operations. Your breakdown shows 45 drying systems being operated continuously. How many tank farms does this represent? Does each drying system have its own stack? What are the stack parameters and locations?

4.2.4	We have no data concerning the gravel stock piles and filling operations. If these emissions are significant, please provide emissions data. I assume that these emissions would be similar as those for the fill and cap alternative.
4.2.4	I am assuming that the emissions from the HLW and LLW plants will be scaled from the emissions given for the TPA alternative. Please give the new emissions or the scale factor. Will the stack parameters be the same as for the TPA? If not, please provide the new stack parameters.
4.2.5, 4.2.6, 4.2.7	I am assuming that these impacts are negligible. Please confirm.

fedex 9/26

Request Number 081

Jacobs Engineering Group
Engineering Information Request - TWRS EIS

Requested By: John Kuhn (ESE) Date: 09/14/95

Phone Number: (904) 332-3318 ext 6058 Fax Number: (904) 333-6631

Request Information: Data for the Selective Retrieval alternative. See attached sheets for detailed information.

Need Date: 9/22/95

Response: see attached

Data Source/Accuracy:

Prepared By: Colin Henderson

Date Sent/Faxed:

Concurrence:
Marc Nelson - Project Manager

H:\USERS\CHENDERS\EIR\ENINFRQ.081

ENGINEERING INFORMATION REQUEST: 081

SUBJECT: Selective Retrieval

Reference

4.1.1 The transfer annexes, and waste storage/sampling facility would be located in the same areas as identified for the Extensive Retrieval (Ex Situ Vitrification) alternative.

4.1.1 Emissions from the construction of the transfer annexes and storage/sampling facility can be estimated by scaling the emissions for Extensive Retrieval by 50%.

4.1.2 The combined pretreatment LAW vitrification plant would be located in the same area as ST-L.

4.1.2 Emissions from the construction of the pretreatment facility and the low activity waste (LAW) would occur within the ST-L area source. Construction emissions can be scaled at 50%. See attached table for treatment facility construction emissions. These construction emissions are scaled from the modified TPA construction emissions.

4.1.3 Tanks that will be retrieved for exsitu processing are identified in the attached figure. A listing of the retrieved tanks is as follows:

241-AN tank farm: AN-102,103, 104,105,107
241-AW tank farm: AW-101
241-AZ tank farm: AZ-101, 102
241-SY tank farm: SY-101, 103
241-A tank farm: A-101, 102, 104, 106
241-B tank farm: B-101, 108, 109, 110, 111, 202
241-BX tank farm: BX-101, 102, 104, 105, 106, 109, 110, 111, 112
241-BY tank farm: BY-101, 103, 104, 105, 106, 107, 110, 111
241-C tank farm: C-102, 103, 104, 105, 106, 107
241-S tank farm: S-101, 107, 109, 110, 111, 112
241-SX tank farm: SX-103, 104, 105, 106, 111, 114, 115
241-T tank farm:T-105, 112
241-TX tank farm: TX-109, 110, 113, 114, 115, 116, 117, 118
241-TY tank farm: TY-103, 105
241-U tank farm: U-101, 110

All other tanks will be filled and capped.

4.1.3 The location of the HLW vit facility will correspond to ST-H.

4.1.4 The emissions from the construction of the storage pads for interim storage of HLW are accounted for in the emissions for the HLW vit plant.

4.1.5 The emissions from the construction of the LLW disposal vaults are accounted for in the emission estimates made for the alternative. (I don't think the construction emissions were broken down to be facility specific)

4.2.2 Retrieval air emissions: assume non radiological air emissions are ~~zero.~~ Use 3X Continued
Assume radiological air emissions due to retrieval operations are 50% of the Extensive Retrieval (Ex Situ Vitrification) alternative.

4.2.4 Radio frequency drying of the tanks has been deleted. The emissions from gravel filling for selective retrieval can be scaled using the following factors:

89 out of 149 of the SSTs will be filled with gravel.

18 of the 28 DSTs will be filled with gravel.

See Engineering Information Request 080 for Fill and Cap Emissions. Associated with the fill and cap of the DST would be 3 years of continuous evaporator operations to reduce the liquids in the 18 DSTs that are not retrieved. Three years is obtained from 5 yrs for evaporating contents of 28 DSTs X (18/28). The emissions from continuous evaporator operations are provided in the response to Eng. Inf. Req. -078.

4.2.4 The locations for the gravel stock piles would be the same as identified for the Fill and Cap alternative.

4.2.4 The attached tables show the percentages of the various radionuclides that are recovered under the Selective Retrieval alternative. For the purpose of estimating air emissions it appears that we would be conservative for most isotopes by saying that 90% of the inventory gets retrieved and thus the air radiological air emissions for selective retrieval are 90% of those estimated for Extensive Retrieval (Ex Situ Vitrification). The exception to this is the C-14 which is recovered at approximately 95%.

Since the total volume of waste retrieved under Selective Retrieval for exsitu processing is approximately 50% of the total waste volume the non radiological operating emissions should be scaled at 50%.

Note: Specific recovery percentages of chemical constituents for selective retrieval will be developed in the future. Refinement of the Selective Retrieval chemical emissions would be possible at that time.

The stack parameters are assumed to be the same as the Extensive Retrieval (Ex Situ Vitrification) alternative. The volumetric flow rate in the off-gas system would be lower but the stack diameter is assumed to be reduced to yield the same exit velocities.

4.2.5 The air emissions from 4.2.5, 4.2.6, and 4.2.7 are considered negligible

Continued Operations :

See attached continued operations phase out schedule for phase out of continued operations during the waste treatment operations. See Eng. Inf. Request -078 for continued operations emissions.

TABLE 2

Percentage of the SST inventory recovered from 60 tanks for the Selective Retrieval alternative (based on 99% retrieval)				
Gmcl				
Ac225	74.28			
Ac227	89.37			
Am241	89.22			
Am242	91.09			
Am242m	91.09			
Am243	92.60			
At217	74.27			
Ba135m	N/A			
Ba137m	88.32			
Bi210	82.97			
Bi211	89.36			
Bi213	74.28			
Bi214	83.72			
C14	92.89			
Cm242	91.09			
Cm244	93.89			
Cm245	93.89			
Cs135	84.79			
Cs137	88.32			
Fr221	74.29			
Fr223	89.38			
I129	91.65			
Nb93m	77.38			
Ni59	N/A			
Ni63	78.79			
Np237	89.57			
Np239	92.59			
Pa231	90.46			
Pa233	89.58			
Pa234m	91.42			
Pb209	74.27			
Pb210	82.96			
Pb211	89.36			
Pb214	83.72			
Pd107	91.97			
Po210	82.91			
Po213	74.26			
Po214	83.71			
Po215	89.37			
Po218	83.71			
Pu238	74.21			
Pu239	78.55			
Pu240	79.83			
Pu241	81.48			
Ra223	89.37			
Ra225	74.28			
Ra226	83.72			
Ru106	36.50			

Sb125	72.34			
Sb125m	72.33			
Se79	91.67			
Sm151	71.82			
Sn126	72.31			
Sr90	65.38			
Tc99	91.62			
Th227	89.37			
Th229	74.31			
Th230	81.60			
Th231	91.08			
Th233	N/A			
Th234	91.42			
Tl207	89.37			
U233	78.32			
U234	80.43			
U235	91.07			
U238	91.42			
Y90	65.38			
Zr93	66.40			

TABLE 3

sel ret percentage

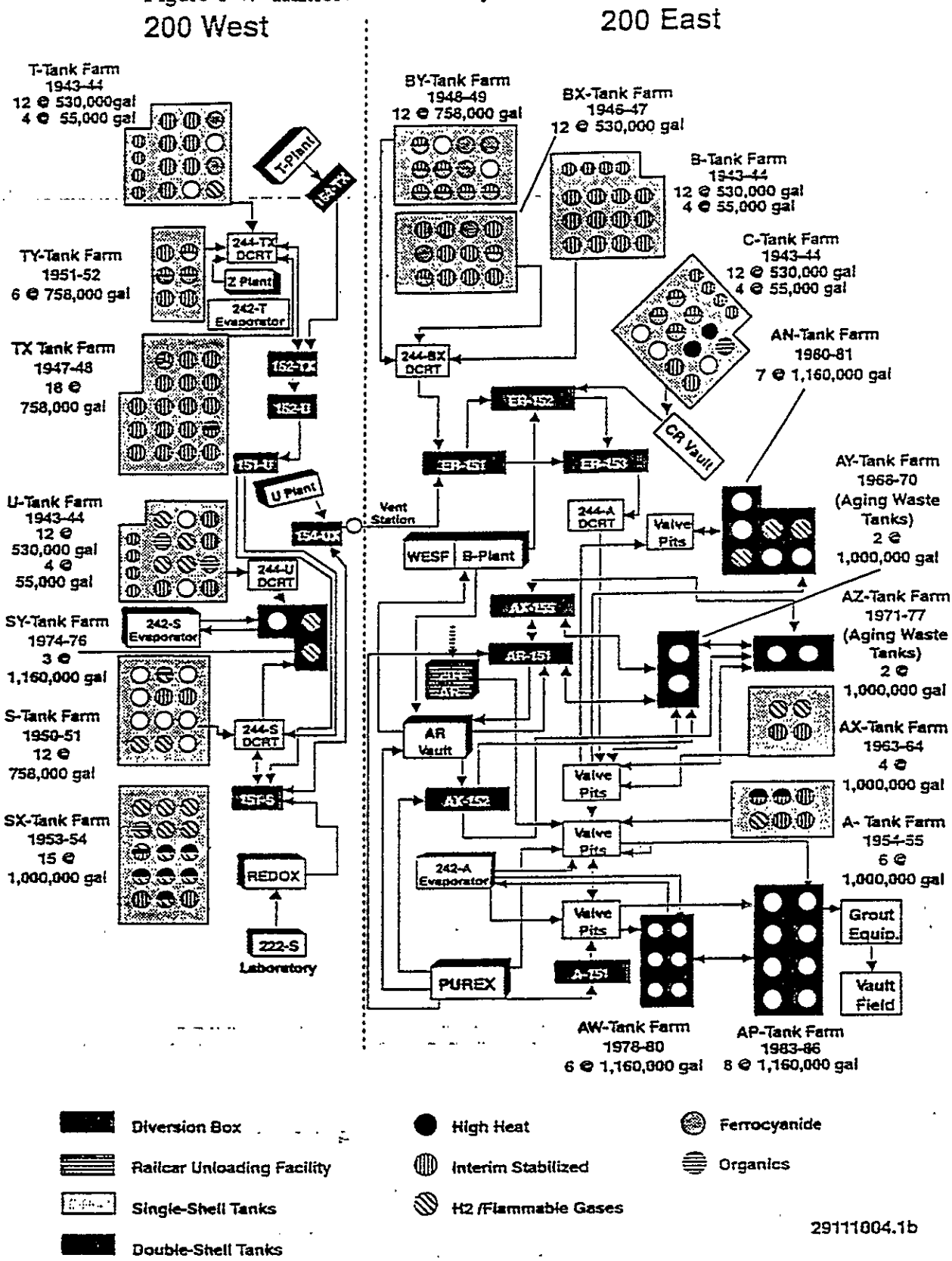
Percentage of the DST inventory recovered from 10 DSTs					
for the Selective Retrieval alterative (based on 99% retrieval)					
Radionuclides					
(Ci)					
Na, kgs	77.68				
14C	98.79				
90Sr	87.14				
90Y	87.14				
99Tc	91.44				
137Cs	89.36				
137Ba	89.36				
154Eu	97.60				
235U	N/A				
238U	N/A				
237Np	97.87				
238Pu	11.92				
239Pu	28.27				
240Pu	26.13				
241Pu	23.98				
241Am	70.66				
Curies	88.69				

Continued Operatio. .ase Out Schedule

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
No Action																
Min Retrieval (In Situ Vit)																
Waste Treatment 2008-2013 Number of Tanks Treated														30	59	89
% of tanks remaining under continued operations	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	83%	67%	50%
Min Retrieval (Fill and Cap)																
Waste Treatment 2006-2013 Number of Tanks Treated												22	44	66	89	111
% of tanks remaining under continued operations	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	88%	75%	63%	50%	38%
Selective Retrieval																
Retrieval 2001-2023, Number of Tanks Treated							3	6	9	12	15	18	21	24	27	30
Fill and Cap 2006-2013												13	27	40	54	67
Total Tanks Treated							3	6	9	12	15	32	48	64	81	97
% of tanks remaining under continued operations	100%	100%	100%	100%	100%	100%	98%	97%	95%	93%	91%	82%	73%	64%	54%	45%
Extensive Retrieval (Ex Situ Vit)																
Retrieval 2001-2023, Number of Tanks Treated							8	15	23	31	38	46	54	62	69	77
% of tanks remaining under continued operations	100%	100%	100%	100%	100%	100%	96%	91%	87%	83%	78%	74%	70%	65%	61%	57%
Extensive Retrieval (No Separations)																
Retrieval 2001-2018, Number of Tanks Treated							10	20	30	39	49	59	69	79	89	98
% of tanks remaining under continued operations	100%	100%	100%	100%	100%	100%	94%	89%	83%	78%	72%	67%	61%	56%	50%	44%
Extensive Retrieval (Extensive Separations)																
Retrieval 2001-2024, Number of Tanks Treated							7	15	22	30	37	44	52	59	66	74
% of tanks remaining under continued operations	100%	100%	100%	100%	100%	100%	96%	92%	88%	83%	79%	75%	71%	67%	63%	58%

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
118	148	177											
33%	17%	0%											
133	155	177											
25%	13%	0%											
33	37	40	43	46	49	52	55	58	61	64	67	70	
80	94	107											
114	130	147	150	153	156	159	162	165	168	171	174	177	
36%	26%	17%	15%	14%	12%	10%	9%	7%	5%	3%	2%	0%	
85	92	100	108	115	123	131	139	146	154	162	169	177	
52%	48%	43%	39%	35%	30%	26%	22%	17%	13%	9%	4%	0%	
108	118	128	138	148	157	167	177						
39%	33%	28%	22%	17%	11%	6%	0%						
81	89	96	103	111	118	125	133	140	148	155	162	170	177
54%	50%	46%	42%	38%	33%	29%	25%	21%	17%	13%	8%	4%	0%

Figure 1-4. Hanford Site Tank System Schematic Diagram.



Alternative	1.0 No Action					2.0 Long Term Management				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NOT APPLICABLE					NO EMISSIONS				
Operation										
Continued Operations	emiss1.xls (periodic)	100 yr	Ground			emiss1.xls (periodic)	100 yr	Ground		
	Total Alpha=2.88E-08 Ci/yr					See No Action				
	Total Beta=7.91E-07 Ci/yr					100% of current				
-Monitor SSTs, DSTs, and MUSTs	Sr-90=1.81E-05 Ci/yr									
	Cs-137=5.35E-05 Ci/yr									
	I-129=4.6E-05 Ci/yr		100% of current		511					521
-Operate 242A Evaporator	emit.xls	10 yr	6.7 m	10.3 cu m/s	46 C	emit.xls (periodic)	10 yr	6.7 m	10.3 cu m/s	46 C
	Tot. Alpa =2.1E-5 Ci/Y		.53 m			See No Action		.53 m		
	Tot. Beta=1.2E-5 Ci/Y	P			512	P				522
Retrieval	NOT APPLICABLE					Cs-137=.0007 Ci ÷10		Ground		
						I-129=.001 Ci ÷10	10 yr			
						Sr-90=.0001 Ci ÷10	(per memo from Colin)			523
Evaporate DSTS (a)	NOT APPLICABLE					emit.xlas (continuous)	10 yr	6.7 m	10.3 cu m/s	46 C
						Tot. Alpha=1.4E-04 Ci/Y				
						Tot. Beta=8.04E-05 Ci/Y	C	.53 m		524
Separations	NOT APPLICABLE					NOT APPLICABLE				
Vitrify Tank Waste (a)	NOT APPLICABLE					NOT APPLICABLE				
Process Capsules	NOT APPLICABLE					NOT APPLICABLE				
Storage and Disposal	NOT APPLICABLE					NOT APPLICABLE				
Monitoring and Maintenance	NOT APPLICABLE					NOT APPLICABLE				
Post Remediation										
Closure	NOT APPLICABLE					NOT APPLICABLE				
Monitoring of Final Waste Form	NOT APPLICABLE					NOT APPLICABLE				

(a) for gravel and fill, these emissions are based on ten times the value of current emissions per hour for 24 hours (3 days) for 22 tanks per year.

Alternative	3.0 Minimal Retrieval In Situ Vitrification					4.0 In Situ Fill and Cap				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NO EMISSIONS					NO EMISSIONS				
Operation										
Continued Operations -Monitor SSTs, DSTs, and MUSTs	emiss1.xls (periodic) See No Action 82% of current	19 yr (15.6 yr adj)	Ground		S31	emiss1.xls (periodic) See No Action 75% of current	19 yr (14.25 yr adj)	Ground		S41
-Operate 242A Evaporator	emit.xls (periodic) See No Action	10 yr P	6.7 m .53 m	10.3 cu m/s	46 C S32	emit.xls (periodic) See No Action	10 yr P	6.7 m .53 m	10.3 cu m/s	46 C S42
Retrieval	NOT APPLICABLE					NOT APPLICABLE				
Evaporate DSTS (a)	emit.xlas (continuous) See Long Term Mgmt	5 yr C	6.7 m .53 m	10.3 cu m/s	46 C S33	emit.xlas (continuous) See Long Term Mgmt	5 yr C	6.7 m .53 m	10.3 cu m/s	46 C S43
Separations	NOT APPLICABLE					NOT APPLICABLE				
Vitrify Tank Waste (a)	Table D.45 pg. D-88	9 yr	31 m .33m	4.3 cu m/s	93 oC S34	Total Alpha=9.83E-11 Ci/yr Total Beta=2.69E-09 Ci/yr Sr-90=2.91E-08 Ci/yr Cs-137=1.81E-07 Ci/yr I-129=1.57E-07 Ci/yr	8 yr	Ground		S44
Process Capsules	NOT APPLICABLE					NOT APPLICABLE				
Storage and Disposal	NO EMISSIONS					NO EMISSIONS				
Monitoring and Maintenanc	NO EMISSIONS					NO EMISSIONS				
Post Remediation										
Closure	NO EMISSIONS					NO EMISSIONS				
Monitoring of Final Waste Fo	NO EMISSIONS					NO EMISSIONS				

Jan value omitted for this Section in the tables you supplied ALEX

(a) for gravel and fill, these e

Alternative	6.0 Selective Retrieval					7.0 Extensive Retrieval (Ex Situ Vit) Alternative				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NO EMISSIONS					NO EMISSIONS				
Operation										
Continued Operations	emiss1.xls (periodic) See No Action 53% of current	29 yr (15.4 yr adj)	Ground			emiss1.xls (periodic) See No Action 59% of current	29 yr (17.1 yr adj)	Ground		
-Monitor SSTs, DSTs, and MUSTs					✓ S61					✓ S71
-Operate 242A Evaporator	emit.xls (periodic) See No Action	10 yr P	6.7 m .53 m	10.3 cu m/s	46 C ✓ S62	emit.xls (periodic) See No Action	10 yr P	6.7 m .53 m	10.3 cu m/s	46 C ✓ S72
Retrieval	Assume 50% of Table D.60	26 yr	Ground		✓ S63	Table D.60	26 yr	Ground	✓	S73.
Evaporate DSTS (a)	emit.xlas (continuous) See Long Term Mgmt	5 yr C	6.7 m .53 m	10.3 cu m/s	46 C ✓ S64		NOT APPLICABLE			
Separations		INCLUDED IN VITRIFICATION					INCLUDED IN VITRIFICATION			
Vitrify Tank Waste (a)	Table D.54 pg. D-103	24 yr	55 m .88 m	33 cu m/s ✓	160 oC S65	Table D.61	24 yr	55 m .88 m	33 cu m/s ✓	160 oC S74
	See insitu gravel and fill (60%) S14 X 60% Direct multiplied D.48 (in situ Fill + Cap Bg. i)	8 yr	Ground		S66					
Process Capsules		NOT APPLICABLE					NOT APPLICABLE			
Storage and Disposal		NO EMISSIONS					NO EMISSIONS			
Monitoring and Maintenanc		NO EMISSIONS					NO EMISSIONS			
Post Remediation										
Closure		NO EMISSIONS					NO EMISSIONS			
Monitoring of Final Waste Fo		NO EMISSIONS					NO EMISSIONS			

(a) for gravel and fill, these e

Alternative	8.0 No Separations Alternative					9.0 Extensive Separations Alternative				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NO EMISSIONS					NO EMISSIONS				
Operation										
Continued Operations -Monitor SSTs, DSTs, and MUSTs	emiss1.xls (periodic) See No Action 69% of current	24 yr (16.6 yr adj)	Ground		S81	emiss1.xls (periodic) See No Action 58% of current	30 yr (17.4 yr adj)	Ground		S91
-Operate 242A Evaporator	emit.xls (periodic) See No Action	10 yr	6.7 m .53 m	10.3 cu m/s	46 C S82	emit.xls (periodic) See No Action	10 yr	6.7 m .53 m	10.3 cu m/s	46 C S92
Retrieval	Table D.60	19 yr	Ground		S83	Table D.60	23 yr	Ground		S93.
Evaporate DSTS (a)	NOT APPLICABLE					NOT APPLICABLE				
Separations	NOT APPLICABLE									
Vitrify Tank Waste (a)	Table D.65 (change C-14 to 812 Ci or 58 Ci/Yr for calcination)	14 yr	55 m .88 m	33 cu m/s	160 oC S84	Table D.69	21 yr	55 m .88 m	33 cu m/s	160 C S94
Process Capsules	NOT APPLICABLE					NOT APPLICABLE				
Storage and Disposal	NO EMISSIONS					NO EMISSIONS				
Monitoring and Maintenanc	NO EMISSIONS					NO EMISSIONS				
Post Remediation										
Closure	NO EMISSIONS					NO EMISSIONS				
Monitoring of Final Waste Fo	NO EMISSIONS					NO EMISSIONS				

(a) for gravel and fill, these e

Alternative	*10.0 Capsule-No Action Alternative*					*11. Capsule-Onsite Storage*				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NOT APPLICABLE					NO EMISSIONS				
Operation										
Continued Operations	NOT APPLICABLE					NOT APPLICABLE				
-Monitor SSTs, DSTs, and MUSTs										
-Operate 242A Evaporator	NOT APPLICABLE					NOT APPLICABLE				
Retrieval	NOT APPLICABLE					NOT APPLICABLE				
Evaporate DSTS (a)	NOT APPLICABLE					NOT APPLICABLE				
Separations	NOT APPLICABLE					NOT APPLICABLE				
Vitrify Tank Waste (a)	NOT APPLICABLE					NOT APPLICABLE				
Process Capsules	wesfops.xls	10 yr	21 m .53 m radius	10.2 mps 9.2 cu m/s	20 C S101	wesfops.xls	19 yr	21 m .53 m radius	10.2 mps 9.2 cu m/s	20 C S11
Storage and Disposal	NOT APPLICABLE					NO EMISSIONS				
Monitoring and Maintenanc	NOT APPLICABLE					NOT APPLICABLE				
Post Remediation										
Closure	NOT APPLICABLE					NO EMISSIONS				
Monitoring of Final Waste Fo	NOT APPLICABLE					NO EMISSIONS				

(a) for gravel and fill, these e

Alternative	12.0 Capsule-Overpack and Ship					13.0 Capsule-Vitrify with Tank Waste				
	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.	Source	Duration in Years	Stack Ht/Rad	Stack Velocity	Stack Temp.
Construction	NO EMISSIONS					NO EMISSIONS				
Operation										
Continued Operations	NOT APPLICABLE					NOT APPLICABLE				
-Monitor SSTs, DSTs, and MUSTs										
-Operate 242A Evaporator	NOT APPLICABLE					NOT APPLICABLE				
Retrieval	NOT APPLICABLE					NOT APPLICABLE				
Evaporate DSTS (a)	NOT APPLICABLE					NOT APPLICABLE				
Separations	NOT APPLICABLE					NOT APPLICABLE				
Vitrify Tank Waste (a)	NOT APPLICABLE					NOT APPLICABLE				
Process Capsules	wesfops.xls	19 yr	21 m .53 m radius	10.2 mps 9.2 cu m/s	20 C ~~521~~	wesfops.xls	19 yr	21 m .53 m radius	10.2 mps 9.2 cu m/s	20 C ~~513~~
Storage and Disposal	NOT APPLICABLE					NOT APPLICABLE				
Monitoring and Maintenanc	NOT APPLICABLE					NOT APPLICABLE				
Post Remediation										
Closure	NOT APPLICABLE					NOT APPLICABLE				
Monitoring of Final Waste Fo	NOT APPLICABLE					NOT APPLICABLE				

(a) for gravel and fill, these e

Alternative	*1.0 No Action*		*2.0 Long Term Managment*		*3.0 In Situ Vitrification*		*4.0 In Situ Gravel and Fill*	
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
Construction	NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Operation								
Continued Operations	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE
-Monitor SSTs, DSTs, and MUSTs								
-Operate 242A Evaporator	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE
Retrieval	NOT APPLICABLE		100 m ESE	22 km ESE	NOT APPLICABLE		NOT APPLICABLE	
Evaporate DSTS (a)	NOT APPLICABLE		200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE
Separations	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Vitrify Tank Waste	NOT APPLICABLE		NOT APPLICABLE		300 m ESE	22 km ESE	NOT APPLICABLE	
(or Gravel Fill for Alt4)							100 m ESE	22 km ESE
Process Capsules	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Storage and Disposal	NOT APPLICABLE		NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS	
Monitoring and Maintenance	NOT APPLICABLE		NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS	
Post Remediation								
Closure	NOT APPLICABLE		NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS	
Monitoring of Final Waste Form	NOT APPLICABLE		NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS	

Alternative	*6.0 Selective Retrieval*		*7.0 Extensive Retrieval*		*8.0 No Separations*		*9.0 Extensive Separations*	
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
Construction	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Operation								
Continued Operations	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE
-Monitor SSTs, DSTs, and MUSTs								
-Operate 242A Evaporator	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE
Retrieval	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE
Evaporate DSTS (a)	200 m ESE	22 km ESE	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Separations	INCLUDED IN VITRIFICAT		INCLUDED IN VITRIFICAT		NOT APPLICABLE		INCLUDED IN VITRIFICATIO	
Vitrify Tank Waste	800 m ESE	22 km ESE	800 m ESE	22 km ESE	800 m ESE	22 km ESE	800 m ESE	22 km ESE
(or Gravel Fill for Alt4)	100 m ESE	22 km ESE						
Process Capsules	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Storage and Disposal	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Monitoring and Maintenance	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Post Remediation								
Closure	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Monitoring of Final Waste Form	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	

Alternative	*10.0 Capsule-No Action*		*11. Capsule-Onsite*		*12.0 Capsule-Overpack*		*13.0 Capsule-Vitrify*	
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
Construction	NOT APPLICABLE		NO EMISSIONS		NOT APPLICABLE		NO EMISSIONS	
Operation								
Continued Operations	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
-Monitor SSTs, DSTs, and MUSTs								
-Operate 242A Evaporator	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Retrieval	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Evaporate DSTS (a)	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Separations	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Vitrify Tank Waste	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
(or Gravel Fill for Alt4)								
Process Capsules	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE
Storage and Disposal	NOT APPLICABLE		NO EMISSIONS		NOT APPLICABLE		NOT APPLICABLE	
Monitoring and Maintenance	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Post Remediation								
Closure	NOT APPLICABLE		NO EMISSIONS		NOT APPLICABLE		NOT APPLICABLE	
Monitoring of Final Waste Form	NOT APPLICABLE		NO EMISSIONS		NOT APPLICABLE		NOT APPLICABLE	

Hanford Waste Vitrification Project - Environmental Impact Statement
Construction Equipment Non-Radiological Emissions Estimates
"Tri-Party Agreement" alternative linearly scaled against "No Pretreatment" alternative baseline

5 Year Duration of Construction

Fluor Daniel Environmental Services
contract #04-436303-2013-052

Equipment descript	Rated power (hp)	AP-42 category	No of units	Total use		Emiss factor	Carbon monoxide		Exhaust hydrocarbons		Fugitive hydrocarbons		Nitrogen oxides as NO2		Aldehydes as HCHO		Sulfur oxides as SO2†		Particulate matter	
						Units	CO		Exh HC		Fug HC		NOx		Aldehydes		SOx		Particulate	
							Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)
Utility dozer	65	wheeled dozer D	5	16000	hr	g/hr	816.8	13069	86.84	1389.44	-	0	1889	30226.6	29.5	472	-	-	75	1200
Utility loader/ backhoe	65	wheeled loader D	6	19000	hr	g/hr	259.6	4932.02	113.2	2150.23	-	0	858.2	16305.6	18.8	357.2	-	-	77.9	1480.1
Backhoe - 1 cy	65	wheeled loader D	4	10000	hr	g/hr	259.6	2595.8	113.2	1131.7	-	0	858.2	8581.9	18.8	188	-	-	77.9	779
Backhoe - 2 cy	120	wheeled loader D	3	6000	hr	g/hr	259.6	778.74	113.2	339.51	-	0	858.2	2574.57	18.8	56.4	-	-	77.9	233.7
Loader - 2 cy	120	wheeled loader D	4	10000	hr	g/hr	259.6	2595.8	113.2	1131.7	-	0	858.2	8581.9	18.8	188	-	-	77.9	779
Loader - 4 cy	200	wheeled loader D	3	6000	hr	g/hr	259.6	778.74	113.2	339.51	-	0	858.2	2574.57	18.8	56.4	-	-	77.9	233.7
Crane - 15 ton	150	misc D	10	64000	hr	g/hr	306.4	19607.7	69.35	4438.4	-	0	767.3	49107.2	13.9	889.6	-	-	63.2	4044.8
Crane - 25 ton	185	misc D	10	48000	hr	g/hr	306.4	14705.8	69.35	3328.8	-	0	767.3	36830.4	13.9	667.2	-	-	63.2	3033.6
Crane - 50 ton	200	misc D	5	16000	hr	g/hr	306.4	4901.92	69.35	1109.6	-	0	767.3	12276.8	13.9	222.4	-	-	63.2	1011.2
Crane - 100 ton	300	misc D	2	6000	hr	g/hr	306.4	1838.22	69.35	416.1	-	0	767.3	4603.8	13.9	83.4	-	-	63.2	379.2
Forklift - 2 ton	60	wheeled loader D	10	56000	hr	g/hr	259.6	14536.5	113.2	6337.52	-	0	858.2	48058.6	18.8	1052.8	-	-	77.9	4362.4
Forklift - 4 ton	70	wheeled loader D	6	29000	hr	g/hr	259.6	7527.82	113.2	3281.93	-	0	858.2	24887.5	18.8	545.2	-	-	77.9	2259.1
Forklift - 6 ton	100	wheeled loader D	4	16000	hr	g/hr	259.6	4153.28	113.2	1810.72	-	0	858.2	13731	18.8	300.8	-	-	77.9	1246.4
Forklift - 10 ton	130	wheeled loader D	4	13000	hr	g/hr	259.6	3374.54	113.2	1471.21	-	0	858.2	11156.5	18.8	244.4	-	-	77.9	1012.7
Forklift - 15 ton	150	wheeled loader D	4	10000	hr	g/hr	259.6	2595.8	113.2	1131.7	-	0	858.2	8581.9	18.8	188	-	-	77.9	779
Motor grader	125	motor grader D	4	22000	hr	g/hr	68.46	1506.12	18.07	397.54	-	0	324.4	7137.46	5.54	121.88	-	-	27.7	609.4
Pumps - 1"	2	IC gasoline	40	128000	hr	g/hp * hr	199	50944	6.68	1710.08	2.99	765.44	5.16	1320.96	0.22	56.32	-	-	0.327	83.712
Pumps - 2"	5	IC gasoline	20	64000	hr	g/hp * hr	199	63680	6.68	2137.6	2.99	956.8	5.16	1651.2	0.22	70.4	-	-	0.327	104.64
Pumps - 6"	10	IC gasoline	10	16000	hr	g/hp * hr	199	31840	6.68	1068.8	2.99	478.4	5.16	825.6	0.22	35.2	-	-	0.327	52.32
Totals			152			No Pretreatment Baseline		245962		35122.1		2200.64		289014		5795.6		3379.0		23684

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Infinite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMITF1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
	----Release Terms------		
PU239	2.9E-08	0.0E+00	0.0E+00
SR90	7.9E-07	0.0E+00	0.0E+00
SR90	1.8E-05	0.0E+00	0.0E+00
CS137	5.4E-05	0.0E+00	0.0E+00
I 129	4.6E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
2 ,+04 Maximum individual distance from release point (m)
1.3E+01 Maximum individual sector index (Wind Toward E)
Ground level release.

========== EXTERNAL EXPOSURE ==========

8.8E+03 Hours of exposure to plume
4.4E+03 Hours of exposure to ground contamination

== ====== INHALATION ==========
8.[illegible]E+03 Hours of inhalation exposure per year
1 Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04 Mass loading factor (g/m3)

========== INGESTION POPULATION ==========
1 Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	3.0E-08 +	3.3E-09 +	4.2E-10 +	...	=	3.4E-08	
	||	||	||				
ernal ual Dose	3.0E-08 +	3.3E-09 +	4.2E-10 +	...	=	3.4E-08	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.6E-11	0.0E+00	0.0E+00	...		2.6E-11	
	||	||	||			||	
Annual Dose	3.0E-08 +	3.3E-09 +	4.2E-10 +	...	=	3.4E-08	Cumulative Dose
						3.0E-08	Maximum Annual Dose Occurred In Year 1

6.6E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

e title: Chronic Offsite MI - No Action Tank Farm Ground Release

Executed on: 10/14/95 at 12:10:56

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.2E-09	2.5E-01	3.1E-10
Breast	1.2E-09	1.5E-01	1.7E-10
R Marrow	4.0E-09	1.2E-01	4.9E-10
Lung	1.1E-09	1.2E-01	1.4E-10
Thyroid	1.1E-06	3.0E-02	3.2E-08
Bone Sur	1.2E-08	3.0E-02	3.7E-10
LL Int.	1.7E-09	6.0E-02	1.0E-10
UL Int.	1.4E-09	6.0E-02	8.2E-11
Stomach	1.2E-09	6.0E-02	7.3E-11
S Int.	1.2E-09	6.0E-02	7.3E-11
Liver	8.4E-10	6.0E-02	5.1E-11
Internal Effective Dose Equivalent			3.4E-08
External Dose			2.6E-11
Annual Effective Dose Equivalent			3.4E-08

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 129
Total Inhalation EDE:	4.9E-10
Total Ingestion EDE:	3.4E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	6.7E-11	3.2E-11	3.3E-11	3.3E-11	3.6E-11	6.0E-09	7.7E-10	1.1E-10
Leaf Veg	7.0E-11	8.0E-11	7.9E-11	1.0E-10	1.5E-10	7.9E-10	3.6E-10	7.5E-11
Oth. Veg	9.8E-11	1.1E-10	1.2E-10	1.7E-10	3.0E-10	1.9E-09	8.5E-10	1.1E-10
Fruit	1.0E-10	1.2E-10	1.2E-10	1.8E-10	3.1E-10	1.9E-09	8.5E-10	1.1E-10
Cereals	3.6E-11	4.1E-11	4.1E-11	5.3E-11	8.1E-11	4.0E-10	1.8E-10	3.8E-11
Meat	4.8E-10	5.2E-10	5.2E-10	5.3E-10	5.4E-10	6.1E-10	5.4E-10	5.2E-10
Poultry	3.8E-12	4.1E-12	4.2E-12	4.2E-12	4.2E-12	4.1E-12	4.0E-12	4.1E-12
Cow Milk	2.7E-10	3.1E-10	2.9E-10	3.0E-10	3.2E-10	7.5E-10	4.9E-10	2.9E-10
Eggs	1.2E-12	1.4E-12	1.2E-12	1.3E-12	1.5E-12	5.8E-12	3.2E-12	1.1E-12
Soil Ing	1.3E-13	1.4E-13	1.4E-13	1.8E-13	2.8E-13	1.4E-12	6.2E-13	1.4E-13
. cal	1.1E-09	1.2E-09	1.2E-09	1.4E-09	1.7E-09	1.2E-08	4.0E-09	1.2E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.1E-10	2.9E-11	4.1E-09	8.0E-10
Leaf Veg	7.0E-11	7.5E-11	9.1E-08	8.9E-12
Oth. Veg	9.8E-11	1.1E-10	1.4E-07	1.2E-11
Fruit	1.0E-10	1.1E-10	1.5E-07	1.3E-11
Cereals	3.6E-11	3.9E-11	5.2E-08	4.6E-12
Meat	4.8E-10	4.7E-10	4.7E-08	4.6E-15
Poultry	3.8E-12	3.8E-12	2.9E-11	1.8E-17
Cow Milk	2.7E-10	3.1E-10	5.9E-07	5.8E-16
Eggs	1.1E-12	1.6E-12	6.5E-09	1.7E-15
Soil Ing	1.3E-13	1.3E-13	1.2E-10	1.7E-14
Total	1.2E-09	1.2E-09	1.1E-06	8.4E-10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	4.1E-13
Sur Soil	2.5E-11
Total	2.6E-11

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	6.7E-11	3.2E-11	3.3E-11	3.3E-11	3.6E-11	6.0E-09	7.7E-10	1.1E-10
Leaf Veg	7.0E-11	8.0E-11	7.9E-11	1.0E-10	1.5E-10	7.9E-10	3.6E-10	7.5E-11
Oth. Veg	9.8E-11	1.1E-10	1.2E-10	1.7E-10	3.0E-10	1.9E-09	8.5E-10	1.1E-10
Fruit	1.0E-10	1.2E-10	1.2E-10	1.8E-10	3.1E-10	1.9E-09	8.5E-10	1.1E-10
Cereals	3.6E-11	4.1E-11	4.1E-11	5.3E-11	8.1E-11	4.0E-10	1.8E-10	3.8E-11
Meat	4.8E-10	5.2E-10	5.2E-10	5.3E-10	5.4E-10	6.1E-10	5.4E-10	5.2E-10
Poultry	3.8E-12	4.1E-12	4.2E-12	4.2E-12	4.2E-12	4.1E-12	4.0E-12	4.1E-12
Cow Milk	2.7E-10	3.1E-10	2.9E-10	3.0E-10	3.2E-10	7.5E-10	4.9E-10	2.9E-10
Eggs	1.2E-12	1.4E-12	1.2E-12	1.3E-12	1.5E-12	5.8E-12	3.2E-12	1.1E-12
Soil Ing	1.3E-13	1.4E-13	1.4E-13	1.8E-13	2.8E-13	1.4E-12	6.2E-13	1.4E-13
Total	1.1E-09	1.2E-09	1.2E-09	1.4E-09	1.7E-09	1.2E-08	4.0E-09	1.2E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.1E-10	2.9E-11	4.1E-09	8.0E-10
Leaf Veg	7.0E-11	7.5E-11	9.1E-08	8.9E-12
Oth. Veg	9.8E-11	1.1E-10	1.4E-07	1.2E-11
Fruit	1.0E-10	1.1E-10	1.5E-07	1.3E-11
Cereals	3.6E-11	3.9E-11	5.2E-08	4.6E-12
Meat	4.8E-10	4.7E-10	4.7E-08	4.6E-15
Poultry	3.8E-12	3.8E-12	2.9E-11	1.8E-17
Cow Milk	2.7E-10	3.1E-10	5.9E-07	5.8E-16
Eggs	1.1E-12	1.6E-12	6.5E-09	1.7E-15
Soil Ing	1.3E-13	1.3E-13	1.2E-10	1.7E-14
Total	1.2E-09	1.2E-09	1.1E-06	8.4E-10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	4.1E-13
Sur Soil	2.5E-11
Total	2.6E-11

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.5E-12	6.2E-12	9.5E-12	5.7E-11	2.4E-10	5.8E-09	2.5E-09	3.2E-12
Y 90	1.7E-13	1.1E-11	2.7E-11	1.3E-10	3.3E-10	4.4E-15	4.3E-15	1.4E-16
I 129	7.3E-11	1.0E-10	6.3E-11	6.3E-11	6.3E-11	8.2E-11	8.7E-11	5.8E-11
CS 137	1.0E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.0E-09	1.0E-09	1.1E-09
PU 239	3.3E-11	1.6E-14	3.8E-14	2.1E-13	6.4E-13	5.4E-09	4.2E-10	8.3E-11
Total	1.1E-09	1.2E-09	1.2E-09	1.4E-09	1.7E-09	1.2E-08	4.0E-09	1.2E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
[illegible] 90	3.2E-12	3.2E-12	3.2E-12	0.0E+00
[illegible] 90	1.6E-16	1.4E-16	1.4E-16	4.2E-15
I 129	6.3E-11	1.4E-10	1.1E-06	0.0E+00
CS 137	1.0E-09	1.0E-09	1.0E-09	0.0E+00
PU 239	8.2E-11	1.9E-15	1.8E-15	8.4E-10
Total	1.2E-09	1.2E-09	1.1E-06	8.4E-10

External Dose by Radionuclide

Radionuclide	
SR 90	1.6E-15
Y 90	8.5E-14
I 129	4.1E-13
CS 137	2.5E-11
PU 239	1.0E-18
Total	2.6E-11

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.5E-12	6.2E-12	9.5E-12	5.7E-11	2.4E-10	5.8E-09	2.5E-09	3.2E-12
Y 90	1.7E-13	1.1E-11	2.7E-11	1.3E-10	3.3E-10	4.4E-15	4.3E-15	1.4E-16
I 129	7.3E-11	1.0E-10	6.3E-11	6.3E-11	6.3E-11	8.2E-11	8.7E-11	5.8E-11
CS 137	1.0E-09	1.1E-09	1.1E-09	1.1E-09	1.1E-09	1.0E-09	1.0E-09	1.1E-09
PU 239	3.3E-11	1.6E-14	3.8E-14	2.1E-13	6.4E-13	5.4E-09	4.2E-10	8.3E-11
Total	1.1E-09	1.2E-09	1.2E-09	1.4E-09	1.7E-09	1.2E-08	4.0E-09	1.2E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
' 90	3.2E-12	3.2E-12	3.2E-12	0.0E+00
. 90	1.6E-16	1.4E-16	1.4E-16	4.2E-15
I 129	6.3E-11	1.4E-10	1.1E-06	0.0E+00
CS 137	1.0E-09	1.0E-09	1.0E-09	0.0E+00
PU 239	8.2E-11	1.9E-15	1.8E-15	8.4E-10
Total	1.2E-09	1.2E-09	1.1E-06	8.4E-10

External Dose by Radionuclide

Radionuclide	
SR 90	1.6E-15
Y 90	8.5E-14
I 129	4.1E-13
CS 137	2.5E-11
PU 239	1.0E-18
Total	2.6E-11

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

= ====== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPOTF1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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----Release Terms------

Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	2.9E-08	0.0E+00	0.0E+00
SR90	7.9E-07	0.0E+00	0.0E+00
SR90	1.8E-05	0.0E+00	0.0E+00
CS137	5.4E-05	0.0E+00	0.0E+00
I 129	4.6E-05	0.0E+00	0.0E+00

= ====== AIR TRANSPORT ==========
Joint frequency data input.
Ground level release.

========== EXTERNAL EXPOSURE ==========

8.8E+03 Hours of exposure to plume
2.9E+03 Hours of exposure to ground contamination

========== INHALATION ==========
E+03 Hours of inhalation exposure per year
1 Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04 Mass loading factor (g/m3)

========== INGESTION POPULATION ==========
1 Atmospheric production definition: 1 - Use population-weighted chi/Q
Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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2.9E-03 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	4.2E-05	2.5E-01	1.1E-05
Breast	3.8E-05	1.5E-01	5.7E-06
R Marrow	1.2E-04	1.2E-01	1.4E-05
Lung	3.8E-05	1.2E-01	4.6E-06
Thyroid	3.4E-02	3.0E-02	1.0E-03
Bone Sur	4.2E-04	3.0E-02	1.3E-05
LL Int.	5.3E-05	6.0E-02	3.2E-06
UL Int.	4.4E-05	6.0E-02	2.6E-06
Stomach	4.1E-05	6.0E-02	2.4E-06
S Int.	4.0E-05	6.0E-02	2.4E-06
Liver	3.6E-05	6.0E-02	2.2E-06
Internal Effective Dose Equivalent			1.1E-03
External Dose			7.5E-07
Annual Effective Dose Equivalent			1.1E-03

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 129
Total Inhalation EDE:	2.2E-05
Total Ingestion EDE:	1.1E-03

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	9.4E-04 +	1.0E-04 +	1.3E-05 +	...	=	1.1E-03	
	||	||	||				
Internal Annual Dose	9.4E-04 +	1.0E-04 +	1.3E-05 +	...	=	1.1E-03	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	7.5E-07	0.0E+00	0.0E+00	...		7.5E-07	
	||	||	||			||	
Annual Dose	9.4E-04 +	1.0E-04 +	1.3E-05 +	...	=	1.1E-03	Cumulative Dose
						9.4E-04	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	3.0E-06	1.4E-06	1.4E-06	1.5E-06	1.6E-06	2.7E-04	3.4E-05	4.9E-06
Leaf Veg	1.5E-06	1.7E-06	1.7E-06	2.3E-06	3.5E-06	1.7E-05	7.8E-06	1.6E-06
Oth. Veg	2.7E-06	3.2E-06	3.3E-06	5.0E-06	8.9E-06	5.2E-05	2.3E-05	2.9E-06
Fruit	8.7E-07	1.0E-06	1.1E-06	1.6E-06	2.8E-06	1.7E-05	7.7E-06	9.3E-07
Cereals	1.4E-06	1.6E-06	1.6E-06	2.1E-06	3.2E-06	1.6E-05	7.3E-06	1.5E-06
Meat	1.8E-05	2.0E-05	2.0E-05	2.0E-05	2.1E-05	2.3E-05	2.1E-05	2.0E-05
Poultry	7.8E-08	8.5E-08	8.5E-08	8.6E-08	8.6E-08	8.5E-08	8.2E-08	8.5E-08
Cow Milk	1.0E-05	1.2E-05	1.1E-05	1.1E-05	1.3E-05	2.8E-05	1.8E-05	1.1E-05
Eggs	3.4E-08	4.1E-08	3.5E-08	4.0E-08	5.1E-08	1.7E-07	9.3E-08	3.3E-08
Soil Ing	5.3E-09	6.0E-09	6.0E-09	7.8E-09	1.2E-08	5.9E-08	2.7E-08	5.7E-09
.al	3.8E-05	4.1E-05	4.0E-05	4.4E-05	5.3E-05	4.2E-04	1.2E-04	4.2E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	4.8E-06	1.3E-06	1.8E-04	3.6E-05
Leaf Veg	1.5E-06	1.6E-06	2.0E-03	1.9E-07
Oth. Veg	2.7E-06	3.0E-06	4.0E-03	3.5E-07
Fruit	8.7E-07	9.4E-07	1.2E-03	1.1E-07
Cereals	1.4E-06	1.5E-06	2.1E-03	1.8E-07
Meat	1.8E-05	1.8E-05	1.8E-03	1.9E-10
Poultry	7.8E-08	7.7E-08	6.0E-07	3.9E-13
Cow Milk	1.0E-05	1.2E-05	2.2E-02	2.9E-11
Eggs	3.2E-08	4.6E-08	1.9E-04	4.9E-11
Soil Ing	5.3E-09	5.5E-09	5.1E-06	7.2E-10
Total	4.0E-05	3.8E-05	3.4E-02	3.6E-05

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	9.6E-09
Sur Soil	7.4E-07
Total	7.5E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	3.0E-06	1.4E-06	1.4E-06	1.5E-06	1.6E-06	2.7E-04	3.4E-05	4.9E-06
Leaf Veg	1.5E-06	1.7E-06	1.7E-06	2.3E-06	3.5E-06	1.7E-05	7.8E-06	1.6E-06
Oth. Veg	2.7E-06	3.2E-06	3.3E-06	5.0E-06	8.9E-06	5.2E-05	2.3E-05	2.9E-06
Fruit	8.7E-07	1.0E-06	1.1E-06	1.6E-06	2.8E-06	1.7E-05	7.7E-06	9.3E-07
Cereals	1.4E-06	1.6E-06	1.6E-06	2.1E-06	3.2E-06	1.6E-05	7.3E-06	1.5E-06
Meat	1.8E-05	2.0E-05	2.0E-05	2.0E-05	2.1E-05	2.3E-05	2.1E-05	2.0E-05
Poultry	7.8E-08	8.5E-08	8.5E-08	8.6E-08	8.6E-08	8.5E-08	8.2E-08	8.5E-08
Cow Milk	1.0E-05	1.2E-05	1.1E-05	1.1E-05	1.3E-05	2.8E-05	1.8E-05	1.1E-05
Eggs	3.4E-08	4.1E-08	3.5E-08	4.0E-08	5.1E-08	1.7E-07	9.3E-08	3.3E-08
Soil Ing	5.3E-09	6.0E-09	6.0E-09	7.8E-09	1.2E-08	5.9E-08	2.7E-08	5.7E-09
----------	-------	-------	-------	-------	-------	-------	-------	-------
,al	3.8E-05	4.1E-05	4.0E-05	4.4E-05	5.3E-05	4.2E-04	1.2E-04	4.2E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	4.8E-06	1.3E-06	1.8E-04	3.6E-05
Leaf Veg	1.5E-06	1.6E-06	2.0E-03	1.9E-07
Oth. Veg	2.7E-06	3.0E-06	4.0E-03	3.5E-07
Fruit	8.7E-07	9.4E-07	1.2E-03	1.1E-07
Cereals	1.4E-06	1.5E-06	2.1E-03	1.8E-07
Meat	1.8E-05	1.8E-05	1.8E-03	1.9E-10
Poultry	7.8E-08	7.7E-08	6.0E-07	3.9E-13
Cow Milk	1.0E-05	1.2E-05	2.2E-02	2.9E-11
Eggs	3.2E-08	4.6E-08	1.9E-04	4.9E-11
Soil Ing	5.3E-09	5.5E-09	5.1E-06	7.2E-10
----------	-------	-------	-------	-------
Total	4.0E-05	3.8E-05	3.4E-02	3.6E-05

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	9.6E-09
Sur Soil	7.4E-07
Total	7.5E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.4E-07	1.5E-07	2.2E-07	1.3E-06	5.4E-06	1.5E-04	6.4E-05	8.1E-08
Y 90	2.6E-08	3.0E-07	7.0E-07	3.5E-06	8.7E-06	1.5E-10	1.5E-10	4.9E-12
I 129	2.3E-06	3.2E-06	2.0E-06	2.0E-06	2.0E-06	2.6E-06	2.7E-06	1.8E-06
CS 137	3.4E-05	3.7E-05	3.7E-05	3.7E-05	3.7E-05	3.4E-05	3.4E-05	3.7E-05
PU 239	1.4E-06	4.1E-10	9.2E-10	4.9E-09	1.5E-08	2.3E-04	1.8E-05	3.6E-06
Total	3.8E-05	4.1E-05	4.0E-05	4.4E-05	5.3E-05	4.2E-04	1.2E-04	4.2E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
90	8.1E-08	8.1E-08	8.1E-08	0.0E+00
90	5.5E-12	4.9E-12	4.9E-12	1.5E-10
I 129	2.0E-06	4.5E-06	3.4E-02	0.0E+00
CS 137	3.4E-05	3.4E-05	3.4E-05	0.0E+00
PU 239	3.5E-06	8.1E-11	7.9E-11	3.6E-05
Total	4.0E-05	3.8E-05	3.4E-02	3.6E-05

External Dose by Radionuclide

Radionuclide	
SR 90	4.4E-11
Y 90	2.5E-09
I 129	1.3E-08
CS 137	7.3E-07
PU 239	3.6E-14
Total	7.5E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.4E-07	1.5E-07	2.2E-07	1.3E-06	5.4E-06	1.5E-04	6.4E-05	8.1E-08
Y 90	2.6E-08	3.0E-07	7.0E-07	3.5E-06	8.7E-06	1.5E-10	1.5E-10	4.9E-12
I 129	2.3E-06	3.2E-06	2.0E-06	2.0E-06	2.0E-06	2.6E-06	2.7E-06	1.8E-06
CS 137	3.4E-05	3.7E-05	3.7E-05	3.7E-05	3.7E-05	3.4E-05	3.4E-05	3.7E-05
PU 239	1.4E-06	4.1E-10	9.2E-10	4.9E-09	1.5E-08	2.3E-04	1.8E-05	3.6E-06
Total	3.8E-05	4.1E-05	4.0E-05	4.4E-05	5.3E-05	4.2E-04	1.2E-04	4.2E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
' 90	8.1E-08	8.1E-08	8.1E-08	0.0E+00
. 90	5.5E-12	4.9E-12	4.9E-12	1.5E-10
I 129	2.0E-06	4.5E-06	3.4E-02	0.0E+00
CS 137	3.4E-05	3.4E-05	3.4E-05	0.0E+00
PU 239	3.5E-06	8.1E-11	7.9E-11	3.6E-05
Total	4.0E-05	3.8E-05	3.4E-02	3.6E-05

External Dose by Radionuclide

Radionuclide	
SR 90	4.4E-11
Y 90	2.5E-09
I 129	1.3E-08
CS 137	7.3E-07
PU 239	3.6E-14
Total	7.5E-07

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMITF1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	2.9E-08	0.0E+00	0.0E+00
SR90	7.9E-07	0.0E+00	0.0E+00
SR90	1.8E-05	0.0E+00	0.0E+00
CS137	5.4E-05	0.0E+00	0.0E+00
I 129	4.6E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
1.0E+02 Maximum individual distance from release point (m)
1.4E+01 Maximum individual sector index (Wind Toward ESE)
Ground level release.

========== EXTERNAL EXPOSURE ==========
8.8E+03 Hours of exposure to plume
4.4E+03 Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1 E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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4.0E-04 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

C e title: Chronic (No Action) Onsite MI - Ground Level

Executed on: 10/14/95 at 12:21:18

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	6.8E-07	2.5E-01	1.7E-07
Breast	1.8E-07	1.5E-01	2.7E-08
R Marrow	4.8E-06	1.2E-01	5.8E-07
Lung	4.1E-07	1.2E-01	5.0E-08
Thyroid	2.6E-05	3.0E-02	7.8E-07
Bone Sur	3.7E-05	3.0E-02	1.1E-06
Liver	4.9E-06	6.0E-02	3.0E-07
LL Int.	2.2E-07	6.0E-02	1.3E-08
UL Int.	2.1E-07	6.0E-02	1.2E-08
S Int.	2.0E-07	6.0E-02	1.2E-08
Stomach	2.0E-07	6.0E-02	1.2E-08
Internal Effective Dose Equivalent			3.1E-06
External Dose			1.6E-07
Annual Effective Dose Equivalent			3.2E-06

Controlling Organ: Bone Sur
Controlling Pathway: Inh
Controlling Radionuclide: PU239

Total Inhalation EDE: 3.0E-06
Total Ingestion EDE: 2.3E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	9.7E-07 +	1.8E-07 +	8.7E-08 +	...	=	3.1E-06	
	||	||	||				
Internal Annual Dose	9.7E-07 +	1.8E-07 +	8.7E-08 +	...	=	3.1E-06	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	1.6E-07	0.0E+00	0.0E+00	...		1.6E-07	
	||	||	||			||	
Annual Dose	1.1E-06 +	1.8E-07 +	8.7E-08 +	...	=	3.2E-06	Cumulative Dose
						1.1E-06	Maximum Annual Dose Occurred In Year 1

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	4.1E-07	1.9E-07	2.0E-07	2.0E-07	2.2E-07	3.7E-05	4.8E-06	6.8E-07
Soil Ing	7.4E-10	8.4E-10	8.5E-10	1.1E-09	1.7E-09	8.3E-09	3.8E-09	7.9E-10
Total	4.1E-07	2.0E-07	2.0E-07	2.1E-07	2.2E-07	3.7E-05	4.8E-06	6.8E-07

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	6.7E-07	1.8E-07	2.5E-05	4.9E-06
Soil Ing	7.4E-10	7.7E-10	7.2E-07	1.0E-10
Total	6.7E-07	1.8E-07	2.6E-05	4.9E-06

External Dose by Exposure Pathway

Pathway	
Plume	8.3E-11
Sur Soil	1.6E-07
Total	1.6E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	4.1E-07	1.9E-07	2.0E-07	2.0E-07	2.2E-07	3.7E-05	4.8E-06	6.8E-07
Soil Ing	7.4E-10	8.4E-10	8.5E-10	1.1E-09	1.7E-09	8.3E-09	3.8E-09	7.9E-10
Total	4.1E-07	2.0E-07	2.0E-07	2.1E-07	2.2E-07	3.7E-05	4.8E-06	6.8E-07

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	6.7E-07	1.8E-07	2.5E-05	4.9E-06
Soil Ing	7.4E-10	7.7E-10	7.2E-07	1.0E-10
Total	6.7E-07	1.8E-07	2.6E-05	4.9E-06

External Dose by Exposure Pathway

Pathway	
Plume	8.3E-11
Sur Soil	1.6E-07
Total	1.6E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.1E-08	3.0E-09	3.3E-09	7.5E-09	2.3E-08	5.0E-06	2.1E-06	2.8E-09
Y 90	5.7E-12	1.9E-11	4.6E-11	2.3E-10	5.6E-10	1.6E-14	1.6E-14	5.5E-16
I 129	5.6E-09	1.8E-09	1.5E-09	1.5E-09	1.5E-09	2.1E-09	2.3E-09	1.4E-09
CS 137	1.9E-07	1.9E-07	2.0E-07	2.0E-07	2.0E-07	1.8E-07	1.8E-07	1.9E-07
PU 239	2.0E-07	1.8E-11	2.9E-11	1.2E-10	3.3E-10	3.2E-05	2.5E-06	4.8E-07
Total	4.1E-07	2.0E-07	2.0E-07	2.1E-07	2.2E-07	3.7E-05	4.8E-06	6.8E-07

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	2.8E-09	2.7E-09	2.8E-09	0.0E+00
Y 90	5.7E-16	5.3E-16	5.4E-16	1.6E-14
I 129	1.5E-09	3.6E-09	2.6E-05	0.0E+00
CS 137	1.8E-07	1.7E-07	1.7E-07	0.0E+00
PU 239	4.8E-07	1.1E-11	1.1E-11	4.9E-06
Total	6.7E-07	1.8E-07	2.6E-05	4.9E-06

External Dose by Radionuclide

Radionuclide	
SR 90	9.4E-12
Y 90	5.1E-10
I 129	2.6E-09
CS 137	1.5E-07
PU 239	6.0E-15
Total	1.6E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.1E-08	3.0E-09	3.3E-09	7.5E-09	2.3E-08	5.0E-06	2.1E-06	2.8E-09
Y 90	5.7E-12	1.9E-11	4.6E-11	2.3E-10	5.6E-10	1.6E-14	1.6E-14	5.5E-16
I 129	5.6E-09	1.8E-09	1.5E-09	1.5E-09	1.5E-09	2.1E-09	2.3E-09	1.4E-09
CS 137	1.9E-07	1.9E-07	2.0E-07	2.0E-07	2.0E-07	1.8E-07	1.8E-07	1.9E-07
PU 239	2.0E-07	1.8E-11	2.9E-11	1.2E-10	3.3E-10	3.2E-05	2.5E-06	4.8E-07
Total	4.1E-07	2.0E-07	2.0E-07	2.1E-07	2.2E-07	3.7E-05	4.8E-06	6.8E-07

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	2.8E-09	2.7E-09	2.8E-09	0.0E+00
Y 90	5.7E-16	5.3E-16	5.4E-16	1.6E-14
I 129	1.5E-09	3.6E-09	2.6E-05	0.0E+00
CS 137	1.8E-07	1.7E-07	1.7E-07	0.0E+00
PU 239	4.8E-07	1.1E-11	1.1E-11	4.9E-06
Total	6.7E-07	1.8E-07	2.6E-05	4.9E-06

External Dose by Radionuclide

Radionuclide	
SR 90	9.4E-12
Y 90	5.1E-10
I 129	2.6E-09
CS 137	1.5E-07
PU 239	6.0E-15
Total	1.6E-07

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

i..put file name: \GENII\ROSPOTF1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	2.9E-08	0.0E+00	0.0E+00
SR90	7.9E-07	0.0E+00	0.0E+00
SR90	1.8E-05	0.0E+00	0.0E+00
CS137	5.4E-05	0.0E+00	0.0E+00
I 129	4.6E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
Ground level release.

========== EXTERNAL EXPOSURE ==========
8.8E+03 Hours of exposure to plume
2.9E+03 Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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1.6E-03 Population-weighted chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

(;e title: Chronic Onsite Population - Use Weighted X/Q Ground Release

Executed on: 10/14/95 at 12:26:11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.8E-06	2.5E-01	6.9E-07
Breast	7.4E-07	1.5E-01	1.1E-07
R Marrow	1.9E-05	1.2E-01	2.3E-06
Lung	1.7E-06	1.2E-01	2.0E-07
Thyroid	1.0E-04	3.0E-02	3.1E-06
Bone Sur	1.5E-04	3.0E-02	4.5E-06
Liver	2.0E-05	6.0E-02	1.2E-06
LL Int.	9.1E-07	6.0E-02	5.5E-08
UL Int.	8.4E-07	6.0E-02	5.0E-08
S Int.	8.3E-07	6.0E-02	5.0E-08
Stomach	8.0E-07	6.0E-02	4.8E-08
Internal Effective Dose Equivalent			1.2E-05
External Dose			4.1E-07
Annual Effective Dose Equivalent			1.3E-05

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	1.2E-05
Total Ingestion EDE:	9.0E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	3.9E-06 +	7.2E-07 +	3.5E-07 +	...	=	1.2E-05	
	||	||	||				
Internal Annual Dose	3.9E-06 +	7.2E-07 +	3.5E-07 +	...	=	1.2E-05	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	4.1E-07	0.0E+00	0.0E+00	...		4.1E-07	
	||	||	||			||	
Annual Dose	4.3E-06 +	7.2E-07 +	3.5E-07 +	...	=	1.3E-05	Cumulative Dose
						4.3E-06	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.7E-06	7.9E-07	8.3E-07	8.3E-07	9.1E-07	1.5E-04	1.9E-05	2.8E-06
Soil Ing	3.0E-09	3.4E-09	3.5E-09	4.5E-09	6.8E-09	3.3E-08	1.5E-08	3.3E-09
Total	1.7E-06	8.0E-07	8.3E-07	8.4E-07	9.1E-07	1.5E-04	1.9E-05	2.8E-06

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.7E-06	7.3E-07	1.0E-04	2.0E-05
Soil Ing	3.1E-09	3.2E-09	2.8E-06	4.0E-10
Total	2.7E-06	7.4E-07	1.0E-04	2.0E-05

External Dose by Exposure Pathway

Pathway	
Plume	3.1E-09
Sur Soil	4.1E-07
Total	4.1E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.7E-06	7.9E-07	8.3E-07	8.3E-07	9.1E-07	1.5E-04	1.9E-05	2.8E-06
Soil Ing	3.0E-09	3.4E-09	3.5E-09	4.5E-09	6.8E-09	3.3E-08	1.5E-08	3.3E-09
Total	1.7E-06	8.0E-07	8.3E-07	8.4E-07	9.1E-07	1.5E-04	1.9E-05	2.8E-06

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.7E-06	7.3E-07	1.0E-04	2.0E-05
Soil Ing	3.1E-09	3.2E-09	2.8E-06	4.0E-10
Total	2.7E-06	7.4E-07	1.0E-04	2.0E-05

External Dose by Exposure Pathway

Pathway	
Plume	3.1E-09
Sur Soil	4.1E-07
Total	4.1E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.4E-08	1.2E-08	1.3E-08	3.0E-08	9.2E-08	2.0E-05	8.5E-06	1.1E-08
Y 90	1.3E-09	1.4E-10	3.3E-10	1.6E-09	4.0E-09	2.2E-12	2.2E-12	7.5E-14
I 129	2.2E-08	7.1E-09	6.0E-09	6.0E-09	6.0E-09	8.4E-09	9.1E-09	5.6E-09
CS 137	7.9E-07	7.8E-07	8.1E-07	8.0E-07	8.1E-07	7.2E-07	7.5E-07	7.9E-07
PU 239	8.2E-07	7.2E-11	1.2E-10	4.7E-10	1.4E-09	1.3E-04	1.0E-05	2.0E-06
Total	1.7E-06	8.0E-07	8.3E-07	8.4E-07	9.1E-07	1.5E-04	1.9E-05	2.8E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
Y 90	1.1E-08	1.1E-08	1.1E-08	0.0E+00
Y 90	7.4E-14	7.2E-14	7.3E-14	2.2E-12
I 129	6.0E-09	1.4E-08	1.0E-04	0.0E+00
CS 137	7.3E-07	7.1E-07	7.1E-07	0.0E+00
PU 239	2.0E-06	4.5E-11	4.4E-11	2.0E-05
Total	2.7E-06	7.4E-07	1.0E-04	2.0E-05

External Dose by Radionuclide

Radionuclide	
SR 90	2.5E-11
Y 90	1.4E-09
I 129	7.1E-09
CS 137	4.1E-07
PU 239	1.9E-14
Total	4.1E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.4E-08	1.2E-08	1.3E-08	3.0E-08	9.2E-08	2.0E-05	8.5E-06	1.1E-08
Y 90	1.3E-09	1.4E-10	3.3E-10	1.6E-09	4.0E-09	2.2E-12	2.2E-12	7.5E-14
I 129	2.2E-08	7.1E-09	6.0E-09	6.0E-09	6.0E-09	8.4E-09	9.1E-09	5.6E-09
CS 137	7.9E-07	7.8E-07	8.1E-07	8.0E-07	8.1E-07	7.2E-07	7.5E-07	7.9E-07
PU 239	8.2E-07	7.2E-11	1.2E-10	4.7E-10	1.4E-09	1.3E-04	1.0E-05	2.0E-06
Total	1.7E-06	8.0E-07	8.3E-07	8.4E-07	9.1E-07	1.5E-04	1.9E-05	2.8E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
' 90	1.1E-08	1.1E-08	1.1E-08	0.0E+00
Y 90	7.4E-14	7.2E-14	7.3E-14	2.2E-12
I 129	6.0E-09	1.4E-08	1.0E-04	0.0E+00
CS 137	7.3E-07	7.1E-07	7.1E-07	0.0E+00
PU 239	2.0E-06	4.5E-11	4.4E-11	2.0E-05
Total	2.7E-06	7.4E-07	1.0E-04	2.0E-05

External Dose by Radionuclide

Radionuclide	
SR 90	2.5E-11
Y 90	1.4E-09
I 129	7.1E-09
CS 137	4.1E-07
PU 239	1.9E-14
Total	4.1E-07

Tank Farm Emissions From Current Operations							
242A 6 Source Emissions Roll-UP		Avg Exit Velocity 37.8 (ft/sec)		Area 9.62 (sq. ft)			
Active Ventilation		Avg Exit Temperature 117 (F)		Height 22 (ft)			
					Operating release		
	Continuous Ops	Periodic Ops	Periodic Ops	Continuous	Concentration		
Emissions	Potential (tons/yr)	Actual (tons/yr)	Actual (kg/hr)	Actual (kg/hr)	g/m^3	Area (ft^2)	Velocity (ft/s)
2-Hexanone	3.80E-04	2.88E-05	2.98E-06	3.94E-05	1.06E-06	9.62	37.8
Acetone	1.06E-01	7.98E-03	8.27E-04	1.10E-02	2.97E-04	9.62	37.8
Methyl Isobutyl Ketone	7.25E-03	5.44E-04	5.64E-05	7.51E-04	2.03E-05	9.62	37.8
N-Butyl Alcohol	8.00E-01	6.00E-02	6.22E-03	8.29E-02	2.24E-03	9.62	37.8
Ammonia	1.00E-01	7.51E-03	7.78E-04	1.04E-02	2.80E-04	9.62	37.8
	Ci/yr	Ci/yr		Ci/hr	grams/m^3		
Total Alpha (Ci) (Pu)	1.41E-04	2.10E-05		1.61E-08	7.00E-12	9.62	37.8
Total Beta (Ci) (Sr-90)	8.04E-05	1.20E-05		9.18E-09	1.78E-15	9.62	37.8

note: total alpha and beta taken from WHC-SD-WM-EV-099 and are from 1987 evaporator operations (11 MM gal run, Capacity=73.6 MM gal/yr so continuous ops =6.7 times periodic)

note: evaporator emissions are the sum of the building ventilation and the vessel vent systems which each have a stack. The shorter stack was chosen as the release point for all emissions.

.524 512

Years 2 4 of Construction

Hanford Waste Vitrification Project - Environmental Impact Statement
Construction Equipment Non-Radiological Emissions Estimates
"Tri-Party Agreement" alternative linearly scaled against "No Pretreatment" alternative baseline

Fluor Daniel Environmental Services
contract #04-436303-2013-052

Equipment description	Rated power (hp)	AP-42 category	No. of units	Total use	Emiss factor	Carbon monoxide		Exhaust hydrocarbons		Fugitive hydrocarbons		Nitrogen oxides as NO2		Aldehydes as HCHO		Sulfur oxides as SO2†		Particulate matter	
					Units	CO		Exh HC		Fug HC		NOx		Aldehydes		SOx		Particulate	
						Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)	Fact	Emiss (kg)
D8 dozer	335	wheeled dozer D	1	920 hr	g/hr	816.8	751.463	86.84	79.8928	-	0	1889	1738.03	29.5	27.14	-	-	75	69
966 FE loader	200	wheeled loader D	4	8160 hr	g/hr	259 6	2118 17	113 2	923.467	-	0	858.2	7002.83	18.8	153.408	-	-	77.9	635.66
10 cy dump truck	250	off highway truck D	10	12730 hr	g/hr	816 8	10398	86.84	1105.47	-	0	1889	24049	51	649.23	-	-	116	1476.7
Cat 623E Scraper	330	scraper D	4	610 hr	g/hr	568 2	346.596	128.2	78.1715	-	0	1741	1061.85	65	39.65	-	-	184	112.24
Cat 14G Motor Grader	200	motor grader D	1	150 hr	g/hr	68 46	10 269	18 07	2 7105	-	0	324.4	48.6645	5.54	0.831	-	-	27.7	4.155
¾ ton pickup	250	LDGTI	1	[illegible] mi	g/mi	10 25	30 75	0 81	2.43	0.59	1.77	1.06	3.18	-	-	-	-	-	-
Cat D6 dozer	165	wheeled dozer D	1	1810 hr	g/hr	816 8	1478 43	86.84	157.18	-	0	1889	3419.38	29.5	53.395	-	-	75	135.75
8 cy concrete mixer trucks	250	off-highway truck D	4	16800 hr	g/hr	816 8	13722.4	86.84	1458.91	-	0	1889	31737.9	51	856.8	-	-	116	1948.8
Totals			26		No Pretreatment Baseline		28856.1		3808.24		1.77		69060.8		1780.5		1252		4382.3
					TPA Scale Factor		1.4		1.4		1.4		1.4		1.4		1.4		1.4
					Emissions		40398.5		5331.53		2.478		96685.2		2492.6		1753		6135.2

type description:
- LDG - light duty gasoline
- HDG - heavy duty gasoline
- LDD - light duty diesel
- HDD - heavy duty diesel
- D - diesel
- G - gasoline

Emissions are estimated using U. S. EPA "AP-42" emission factors
The equipment list and usage estimates were obtained from Bob Campbell, Fluor Daniel Inc.

† SOx emissions are estimated using a fuel specific emission factor of 3 23 grams(SOX)/gallon of diesel burned (0.00712 lbs(SOx)/gal).
This factor is based upon the "Clean Air Act" maximum permissible diesel fuel sulfur content of 0.05% (by weight). Diesel fuel usage for this equipment is estimated to be 387,633 gallons.

Prepared by: Andy Kimbrough, Fluor Daniel Inc.

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMIEV1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

==========

Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
SR90	1.2E-05	0.0E+00	0.0E+00
PU239	2.1E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

	Joint frequency data input.
2.0E+02	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
6.7E+00	Stack height (m)
1.0E+01	Stack flow (m3/s)
5.3E-01	Stack radius (m)
4.6E+01	Effluent temperaure (degrees C)
	Building Wake Model used.
	Release from vent or short stack on building roof
0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

```
========== EXTERNAL EXPOSURE ==================================================
 8.8E+03   Hours of exposure to plume
 4.4E+03   Hours of exposure to ground contamination

========== INHALATION =========================================================
 8.8E+03   Hours of inhalation exposure per year
       1   Resuspension model:  1-Mass Loading, 2-Anspaugh
 1.0E-04   Mass loading factor (g/m3)

==============================================================================
```

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

2.3E-06 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (No Action) onsite MI - Elevated Release

Executed on: 10/12/95 at 10:31:32

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.0E-06	2.5E-01	4.9E-07
Breast	5.5E-11	1.5E-01	8.3E-12
R Marrow	1.0E-05	1.2E-01	1.2E-06
Lung	8.2E-07	1.2E-01	9.8E-08
Thyroid	5.4E-11	3.0E-02	1.6E-12
Bone Sur	1.3E-04	3.0E-02	3.9E-06
Liver	2.0E-05	6.0E-02	1.2E-06
LL Int.	1.4E-09	6.0E-02	8.7E-11
UL Int.	5.0E-10	6.0E-02	3.0E-11
S Int.	1.3E-10	6.0E-02	7.7E-12
Stomach	8.4E-11	6.0E-02	5.0E-12
Internal Effective Dose Equivalent			6.9E-06
External Dose			2.1E-12
Annual Effective Dose Equivalent			6.9E-06

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	6.9E-06
Total Ingestion EDE:	1.5E-10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	2.4E-07 +	1.7E-07 +	1.6E-07 +	...	=	6.9E-06	
	||	||	||				
Internal Annual Dose	2.4E-07 +	1.7E-07 +	1.6E-07 +	...	=	6.9E-06	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.1E-12	0.0E+00	0.0E+00	...		2.1E-12	
	||	||	||			||	
Annual Dose	2.4E-07 +	1.7E-07 +	1.6E-07 +	...	=	6.9E-06	Cumulative Dose
						2.4E-07	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.2E-11	1.2E-11	1.2E-11	2.8E-11	8.8E-11	1.9E-08	8.2E-09	1.1E-11
Y 90	4.3E-14	7.5E-14	1.8E-13	8.9E-13	2.2E-12	9.8E-17	9.7E-17	3.3E-18
PU 239	8.2E-07	7.2E-11	1.2E-10	4.7E-10	1.4E-09	1.3E-04	1.0E-05	2.0E-06
Total	8.2E-07	8.4E-11	1.3E-10	5.0E-10	1.4E-09	1.3E-04	1.0E-05	2.0E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.1E-11	1.0E-11	1.1E-11	0.0E+00
Y 90	3.4E-18	3.2E-18	3.2E-18	9.6E-17
PU 239	2.0E-06	4.5E-11	4.4E-11	2.0E-05
Total	2.0E-06	5.5E-11	5.4E-11	2.0E-05

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Radio-nuclide	Inhalation Effective Dose Equivalent	Ingestion Effective Dose Equivalent	External Dose	Internal Effective Dose Equivalent	Annual Effective Dose Equivalent
SR 90	1.6E-09	2.3E-12	3.7E-14	1.6E-09	1.6E-09
Y 90	1.0E-14	1.9E-13	2.0E-12	2.1E-13	2.2E-12
PU 239	6.9E-06	1.4E-10	3.1E-14	6.9E-06	6.9E-06

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ ROSPOEV1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

==========

Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	2.1E-06	0.0E+00	0.0E+00
SR90	1.2E-06	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

	Joint frequency data input.
6.7E+00	Stack height (m)
1.0E+01	Stack flow (m3/s)
5.5E-01	Stack radius (m)
4.6E+01	Effluent temperaure (degrees C)
	Building Wake Model used.
	Release from vent or short stack on building roof
0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

== ====== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

4.0E-04 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.5E-05	2.5E-01	8.7E-06
Breast	9.7E-10	1.5E-01	1.5E-10
R Marrow	1.8E-04	1.2E-01	2.1E-05
Lung	1.4E-05	1.2E-01	1.7E-06
Thyroid	9.6E-10	3.0E-02	2.9E-11
Bone Sur	2.3E-03	3.0E-02	6.9E-05
Liver	3.6E-04	6.0E-02	2.1E-05
LL Int.	2.6E-08	6.0E-02	1.5E-09
UL Int.	8.8E-09	6.0E-02	5.3E-10
S Int.	2.3E-09	6.0E-02	1.4E-10
Stomach	1.5E-09	6.0E-02	8.9E-11
Internal Effective Dose Equivalent			1.2E-04
External Dose			2.4E-11
Annual Effective Dose Equivalent			1.2E-04

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	1.2E-04
Total Ingestion EDE:	2.5E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	4.3E-06 +	3.0E-06 +	2.8E-06 +	...	=	1.2E-06	
	||	||	||				
Internal Annual Dose	4.3E-06 +	3.0E-06 +	2.8E-06 +	...	=	1.2E-06	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.4E-11	0.0E+00	0.0E+00	...		2.4E-11	
	||	||	||			||	
Annual Dose	4.3E-06 +	3.0E-06 +	2.8E-06 +	...	=	1.2E-06	Cumulative Dose
						4.3E-06	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.4E-05	1.5E-09	2.3E-09	8.8E-09	2.5E-08	2.3E-03	1.8E-04	3.5E-05
Soil Ing	2.6E-13	4.3E-12	1.0E-11	5.5E-11	1.7E-10	4.7E-08	3.8E-09	7.0E-10
Total	1.4E-05	1.5E-09	2.3E-09	8.8E-09	2.6E-08	2.3E-03	1.8E-04	3.5E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.5E-05	9.7E-10	9.6E-10	3.6E-04
Soil Ing	7.0E-10	2.6E-13	2.6E-13	7.2E-09
Total	3.5E-05	9.7E-10	9.6E-10	3.6E-04

External Dose by Exposure Pathway

Pathway	
Plume	7.7E-14
Sur Soil	2.4E-11
Total	2.4E-11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.4E-05	1.5E-09	2.3E-09	8.8E-09	2.5E-08	2.3E-03	1.8E-04	3.5E-05
Soil Ing	2.6E-13	4.3E-12	1.0E-11	5.5E-11	1.7E-10	4.7E-08	3.8E-09	7.0E-10
Total	1.4E-05	1.5E-09	2.3E-09	8.8E-09	2.6E-08	2.3E-03	1.8E-04	3.5E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.5E-05	9.7E-10	9.6E-10	3.6E-04
Soil Ing	7.0E-10	2.6E-13	2.6E-13	7.2E-09
Total	3.5E-05	9.7E-10	9.6E-10	3.6E-04

External Dose by Exposure Pathway

Pathway	
Plume	7.7E-14
Sur Soil	2.4E-11
Total	2.4E-11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	7.2E-10	2.0E-10	2.1E-10	4.9E-10	1.5E-09	3.2E-07	1.4E-07	1.8E-10
Y 90	4.3E-11	3.2E-12	7.9E-12	3.8E-11	9.4E-11	7.1E-14	7.1E-14	2.4E-15
PU 239	1.4E-05	1.3E-09	2.0E-09	8.3E-09	2.4E-08	2.3E-03	1.8E-04	3.5E-05
Total	1.4E-05	1.5E-09	2.3E-09	8.8E-09	2.6E-08	2.3E-03	1.8E-04	3.5E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.8E-10	1.8E-10	1.8E-10	0.0E+00
Y 90	2.4E-15	2.3E-15	2.4E-15	7.1E-14
P 239	3.5E-05	7.9E-10	7.7E-10	3.6E-04
Total	3.5E-05	9.7E-10	9.6E-10	3.6E-04

External Dose by Radionuclide

Radionuclide	
SR 90	4.2E-13
Y 90	2.3E-11
PU 239	3.6E-13
Total	2.4E-11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	7.2E-10	2.0E-10	2.1E-10	4.9E-10	1.5E-09	3.2E-07	1.4E-07	1.8E-10
Y 90	4.3E-11	3.2E-12	7.9E-12	3.8E-11	9.4E-11	7.1E-14	7.1E-14	2.4E-15
PU 239	1.4E-05	1.3E-09	2.0E-09	8.3E-09	2.4E-08	2.3E-03	1.8E-04	3.5E-05
Total	1.4E-05	1.5E-09	2.3E-09	8.8E-09	2.6E-08	2.3E-03	1.8E-04	3.5E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.8E-10	1.8E-10	1.8E-10	0.0E+00
Y 90	2.4E-15	2.3E-15	2.4E-15	7.1E-14
F 239	3.5E-05	7.9E-10	7.7E-10	3.6E-04
Total	3.5E-05	9.7E-10	9.6E-10	3.6E-04

External Dose by Radionuclide

Radionuclide	
SR 90	4.2E-13
Y 90	2.3E-11
PU 239	3.6E-13
Total	2.4E-11

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMIEV1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

==========

----Release Terms------

Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
SR90	1.2E-05	0.0E+00	0.0E+00
PU239	2.1E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

2.2E+04	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
6.7E+00	Stack height (m)
1.0E+01	Stack flow (m3/s)
5.3E-01	Stack radius (m)
4.6E+01	Effluent temperaure (degrees C)

Building Wake Model used.

Release from vent or short stack on building roof

0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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3.9E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (No Action) Offsite MI - Elevated Release

Executed on: 10/23/95 at 11:02:55

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.5E-08	2.5E-01	8.7E-09
Breast	2.1E-12	1.5E-01	3.1E-13
R Marrow	1.8E-07	1.2E-01	2.2E-08
Lung	1.4E-08	1.2E-01	1.7E-09
Thyroid	2.0E-12	3.0E-02	6.1E-14
Bone Sur	2.3E-06	3.0E-02	6.9E-08
Liver	3.6E-07	6.0E-02	2.1E-08
LL Int.	5.0E-10	6.0E-02	3.0E-11
UL Int.	1.7E-10	6.0E-02	1.0E-11
S Int.	3.1E-11	6.0E-02	1.9E-12
Stomach	1.4E-11	6.0E-02	8.4E-13
Internal Effective Dose Equivalent			1.2E-07
External Dose			3.5E-14
Annual Effective Dose Equivalent			1.2E-07

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	1.2E-07
Total Ingestion EDE:	5.9E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	4.3E-09 +	3.0E-09 +	2.9E-09 +	...	=	1.2E-07	
	||	||	||				
Internal Annual Dose	4.3E-09 +	3.0E-09 +	2.9E-09 +	...	=	1.2E-07	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	3.5E-14	0.0E+00	0.0E+00	...		3.5E-14	
	||	||	||			||	
Annual Dose	4.3E-09 +	3.0E-09 +	2.9E-09 +	...	=	1.2E-07	Cumulative Dose
						4.3E-09	Maximum Annual Dose Occurred In Year 1

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.4E-08	1.4E-12	2.2E-12	8.4E-12	2.4E-11	2.2E-06	1.7E-07	3.3E-08
Leaf Veg	1.5E-13	2.2E-12	5.2E-12	2.9E-11	8.9E-11	2.5E-08	2.0E-09	3.8E-10
Oth. Veg	3.8E-13	4.2E-12	9.6E-12	5.3E-11	1.6E-10	3.5E-08	3.0E-09	5.3E-10
Fruit	3.9E-13	4.4E-12	1.0E-11	5.5E-11	1.7E-10	3.6E-08	3.1E-09	5.4E-10
Cereals	7.7E-14	1.2E-12	2.8E-12	1.5E-11	4.7E-11	1.3E-08	1.0E-09	1.9E-10
Meat	2.9E-14	2.1E-13	4.5E-13	2.4E-12	6.9E-12	6.5E-11	2.4E-11	2.2E-13
Poultry	6.8E-17	3.0E-16	6.1E-16	3.3E-15	1.1E-14	1.8E-13	5.8E-14	8.6E-16
Cow Milk	1.0E-13	3.3E-13	6.2E-13	3.5E-12	1.2E-11	1.9E-10	8.0E-11	1.2E-13
Eggs	1.0E-15	3.5E-15	6.7E-15	3.8E-14	1.3E-13	6.5E-12	1.2E-12	7.1E-14
Soil Ing	2.6E-16	4.2E-15	9.9E-15	5.4E-14	1.7E-13	4.6E-11	3.7E-12	6.9E-13
Total	1.4E-08	1.4E-11	3.1E-11	1.7E-10	5.0E-10	2.3E-06	1.8E-07	3.5E-08

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.3E-08	9.3E-13	9.2E-13	3.4E-07
Leaf Veg	3.8E-10	1.5E-13	1.5E-13	3.9E-09
Oth. Veg	5.3E-10	3.8E-13	3.8E-13	5.4E-09
Fruit	5.4E-10	3.9E-13	3.9E-13	5.5E-09
Cereals	1.9E-10	7.7E-14	7.6E-14	1.9E-09
Meat	2.2E-13	2.9E-14	2.9E-14	1.9E-12
Poultry	8.6E-16	6.8E-17	6.8E-17	8.1E-15
Cow Milk	1.2E-13	1.0E-13	1.0E-13	2.1E-13
Eggs	7.1E-14	1.0E-15	1.0E-15	7.2E-13
Soil Ing	6.9E-13	2.6E-16	2.6E-16	7.1E-12
Total	3.5E-08	2.1E-12	2.0E-12	3.6E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	7.2E-17
Sur Soil	3.5E-14
Total	3.5E-14

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.4E-08	1.4E-12	2.2E-12	8.4E-12	2.4E-11	2.2E-06	1.7E-07	3.3E-08
Leaf Veg	1.5E-13	2.2E-12	5.2E-12	2.9E-11	8.9E-11	2.5E-08	2.0E-09	3.8E-10
Oth. Veg	3.8E-13	4.2E-12	9.6E-12	5.3E-11	1.6E-10	3.5E-08	3.0E-09	5.3E-10
Fruit	3.9E-13	4.4E-12	1.0E-11	5.5E-11	1.7E-10	3.6E-08	3.1E-09	5.4E-10
Cereals	7.7E-14	1.2E-12	2.8E-12	1.5E-11	4.7E-11	1.3E-08	1.0E-09	1.9E-10
Meat	2.9E-14	2.1E-13	4.5E-13	2.4E-12	6.9E-12	6.5E-11	2.4E-11	2.2E-13
Poultry	6.8E-17	3.0E-16	6.1E-16	3.3E-15	1.1E-14	1.8E-13	5.8E-14	8.6E-16
Cow Milk	1.0E-13	3.3E-13	6.2E-13	3.5E-12	1.2E-11	1.9E-10	8.0E-11	1.2E-13
Eggs	1.0E-15	3.5E-15	6.7E-15	3.8E-14	1.3E-13	6.5E-12	1.2E-12	7.1E-14
Soil Ing	2.6E-16	4.2E-15	9.9E-15	5.4E-14	1.7E-13	4.6E-11	3.7E-12	6.9E-13
Total	1.4E-08	1.4E-11	3.1E-11	1.7E-10	5.0E-10	2.3E-06	1.8E-07	3.5E-08

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.3E-08	9.3E-13	9.2E-13	3.4E-07
Leaf Veg	3.8E-10	1.5E-13	1.5E-13	3.9E-09
Oth. Veg	5.3E-10	3.8E-13	3.8E-13	5.4E-09
Fruit	5.4E-10	3.9E-13	3.9E-13	5.5E-09
Cereals	1.9E-10	7.7E-14	7.6E-14	1.9E-09
Meat	2.2E-13	2.9E-14	2.9E-14	1.9E-12
Poultry	8.6E-16	6.8E-17	6.8E-17	8.1E-15
Cow Milk	1.2E-13	1.0E-13	1.0E-13	2.1E-13
Eggs	7.1E-14	1.0E-15	1.0E-15	7.2E-13
Soil Ing	6.9E-13	2.6E-16	2.6E-16	7.1E-12
Total	3.5E-08	2.1E-12	2.0E-12	3.6E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	7.2E-17
Sur Soil	3.5E-14
Total	3.5E-14

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.8E-12	2.5E-12	3.8E-12	2.3E-11	9.5E-11	2.3E-09	1.0E-09	1.3E-12
Y 90	7.2E-14	4.5E-12	1.1E-11	5.3E-11	1.3E-10	1.8E-15	1.7E-15	5.7E-17
PU 239	1.4E-08	7.0E-12	1.6E-11	9.0E-11	2.8E-10	2.3E-06	1.8E-07	3.5E-08
Total	1.4E-08	1.4E-11	3.1E-11	1.7E-10	5.0E-10	2.3E-06	1.8E-07	3.5E-08

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.3E-12	1.3E-12	1.3E-12	0.0E+00
Y 90	6.6E-17	5.7E-17	5.7E-17	1.7E-15
PU 239	3.5E-08	7.9E-13	7.8E-13	3.6E-07
Total	3.5E-08	2.1E-12	2.0E-12	3.6E-07

External Dose by Radionuclide

Radionuclide	
SR 90	6.0E-16
Y 90	3.4E-14
PU 239	4.9E-16
Total	3.5E-14

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.8E-12	2.5E-12	3.8E-12	2.3E-11	9.5E-11	2.3E-09	1.0E-09	1.3E-12
Y 90	7.2E-14	4.5E-12	1.1E-11	5.3E-11	1.3E-10	1.8E-15	1.7E-15	5.7E-17
PU 239	1.4E-08	7.0E-12	1.6E-11	9.0E-11	2.8E-10	2.3E-06	1.8E-07	3.5E-08
Total	1.4E-08	1.4E-11	3.1E-11	1.7E-10	5.0E-10	2.3E-06	1.8E-07	3.5E-08

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.3E-12	1.3E-12	1.3E-12	0.0E+00
Y 90	6.6E-17	5.7E-17	5.7E-17	1.7E-15
PU 239	3.5E-08	7.9E-13	7.8E-13	3.6E-07
Total	3.5E-08	2.1E-12	2.0E-12	3.6E-07

External Dose by Radionuclide

Radionuclide	
SR 90	6.0E-16
Y 90	3.4E-14
PU 239	4.9E-16
Total	3.5E-14

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPOEV1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
	----Release Terms------		
SR90	1.2E-05	0.0E+00	0.0E+00
PU239	2.1E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

6.7E+00	Stack height (m)
1 E+01	Stack flow (m3/s)
5.3E-01	Stack radius (m)
4.6E+01	Effluent temperaure (degrees C)

Building Wake Model used.
Release from vent or short stack on building roof

0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

========== EXTERNAL EXPOSURE ==========

8 E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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1.6E-03 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.4E-03	2.5E-01	3.5E-04
Breast	6.1E-08	1.5E-01	9.1E-09
R Marrow	7.1E-03	1.2E-01	8.5E-04
Lung	5.6E-04	1.2E-01	6.7E-05
Thyroid	6.0E-08	3.0E-02	1.8E-09
Bone Sur	9.1E-02	3.0E-02	2.7E-03
Liver	1.4E-02	6.0E-02	8.5E-04
LL Int.	1.1E-05	6.0E-02	6.7E-07
UL Int.	3.7E-06	6.0E-02	2.2E-07
S Int.	7.1E-07	6.0E-02	4.3E-08
Stomach	3.3E-07	6.0E-02	2.0E-08
Internal Effective Dose Equivalent			4.8E-03
External Dose			9.4E-10
Annual Effective Dose Equivalent			4.8E-03

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	4.7E-03
Total Ingestion EDE:	1.2E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	1.7E-04 +	1.2E-04 +	1.1E-04 +	...	=	4.8E-03	
	||	||	||				
Internal Annual Dose	1.7E-04 +	1.2E-04 +	1.1E-04 +	...	=	4.8E-03	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	9.4E-10	0.0E+00	0.0E+00	...		9.4E-10	
	||	||	||			||	
Annual Dose	1.7E-04 +	1.2E-04 +	1.1E-04 +	...	=	4.8E-03	Cumulative Dose
						1.7E-04	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.6E-04	5.8E-08	8.8E-08	3.4E-07	9.9E-07	8.9E-02	6.9E-03	1.3E-03
Leaf Veg	3.0E-09	4.7E-08	1.1E-07	6.1E-07	1.8E-06	5.0E-04	4.1E-05	7.6E-06
Oth. Veg	9.6E-09	1.2E-07	2.7E-07	1.5E-06	4.4E-06	9.3E-04	7.8E-05	1.4E-05
Fruit	3.0E-09	3.6E-08	8.2E-08	4.5E-07	1.3E-06	2.8E-04	2.3E-05	4.2E-06
Cereals	2.8E-09	4.4E-08	1.0E-07	5.7E-07	1.7E-06	4.7E-04	3.8E-05	7.0E-06
Meat	1.0E-09	7.4E-09	1.6E-08	8.4E-08	2.4E-07	2.3E-06	8.3E-07	7.7E-09
Poultry	1.3E-12	9.7E-12	2.1E-11	1.1E-10	3.2E-10	3.4E-09	1.1E-09	1.6E-11
Cow Milk	3.4E-09	1.9E-08	3.9E-08	2.1E-07	6.4E-07	6.4E-06	2.7E-06	4.1E-09
Eggs	2.6E-11	1.9E-10	4.2E-10	2.2E-09	6.4E-09	1.7E-07	3.0E-08	1.9E-09
Soil Ing	1.0E-11	1.7E-10	3.9E-10	2.2E-09	6.5E-09	1.8E-06	1.5E-07	2.8E-08
Total	5.6E-04	3.3E-07	7.1E-07	3.7E-06	1.1E-05	9.1E-02	7.1E-03	1.4E-03

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.3E-03	3.8E-08	3.7E-08	1.4E-02
Leaf Veg	7.5E-06	3.0E-09	3.0E-09	7.7E-05
Oth. Veg	1.4E-05	9.6E-09	9.6E-09	1.4E-04
Fruit	4.1E-06	3.0E-09	3.0E-09	4.2E-05
Cereals	7.0E-06	2.8E-09	2.8E-09	7.2E-05
Meat	7.6E-09	1.0E-09	1.0E-09	6.8E-08
Poultry	1.6E-11	1.3E-12	1.3E-12	1.5E-10
Cow Milk	4.1E-09	3.4E-09	3.4E-09	7.0E-09
Eggs	1.9E-09	2.6E-11	2.6E-11	1.9E-08
Soil Ing	2.8E-08	1.0E-11	9.9E-12	2.8E-07
Total	1.4E-03	6.1E-08	6.0E-08	1.4E-02

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	3.3E-12
Sur Soil	9.3E-10
Total	9.4E-10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.6E-04	5.8E-08	8.8E-08	3.4E-07	9.9E-07	8.9E-02	6.9E-03	1.3E-03
Leaf Veg	3.0E-09	4.7E-08	1.1E-07	6.1E-07	1.8E-06	5.0E-04	4.1E-05	7.6E-06
Oth. Veg	9.6E-09	1.2E-07	2.7E-07	1.5E-06	4.4E-06	9.3E-04	7.8E-05	1.4E-05
Fruit	3.0E-09	3.6E-08	8.2E-08	4.5E-07	1.3E-06	2.8E-04	2.3E-05	4.2E-06
Cereals	2.8E-09	4.4E-08	1.0E-07	5.7E-07	1.7E-06	4.7E-04	3.8E-05	7.0E-06
Meat	1.0E-09	7.4E-09	1.6E-08	8.4E-08	2.4E-07	2.3E-06	8.3E-07	7.7E-09
Poultry	1.3E-12	9.7E-12	2.1E-11	1.1E-10	3.2E-10	3.4E-09	1.1E-09	1.6E-11
Cow Milk	3.4E-09	1.9E-08	3.9E-08	2.1E-07	6.4E-07	6.4E-06	2.7E-06	4.1E-09
Eggs	2.6E-11	1.9E-10	4.2E-10	2.2E-09	6.4E-09	1.7E-07	3.0E-08	1.9E-09
Soil Ing	1.0E-11	1.7E-10	3.9E-10	2.2E-09	6.5E-09	1.8E-06	1.5E-07	2.8E-08
Total	5.6E-04	3.3E-07	7.1E-07	3.7E-06	1.1E-05	9.1E-02	7.1E-03	1.4E-03

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.3E-03	3.8E-08	3.7E-08	1.4E-02
Leaf Veg	7.5E-06	3.0E-09	3.0E-09	7.7E-05
Oth. Veg	1.4E-05	9.6E-09	9.6E-09	1.4E-04
Fruit	4.1E-06	3.0E-09	3.0E-09	4.2E-05
Cereals	7.0E-06	2.8E-09	2.8E-09	7.2E-05
Meat	7.6E-09	1.0E-09	1.0E-09	6.8E-08
Poultry	1.6E-11	1.3E-12	1.3E-12	1.5E-10
Cow Milk	4.1E-09	3.4E-09	3.4E-09	7.0E-09
Eggs	1.9E-09	2.6E-11	2.6E-11	1.9E-08
Soil Ing	2.8E-08	1.0E-11	9.9E-12	2.8E-07
Total	1.4E-03	6.1E-08	6.0E-08	1.4E-02

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	3.3E-12
Sur Soil	9.3E-10
Total	9.4E-10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	5.1E-08	5.4E-08	8.1E-08	4.7E-07	2.0E-06	5.4E-05	2.3E-05	2.9E-08
Y 90	9.7E-09	1.1E-07	2.6E-07	1.3E-06	3.2E-06	5.6E-11	5.5E-11	1.8E-12
PU 239	5.6E-04	1.6E-07	3.7E-07	2.0E-06	6.0E-06	9.1E-02	7.0E-03	1.4E-03
Total	5.6E-04	3.3E-07	7.1E-07	3.7E-06	1.1E-05	9.1E-02	7.1E-03	1.4E-03

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	2.9E-08	2.9E-08	2.9E-08	0.0E+00
Y 90	2.0E-12	1.8E-12	1.8E-12	5.4E-11
Γ 239	1.4E-03	3.1E-08	3.1E-08	1.4E-02
Total	1.4E-03	6.1E-08	6.0E-08	1.4E-02

External Dose by Radionuclide

Radionuclide	
SR 90	1.6E-11
Y 90	9.1E-10
PU 239	1.5E-11
Total	9.4E-10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	5.1E-08	5.4E-08	8.1E-08	4.7E-07	2.0E-06	5.4E-05	2.3E-05	2.9E-08
Y 90	9.7E-09	1.1E-07	2.6E-07	1.3E-06	3.2E-06	5.6E-11	5.5E-11	1.8E-12
PU 239	5.6E-04	1.6E-07	3.7E-07	2.0E-06	6.0E-06	9.1E-02	7.0E-03	1.4E-03
Total	5.6E-04	3.3E-07	7.1E-07	3.7E-06	1.1E-05	9.1E-02	7.1E-03	1.4E-03

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	2.9E-08	2.9E-08	2.9E-08	0.0E+00
Y 90	2.0E-12	1.8E-12	1.8E-12	5.4E-11
PU 239	1.4E-03	3.1E-08	3.1E-08	1.4E-02
Total	1.4E-03	6.1E-08	6.0E-08	1.4E-02

External Dose by Radionuclide

Radionuclide	
SR 90	1.6E-11
Y 90	9.1E-10
PU 239	1.5E-11
Total	9.4E-10

S23

Retrieval LTM

Off Site

MEI
- χ/Q 6.6E-8
- Dose 7.1E-8

POP
- χ/Q 2.9E-3
- Dose 2.3E-3

On Site

MEI
- χ/Q 4.0E-4
- Dose 2.4E-6

POP
- χ/Q 1.6E-3
- Dose 9.2E-6

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMITF2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
CS137	7.0E-05	0.0E+00	0.0E+00
I 129	1.0E-04	0.0E+00	0.0E+00
SR90	1.0E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
1.0E+02 Maximum individual distance from release point (m)
1.4E+01 Maximum individual sector index (Wind Toward ESE)
Ground level release.

========== EXTERNAL EXPOSURE ==========
8.8E+03 Hours of exposure to plume
4.4E+03 Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

4.0E-04 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (LTM) Onsite MI - Ground Release

Executed on: 10/14/95 at 13:22:52

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.5E-07	2.5E-01	6.4E-08
Breast	2.3E-07	1.5E-01	3.5E-08
R Marrow	1.4E-06	1.2E-01	1.7E-07
Lung	2.7E-07	1.2E-01	3.2E-08
Thyroid	5.7E-05	3.0E-02	1.7E-06
Bone Sur	3.0E-06	3.0E-02	8.9E-08
LL Int.	2.7E-07	6.0E-02	1.6E-08
S Int.	2.6E-07	6.0E-02	1.6E-08
UL Int.	2.6E-07	6.0E-02	1.6E-08
Stomach	2.5E-07	6.0E-02	1.5E-08
Liver	8.8E-15	6.0E-02	5.3E-16
Internal Effective Dose Equivalent			2.2E-06
External Dose			2.0E-07
Annual Effective Dose Equivalent			2.4E-06

Controlling Organ:	Thyroid
Controlling Pathway:	Inh
Controlling Radionuclide:	I 129
Total Inhalation EDE:	2.1E-06
Total Ingestion EDE:	4.9E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	1.8E-06 +	2.2E-07 +	4.1E-08 +	...	=	2.2E-06	
	||	||	||				
Internal Annual Dose	1.8E-06 +	2.2E-07 +	4.1E-08 +	...	=	2.2E-06	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.0E-07	0.0E+00	0.0E+00	...		2.0E-07	
	||	||	||			||	
Annual Dose	2.0E-06 +	2.2E-07 +	4.1E-08 +	...	=	2.4E-06	Cumulative Dose
						2.0E-06	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	2.7E-07	2.5E-07	2.6E-07	2.6E-07	2.7E-07	3.0E-06	1.4E-06	2.5E-07
Soil Ing	1.0E-09	1.2E-09	1.1E-09	1.3E-09	1.6E-09	4.9E-09	2.7E-09	1.1E-09
Total	2.7E-07	2.5E-07	2.6E-07	2.6E-07	2.7E-07	3.0E-06	1.4E-06	2.5E-07

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.4E-07	2.3E-07	5.5E-05	5.2E-15
Soil Ing	1.0E-09	1.1E-09	1.6E-06	3.7E-15
Total	2.4E-07	2.3E-07	5.7E-05	8.8E-15

External Dose by Exposure Pathway

Pathway	
Plume	1.1E-10
Sur Soil	2.0E-07
Total	2.0E-07

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (LTM) Onsite MI - Ground Release

Executed on: 10/14/95 at 13:22:52

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	2.7E-07	2.5E-07	2.6E-07	2.6E-07	2.7E-07	3.0E-06	1.4E-06	2.5E-07
Soil Ing	1.0E-09	1.2E-09	1.1E-09	1.3E-09	1.6E-09	4.9E-09	2.7E-09	1.1E-09
Total	2.7E-07	2.5E-07	2.6E-07	2.6E-07	2.7E-07	3.0E-06	1.4E-06	2.5E-07

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.4E-07	2.3E-07	5.5E-05	5.2E-15
Soil Ing	1.0E-09	1.1E-09	1.6E-06	3.7E-15
Total	2.4E-07	2.3E-07	5.7E-05	8.8E-15

External Dose by Exposure Pathway

Pathway	
Plume	1.1E-10
Sur Soil	2.0E-07
Total	2.0E-07

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (LTM) Onsite MI - Ground Release

Executed on: 10/14/95 at 13:22:52

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	6.1E-09	1.7E-09	1.8E-09	4.1E-09	1.3E-08	2.7E-06	1.2E-06	1.5E-09
Y 90	3.1E-12	1.1E-11	2.5E-11	1.3E-10	3.1E-10	9.0E-15	8.9E-15	3.0E-16
I 129	1.2E-08	3.9E-09	3.3E-09	3.3E-09	3.3E-09	4.6E-09	5.0E-09	3.1E-09
CS 137	2.5E-07	2.5E-07	2.6E-07	2.5E-07	2.6E-07	2.3E-07	2.4E-07	2.5E-07
Total	2.7E-07	2.5E-07	2.6E-07	2.6E-07	2.7E-07	3.0E-06	1.4E-06	2.5E-07

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.5E-09	1.5E-09	1.5E-09	0.0E+00
Y 90	3.1E-16	2.9E-16	3.0E-16	8.8E-15
I 129	3.3E-09	7.9E-09	5.7E-05	0.0E+00
CS 137	2.3E-07	2.3E-07	2.3E-07	0.0E+00
Total	2.4E-07	2.3E-07	5.7E-05	8.8E-15

External Dose by Radionuclide

Radionuclide	
SR 90	5.2E-12
Y 90	2.9E-10
I 129	5.7E-09
CS 137	1.9E-07
Total	2.0E-07

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (LTM) Onsite MI - Ground Release

Executed on: 10/14/95 at 13:22:52

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	6.1E-09	1.7E-09	1.8E-09	4.1E-09	1.3E-08	2.7E-06	1.2E-06	1.5E-09
Y 90	3.1E-12	1.1E-11	2.5E-11	1.3E-10	3.1E-10	9.0E-15	8.9E-15	3.0E-16
I 129	1.2E-08	3.9E-09	3.3E-09	3.3E-09	3.3E-09	4.6E-09	5.0E-09	3.1E-09
CS 137	2.5E-07	2.5E-07	2.6E-07	2.5E-07	2.6E-07	2.3E-07	2.4E-07	2.5E-07
Total	2.7E-07	2.5E-07	2.6E-07	2.6E-07	2.7E-07	3.0E-06	1.4E-06	2.5E-07

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.5E-09	1.5E-09	1.5E-09	0.0E+00
Y 90	3.1E-16	2.9E-16	3.0E-16	8.8E-15
I 129	3.3E-09	7.9E-09	5.7E-05	0.0E+00
CS 137	2.3E-07	2.3E-07	2.3E-07	0.0E+00
Total	2.4E-07	2.3E-07	5.7E-05	8.8E-15

External Dose by Radionuclide

Radionuclide	
SR 90	5.2E-12
Y 90	2.9E-10
I 129	5.7E-09
CS 137	1.9E-07
Total	2.0E-07

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSPOTF2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

==========

Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
CS137	7.0E-05	0.0E+00	0.0E+00
I 129	1.0E-04	0.0E+00	0.0E+00
SR90	1.0E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
Ground level release.

========== EXTERNAL EXPOSURE ==========
8.8E+03 Hours of exposure to plume
2.9E+03 Hours of exposure to ground contamination

========== INHALATION ==========
8.8E+03 Hours of inhalation exposure per year

1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

1.6E-03 Population-weighted chi/Q

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.0E-06	2.5E-01	2.6E-07
Breast	9.6E-07	1.5E-01	1.4E-07
R Marrow	5.7E-06	1.2E-01	6.9E-07
Lung	1.1E-06	1.2E-01	1.3E-07
Thyroid	2.3E-04	3.0E-02	6.8E-06
Bone Sur	1.2E-05	3.0E-02	3.6E-07
LL Int.	1.1E-06	6.0E-02	6.7E-08
S Int.	1.1E-06	6.0E-02	6.4E-08
UL Int.	1.1E-06	6.0E-02	6.4E-08
Stomach	1.0E-06	6.0E-02	6.1E-08
Liver	1.3E-12	6.0E-02	7.6E-14
Internal Effective Dose Equivalent			8.7E-06
External Dose			5.3E-07
Annual Effective Dose Equivalent			9.2E-06

Controlling Organ:	Thyroid
Controlling Pathway:	Inh
Controlling Radionuclide:	I 129
Total Inhalation EDE:	8.5E-06
Total Ingestion EDE:	1.9E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	7.0E-06 +	8.8E-07 +	1.7E-07 +	...	=	8.7E-06	
	||	||	||				
Internal Annual Dose	7.0E-06 +	8.8E-07 +	1.7E-07 +	...	=	8.7E-06	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	5.3E-07	0.0E+00	0.0E+00	...		5.3E-07	
	||	||	||			||	
Annual Dose	7.6E-06 +	8.8E-07 +	1.7E-07 +	...	=	9.2E-06	Cumulative Dose
						7.6E-06	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.1E-06	1.0E-06	1.1E-06	1.1E-06	1.1E-06	1.2E-05	5.7E-06	1.0E-06
Soil Ing	4.1E-09	4.6E-09	4.5E-09	5.1E-09	6.4E-09	2.0E-08	1.1E-08	4.3E-09
Total	1.1E-06	1.0E-06	1.1E-06	1.1E-06	1.1E-06	1.2E-05	5.7E-06	1.0E-06

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	9.6E-07	9.5E-07	2.2E-04	1.2E-12
Soil Ing	4.0E-09	4.4E-09	6.2E-06	1.5E-14
Total	9.6E-07	9.6E-07	2.3E-04	1.3E-12

External Dose by Exposure Pathway

Pathway	
Plume	4.2E-09
Sur Soil	5.3E-07
Total	5.3E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.1E-06	1.0E-06	1.1E-06	1.1E-06	1.1E-06	1.2E-05	5.7E-06	1.0E-06
Soil Ing	4.1E-09	4.6E-09	4.5E-09	5.1E-09	6.4E-09	2.0E-08	1.1E-08	4.3E-09
Total	1.1E-06	1.0E-06	1.1E-06	1.1E-06	1.1E-06	1.2E-05	5.7E-06	1.0E-06

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	9.6E-07	9.5E-07	2.2E-04	1.2E-12
Soil Ing	4.0E-09	4.4E-09	6.2E-06	1.5E-14
Total	9.6E-07	9.6E-07	2.3E-04	1.3E-12

External Dose by Exposure Pathway

Pathway	
Plume	4.2E-09
Sur Soil	5.3E-07
Total	5.3E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.4E-08	6.7E-09	7.2E-09	1.6E-08	5.1E-08	1.1E-05	4.7E-06	6.2E-09
Y 90	7.5E-10	7.9E-11	1.9E-10	9.4E-10	2.3E-09	1.3E-12	1.3E-12	4.2E-14
I 129	4.9E-08	1.6E-08	1.3E-08	1.3E-08	1.3E-08	1.8E-08	2.0E-08	1.2E-08
CS 137	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	9.3E-07	9.7E-07	1.0E-06
Total	1.1E-06	1.0E-06	1.1E-06	1.1E-06	1.1E-06	1.2E-05	5.7E-06	1.0E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	6.2E-09	6.0E-09	6.2E-09	0.0E+00
Y 90	4.2E-14	4.1E-14	4.2E-14	1.3E-12
I 129	1.3E-08	3.2E-08	2.3E-04	0.0E+00
CS 137	9.4E-07	9.2E-07	9.2E-07	0.0E+00
Total	9.6E-07	9.6E-07	2.3E-04	1.3E-12

External Dose by Radionuclide

Radionuclide	
SR 90	1.4E-11
Y 90	7.7E-10
I 129	1.5E-08
CS 137	5.2E-07
Total	5.3E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.4E-08	6.7E-09	7.2E-09	1.6E-08	5.1E-08	1.1E-05	4.7E-06	6.2E-09
Y 90	7.5E-10	7.9E-11	1.9E-10	9.4E-10	2.3E-09	1.3E-12	1.3E-12	4.2E-14
I 129	4.9E-08	1.6E-08	1.3E-08	1.3E-08	1.3E-08	1.8E-08	2.0E-08	1.2E-08
CS 137	1.0E-06	1.0E-06	1.0E-06	1.0E-06	1.0E-06	9.3E-07	9.7E-07	1.0E-06
Total	1.1E-06	1.0E-06	1.1E-06	1.1E-06	1.1E-06	1.2E-05	5.7E-06	1.0E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	6.2E-09	6.0E-09	6.2E-09	0.0E+00
Y 90	4.2E-14	4.1E-14	4.2E-14	1.3E-12
I 129	1.3E-08	3.2E-08	2.3E-04	0.0E+00
CS 137	9.4E-07	9.2E-07	9.2E-07	0.0E+00
Total	9.6E-07	9.6E-07	2.3E-04	1.3E-12

External Dose by Radionuclide

Radionuclide	
SR 90	1.4E-11
Y 90	7.7E-10
I 129	1.5E-08
CS 137	5.2E-07
Total	5.3E-07

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Infinite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMITF2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
CS137	7.0E-05	0.0E+00	0.0E+00
I 129	1.0E-04	0.0E+00	0.0E+00
SR90	1.0E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.
2.0E+04 Maximum individual distance from release point (m)
1.3E+01 Maximum individual sector index (Wind Toward E)
Ground level release.

========== EXTERNAL EXPOSURE ==========

8.8E+03 Hours of exposure to plume
4.4E+03 Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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6.6E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (LTM) Offsite MI - Tank Farm Ground Release

Executed on: 10/14/95 at 13:32:16

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.6E-09	2.5E-01	3.9E-10
Breast	1.6E-09	1.5E-01	2.4E-10
R Marrow	2.9E-09	1.2E-01	3.5E-10
Lung	1.5E-09	1.2E-01	1.8E-10
Thyroid	2.3E-06	3.0E-02	7.0E-08
Bone Sur	4.8E-09	3.0E-02	1.4E-10
LL Int.	1.9E-09	6.0E-02	1.1E-10
UL Int.	1.7E-09	6.0E-02	1.0E-10
Stomach	1.7E-09	6.0E-02	1.0E-10
S Int.	1.6E-09	6.0E-02	9.7E-11
Liver	2.4E-15	6.0E-02	1.4E-16
Internal Effective Dose Equivalent			7.1E-08
External Dose			3.3E-11
Annual Effective Dose Equivalent			7.1E-08

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 129
Total Inhalation EDE:	3.4E-10
Total Ingestion EDE:	7.1E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	6.3E-08 +	7.0E-09 +	7.9E-10 +	...	=	7.1E-08	
	||	||	||				
Internal Annual Dose	6.3E-08 +	7.0E-09 +	7.9E-10 +	...	=	7.1E-08	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	3.3E-11	0.0E+00	0.0E+00	...		3.3E-11	
	||	||	||			||	
Annual Dose	6.3E-08 +	7.0E-09 +	7.9E-10 +	...	=	7.1E-08	Cumulative Dose
						6.3E-08	Maximum Annual Dose Occurred In Year 1

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	4.3E-11	4.0E-11	4.1E-11	4.1E-11	4.3E-11	4.8E-10	2.3E-10	4.0E-11
Leaf Veg	9.7E-11	1.1E-10	1.0E-10	1.2E-10	1.4E-10	4.7E-10	2.6E-10	1.0E-10
Oth. Veg	1.3E-10	1.5E-10	1.5E-10	1.8E-10	2.5E-10	1.1E-09	5.4E-10	1.4E-10
Fruit	1.4E-10	1.6E-10	1.5E-10	1.9E-10	2.6E-10	1.1E-09	5.6E-10	1.5E-10
Cereals	4.9E-11	5.6E-11	5.3E-11	6.0E-11	7.6E-11	2.4E-10	1.3E-10	5.1E-11
Meat	6.4E-10	7.0E-10	7.0E-10	7.0E-10	7.1E-10	7.2E-10	6.8E-10	6.9E-10
Poultry	4.9E-12	5.3E-12	5.3E-12	5.3E-12	5.4E-12	5.1E-12	5.0E-12	5.3E-12
Cow Milk	3.9E-10	4.5E-10	4.0E-10	4.1E-10	4.2E-10	6.6E-10	5.2E-10	4.0E-10
Eggs	1.9E-12	2.3E-12	1.8E-12	1.9E-12	2.0E-12	4.6E-12	3.2E-12	1.8E-12
Soil Ing	1.6E-13	1.8E-13	1.8E-13	2.0E-13	2.5E-13	7.8E-13	4.3E-13	1.7E-13
Total	1.5E-09	1.7E-09	1.6E-09	1.7E-09	1.9E-09	4.8E-09	2.9E-09	1.6E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.7E-11	3.7E-11	9.1E-09	1.6E-16
Leaf Veg	9.5E-11	1.1E-10	2.0E-07	3.0E-16
Oth. Veg	1.3E-10	1.5E-10	3.2E-07	7.7E-16
Fruit	1.4E-10	1.6E-10	3.2E-07	8.2E-16
Cereals	4.8E-11	5.5E-11	1.1E-07	1.8E-16
Meat	6.4E-10	6.4E-10	1.0E-07	7.3E-17
Poultry	4.9E-12	4.8E-12	5.9E-11	7.7E-20
Cow Milk	3.8E-10	4.6E-10	1.2E-06	5.9E-17
Eggs	1.7E-12	2.8E-12	1.4E-08	5.8E-19
Soil Ing	1.6E-13	1.8E-13	2.5E-10	6.0E-19
Total	1.5E-09	1.6E-09	2.3E-06	2.4E-15

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	5.6E-13
Sur Soil	3.3E-11
Total	3.3E-11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	4.3E-11	4.0E-11	4.1E-11	4.1E-11	4.3E-11	4.8E-10	2.3E-10	4.0E-11
Leaf Veg	9.7E-11	1.1E-10	1.0E-10	1.2E-10	1.4E-10	4.7E-10	2.6E-10	1.0E-10
Oth. Veg	1.3E-10	1.5E-10	1.5E-10	1.8E-10	2.5E-10	1.1E-09	5.4E-10	1.4E-10
Fruit	1.4E-10	1.6E-10	1.5E-10	1.9E-10	2.6E-10	1.1E-09	5.6E-10	1.5E-10
Cereals	4.9E-11	5.6E-11	5.3E-11	6.0E-11	7.6E-11	2.4E-10	1.3E-10	5.1E-11
Meat	6.4E-10	7.0E-10	7.0E-10	7.0E-10	7.1E-10	7.2E-10	6.8E-10	6.9E-10
Poultry	4.9E-12	5.3E-12	5.3E-12	5.3E-12	5.4E-12	5.1E-12	5.0E-12	5.3E-12
Cow Milk	3.9E-10	4.5E-10	4.0E-10	4.1E-10	4.2E-10	6.6E-10	5.2E-10	4.0E-10
Eggs	1.9E-12	2.3E-12	1.8E-12	1.9E-12	2.0E-12	4.6E-12	3.2E-12	1.8E-12
Soil Ing	1.6E-13	1.8E-13	1.8E-13	2.0E-13	2.5E-13	7.8E-13	4.3E-13	1.7E-13
Total	1.5E-09	1.7E-09	1.6E-09	1.7E-09	1.9E-09	4.8E-09	2.9E-09	1.6E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.7E-11	3.7E-11	9.1E-09	1.6E-16
Leaf Veg	9.5E-11	1.1E-10	2.0E-07	3.0E-16
Oth. Veg	1.3E-10	1.5E-10	3.2E-07	7.7E-16
Fruit	1.4E-10	1.6E-10	3.2E-07	8.2E-16
Cereals	4.8E-11	5.5E-11	1.1E-07	1.8E-16
Meat	6.4E-10	6.4E-10	1.0E-07	7.3E-17
Poultry	4.9E-12	4.8E-12	5.9E-11	7.7E-20
Cow Milk	3.8E-10	4.6E-10	1.2E-06	5.9E-17
Eggs	1.7E-12	2.8E-12	1.4E-08	5.8E-19
Soil Ing	1.6E-13	1.8E-13	2.5E-10	6.0E-19
Total	1.5E-09	1.6E-09	2.3E-06	2.4E-15

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	5.6E-13
Sur Soil	3.3E-11
Total	3.3E-11

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (LTM) Offsite MI - Tank Farm Ground Release

Executed on: 10/14/95 at 13:32:16

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.5E-12	3.5E-12	5.3E-12	3.2E-11	1.3E-10	3.2E-09	1.4E-09	1.8E-12
Y 90	9.7E-14	6.4E-12	1.5E-11	7.5E-11	1.9E-10	2.5E-15	2.4E-15	8.1E-17
I 129	1.6E-10	2.2E-10	1.3E-10	1.3E-10	1.3E-10	1.8E-10	1.9E-10	1.2E-10
CS 137	1.3E-09	1.4E-09	1.5E-09	1.5E-09	1.5E-09	1.3E-09	1.3E-09	1.4E-09
Total	1.5E-09	1.7E-09	1.6E-09	1.7E-09	1.9E-09	4.8E-09	2.9E-09	1.6E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.8E-12	1.8E-12	1.8E-12	0.0E+00
Y 90	9.2E-17	8.0E-17	8.1E-17	2.4E-15
I 129	1.3E-10	3.1E-10	2.3E-06	0.0E+00
CS 137	1.3E-09	1.3E-09	1.3E-09	0.0E+00
Total	1.5E-09	1.6E-09	2.3E-06	2.4E-15

External Dose by Radionuclide

Radionuclide	
SR 90	8.6E-16
Y 90	4.7E-14
I 129	9.5E-13
CS 137	3.2E-11
Total	3.3E-11

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.5E-12	3.5E-12	5.3E-12	3.2E-11	1.3E-10	3.2E-09	1.4E-09	1.8E-12
Y 90	9.7E-14	6.4E-12	1.5E-11	7.5E-11	1.9E-10	2.5E-15	2.4E-15	8.1E-17
I 129	1.6E-10	2.2E-10	1.3E-10	1.3E-10	1.3E-10	1.8E-10	1.9E-10	1.2E-10
CS 137	1.3E-09	1.4E-09	1.5E-09	1.5E-09	1.5E-09	1.3E-09	1.3E-09	1.4E-09
Total	1.5E-09	1.7E-09	1.6E-09	1.7E-09	1.9E-09	4.8E-09	2.9E-09	1.6E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.8E-12	1.8E-12	1.8E-12	0.0E+00
Y 90	9.2E-17	8.0E-17	8.1E-17	2.4E-15
I 129	1.3E-10	3.1E-10	2.3E-06	0.0E+00
CS 137	1.3E-09	1.3E-09	1.3E-09	0.0E+00
Total	1.5E-09	1.6E-09	2.3E-06	2.4E-15

External Dose by Radionuclide

Radionuclide	
SR 90	8.6E-16
Y 90	4.7E-14
I 129	9.5E-13
CS 137	3.2E-11
Total	3.3E-11

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPOTF2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
CS137	7.0E-05	0.0E+00	0.0E+00
I 129	1.0E-04	0.0E+00	0.0E+00
SR90	1.0E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
Ground level release.

========== EXTERNAL EXPOSURE ==========
8.8E+03 Hours of exposure to plume
2.9E+03 Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1 Atmospheric production definition: 1 - Use population-weighted chi/Q
Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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2.9E-03 Population-weighted chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (LTM) Offsite Population - Ground Release

Executed on: 10/14/95 at 13:36:07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	5.2E-05	2.5E-01	1.3E-05
Breast	5.4E-05	1.5E-01	8.1E-06
R Marrow	8.6E-05	1.2E-01	1.0E-05
Lung	5.0E-05	1.2E-01	6.0E-06
Thyroid	7.4E-02	3.0E-02	2.2E-03
Bone Sur	1.3E-04	3.0E-02	4.0E-06
LL Int.	6.1E-05	6.0E-02	3.6E-06
UL Int.	5.6E-05	6.0E-02	3.3E-06
Stomach	5.5E-05	6.0E-02	3.3E-06
S Int.	5.4E-05	6.0E-02	3.2E-06
Liver	8.1E-11	6.0E-02	4.9E-12
Internal Effective Dose Equivalent			2.3E-03
External Dose			9.7E-07
Annual Effective Dose Equivalent			2.3E-03

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 129
Total Inhalation EDE:	1.5E-05
Total Ingestion EDE:	2.3E-03

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	2.0E-03 +	2.2E-03 +	2.5E-05 +	...	=	2.3E-03	
	||	||	||				
Internal Annual Dose	2.0E-03 +	2.2E-03 +	2.5E-05 +	...	=	2.3E-03	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	9.7E-07	0.0E+00	0.0E+00	...		9.7E-07	
	||	||	||			||	
Annual Dose	2.0E-03 +	2.2E-03 +	2.5E-05 +	...	=	2.3E-03	Cumulative Dose
						2.0E-03	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	2.0E-06	1.8E-06	1.9E-06	1.9E-06	2.0E-06	2.1E-05	1.0E-05	1.8E-06
Leaf Veg	2.1E-06	2.4E-06	2.3E-06	2.6E-06	3.3E-06	1.0E-05	5.6E-06	2.2E-06
Oth. Veg	3.8E-06	4.4E-06	4.2E-06	5.1E-06	7.3E-06	3.0E-05	1.5E-05	3.9E-06
Fruit	1.2E-06	1.3E-06	1.3E-06	1.6E-06	2.3E-06	9.5E-06	4.8E-06	1.2E-06
Cereals	2.0E-06	2.2E-06	2.1E-06	2.4E-06	3.0E-06	9.3E-06	5.2E-06	2.0E-06
Meat	2.4E-05	2.6E-05	2.6E-05	2.6E-05	2.7E-05	2.7E-05	2.6E-05	2.6E-05
Poultry	1.0E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07
Cow Milk	1.4E-05	1.7E-05	1.5E-05	1.5E-05	1.6E-05	2.5E-05	1.9E-05	1.5E-05
Eggs	5.5E-08	6.8E-08	5.4E-08	5.7E-08	6.3E-08	1.3E-07	9.2E-08	5.1E-08
Soil Ing	7.1E-09	8.0E-09	7.8E-09	8.8E-09	1.1E-08	3.4E-08	1.9E-08	7.5E-09
Total	5.0E-05	5.5E-05	5.4E-05	5.6E-05	6.1E-05	1.3E-04	8.6E-05	5.2E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.7E-06	1.7E-06	3.9E-04	2.4E-11
Leaf Veg	2.1E-06	2.4E-06	4.4E-03	7.9E-12
Oth. Veg	3.7E-06	4.4E-06	9.1E-03	2.5E-11
Fruit	1.1E-06	1.3E-06	2.7E-03	8.0E-12
Cereals	1.9E-06	2.2E-06	4.4E-03	7.2E-12
Meat	2.4E-05	2.4E-05	3.9E-03	2.8E-12
Poultry	1.0E-07	1.0E-07	1.3E-06	3.5E-15
Cow Milk	1.4E-05	1.8E-05	4.8E-02	6.2E-12
Eggs	5.1E-08	8.2E-08	4.2E-04	7.2E-14
Soil Ing	7.0E-09	7.7E-09	1.1E-05	2.7E-14
Total	4.9E-05	5.4E-05	7.4E-02	8.1E-11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	1.3E-08
Sur Soil	9.6E-07
Total	9.7E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	2.0E-06	1.8E-06	1.9E-06	1.9E-06	2.0E-06	2.1E-05	1.0E-05	1.8E-06
Leaf Veg	2.1E-06	2.4E-06	2.3E-06	2.6E-06	3.3E-06	1.0E-05	5.6E-06	2.2E-06
Oth. Veg	3.8E-06	4.4E-06	4.2E-06	5.1E-06	7.3E-06	3.0E-05	1.5E-05	3.9E-06
Fruit	1.2E-06	1.3E-06	1.3E-06	1.6E-06	2.3E-06	9.5E-06	4.8E-06	1.2E-06
Cereals	2.0E-06	2.2E-06	2.1E-06	2.4E-06	3.0E-06	9.3E-06	5.2E-06	2.0E-06
Meat	2.4E-05	2.6E-05	2.6E-05	2.6E-05	2.7E-05	2.7E-05	2.6E-05	2.6E-05
Poultry	1.0E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07	1.1E-07
Cow Milk	1.4E-05	1.7E-05	1.5E-05	1.5E-05	1.6E-05	2.5E-05	1.9E-05	1.5E-05
Eggs	5.5E-08	6.8E-08	5.4E-08	5.7E-08	6.3E-08	1.3E-07	9.2E-08	5.1E-08
Soil Ing	7.1E-09	8.0E-09	7.8E-09	8.8E-09	1.1E-08	3.4E-08	1.9E-08	7.5E-09
Total	5.0E-05	5.5E-05	5.4E-05	5.6E-05	6.1E-05	1.3E-04	8.6E-05	5.2E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.7E-06	1.7E-06	3.9E-04	2.4E-11
Leaf Veg	2.1E-06	2.4E-06	4.4E-03	7.9E-12
Oth. Veg	3.7E-06	4.4E-06	9.1E-03	2.5E-11
Fruit	1.1E-06	1.3E-06	2.7E-03	8.0E-12
Cereals	1.9E-06	2.2E-06	4.4E-03	7.2E-12
Meat	2.4E-05	2.4E-05	3.9E-03	2.8E-12
Poultry	1.0E-07	1.0E-07	1.3E-06	3.5E-15
Cow Milk	1.4E-05	1.8E-05	4.8E-02	6.2E-12
Eggs	5.1E-08	8.2E-08	4.2E-04	7.2E-14
Soil Ing	7.0E-09	7.7E-09	1.1E-05	2.7E-14
Total	4.9E-05	5.4E-05	7.4E-02	8.1E-11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	1.3E-08
Sur Soil	9.6E-07
Total	9.7E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	7.7E-08	8.2E-08	1.2E-07	7.2E-07	3.0E-06	8.2E-05	3.5E-05	4.5E-08
Y 90	1.4E-08	1.7E-07	3.9E-07	2.0E-06	4.9E-06	8.4E-11	8.3E-11	2.8E-12
I 129	5.0E-06	6.9E-06	4.3E-06	4.3E-06	4.3E-06	5.6E-06	5.9E-06	3.9E-06
CS 137	4.5E-05	4.8E-05	4.9E-05	4.9E-05	4.9E-05	4.5E-05	4.5E-05	4.8E-05
Total	5.0E-05	5.5E-05	5.4E-05	5.6E-05	6.1E-05	1.3E-04	8.6E-05	5.2E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	4.5E-08	4.4E-08	4.5E-08	0.0E+00
Y 90	3.1E-12	2.7E-12	2.8E-12	8.1E-11
I 129	4.3E-06	9.8E-06	7.4E-02	0.0E+00
CS 137	4.5E-05	4.4E-05	4.4E-05	0.0E+00
Total	4.9E-05	5.4E-05	7.4E-02	8.1E-11

External Dose by Radionuclide

Radionuclide	
SR 90	2.5E-11
Y 90	1.4E-09
I 129	2.8E-08
CS 137	9.4E-07
Total	9.7E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	7.7E-08	8.2E-08	1.2E-07	7.2E-07	3.0E-06	8.2E-05	3.5E-05	4.5E-08
Y 90	1.4E-08	1.7E-07	3.9E-07	2.0E-06	4.9E-06	8.4E-11	8.3E-11	2.8E-12
I 129	5.0E-06	6.9E-06	4.3E-06	4.3E-06	4.3E-06	5.6E-06	5.9E-06	3.9E-06
CS 137	4.5E-05	4.8E-05	4.9E-05	4.9E-05	4.9E-05	4.5E-05	4.5E-05	4.8E-05
Total	5.0E-05	5.5E-05	5.4E-05	5.6E-05	6.1E-05	1.3E-04	8.6E-05	5.2E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	4.5E-08	4.4E-08	4.5E-08	0.0E+00
Y 90	3.1E-12	2.7E-12	2.8E-12	8.1E-11
I 129	4.3E-06	9.8E-06	7.4E-02	0.0E+00
CS 137	4.5E-05	4.4E-05	4.4E-05	0.0E+00
Total	4.9E-05	5.4E-05	7.4E-02	8.1E-11

External Dose by Radionuclide

Radionuclide	
SR 90	2.5E-11
Y 90	1.4E-09
I 129	2.8E-08
CS 137	9.4E-07
Total	9.7E-07

Tank Farm Emissions From Current Operations							
242A 6 Source Emissions Roll-UP		Avg Exit Velocity 37.8 (ft/sec)		Area 9.62 (sq. ft)			
Active Ventilation		Avg Exit Temperature 117 (F)		Height 22 (ft)			
					Operating release		
	Continuous Ops	Periodic Ops	Periodic Ops	Continuous	Concentration		
Emissions	Potential (tons/yr)	Actual (tons/yr)	Actual (kg/hr)	Actual (kg/hr)	g/m^3	Area (ft^2)	Velocity (ft/s)
2-Hexanone	3.80E-04	2.88E-05	2.98E-06	3.94E-05	1.06E-06	9.62	37.8
Acetone	1.06E-01	7.98E-03	8.27E-04	1.10E-02	2.97E-04	9.62	37.8
Methyl Isobutyl Ketone	7.25E-03	5.44E-04	5.64E-05	7.51E-04	2.03E-05	9.62	37.8
N-Butyl Alcohol	8.00E-01	6.00E-02	6.22E-03	8.29E-02	2.24E-03	9.62	37.8
Ammonia	1.00E-01	7.51E-03	7.78E-04	1.04E-02	2.80E-04	9.62	37.8
	Ci/yr	Ci/yr		Ci/hr	grams/m^3		
Total Alpha (Ci) (Pu)	1.41E-04	2.10E-05		1.61E-08	7.00E-12	9.62	37.8
Total Beta (Ci) (Sr-90)	8.04E-05	1.20E-05		9.18E-09	1.78E-15	9.62	37.8

note: total alpha and beta taken from WHC-SD-WM-EV-099 and are from 1987 evaporator operations (11 MM gal run, Capacity=73.6 MM gal/yr so continuous ops =6.7 times periodic)

note: evaporator emissions are the sum of the building ventilation and the vessel vent systems which each have a stack. The shorter stack was chosen as the release point for all emissions.

524 512
527
532
542
5
562
72
82
92

S24, 33, 43, 64,

OFF
- HEI
  - χ/Q 3.9E-8
  - Dose 8.3E-7
- POP
  - χ/Q 1.6E-3
  - Dose 3.3E-2

ON
- HEI
  - χ/Q 2.5E-6 ✓
  - Dose 4.9E-5
- POP
  - χ/Q 4.0E-4 ✓
  - Dose 8.0E-3

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMIEV2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
SR90	8.0E-05	0.0E+00	0.0E+00
PU239	1.4E-04	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

	Joint frequency data input.
2.0E+02	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
6.7E+00	Stack height (m)
1.0E+01	Stack flow (m3/s)
5.5E-01	Stack radius (m)
4 +01	Effluent temperaure (degrees C)
	Building Wake Model used.
	Release from vent or short stack on building roof
0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4 4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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2.5E-06 Individual chi/Q

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.4E-05	2.5E-01	3.5E-06
Breast	3.9E-10	1.5E-01	5.8E-11
R Marrow	7.1E-05	1.2E-01	8.5E-06
Lung	5.8E-06	1.2E-01	6.9E-07
Thyroid	3.8E-10	3.0E-02	1.2E-11
Bone Sur	9.2E-04	3.0E-02	2.8E-05
Liver	1.4E-04	6.0E-02	8.5E-06
LL Int.	1.0E-08	6.0E-02	6.1E-10
UL Int.	3.5E-09	6.0E-02	2.1E-10
S Int.	9.1E-10	6.0E-02	5.4E-11
Stomach	5.9E-10	6.0E-02	3.6E-11
Internal Effective Dose Equivalent			4.9E-05
External Dose			1.4E-11
Annual Effective Dose Equivalent			4.9E-05

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	4.9E-05
Total Ingestion EDE:	1.0E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	1.7E-06 +	1.2E-06 +	1.1E-06 +	...	=	4.9E-05	
	||	||	||				
Internal Annual Dose	1.7E-06 +	1.2E-06 +	1.1E-06 +	...	=	4.9E-05	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	1.4E-11	0.0E+00	0.0E+00	...		1.4E-11	
	||	||	||			||	
Annual Dose	1.7E-06 +	1.2E-06 +	1.1E-06 +	...	=	4.9E-05	Cumulative Dose
						1.7E-06	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.8E-06	5.9E-10	9.0E-10	3.5E-09	1.0E-08	9.2E-04	7.1E-05	1.4E-05
Soil Ing	1.1E-13	1.8E-12	4.1E-12	2.3E-11	6.9E-11	1.9E-08	1.6E-09	2.9E-10
Total	5.8E-06	5.9E-10	9.1E-10	3.5E-09	1.0E-08	9.2E-04	7.1E-05	1.4E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.4E-05	3.9E-10	3.8E-10	1.4E-04
Soil Ing	2.9E-10	1.1E-13	1.1E-13	3.0E-09
Total	1.4E-05	3.9E-10	3.8E-10	1.4E-04

External Dose by Exposure Pathway

Pathway	
Plume	3.9E-14
Sur Soil	1.4E-11
Total	1.4E-11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.8E-06	5.9E-10	9.0E-10	3.5E-09	1.0E-08	9.2E-04	7.1E-05	1.4E-05
Soil Ing	1.1E-13	1.8E-12	4.1E-12	2.3E-11	6.9E-11	1.9E-08	1.6E-09	2.9E-10
Total	5.8E-06	5.9E-10	9.1E-10	3.5E-09	1.0E-08	9.2E-04	7.1E-05	1.4E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.4E-05	3.9E-10	3.8E-10	1.4E-04
Soil Ing	2.9E-10	1.1E-13	1.1E-13	3.0E-09
Total	1.4E-05	3.9E-10	3.8E-10	1.4E-04

External Dose by Exposure Pathway

Pathway	
Plume	3.9E-14
Sur Soil	1.4E-11
Total	1.4E-11

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

C e title: Chronic (No Action) onsite MI - Elevated Release

Executed on: 10/12/95 at 10:49:01

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.9E-10	8.1E-11	8.7E-11	2.0E-10	6.2E-10	1.3E-07	5.7E-08	7.5E-11
Y 90	3.0E-13	5.4E-13	1.3E-12	6.4E-12	1.6E-11	6.9E-16	6.8E-16	2.3E-17
PU 239	5.8E-06	5.1E-10	8.2E-10	3.3E-09	9.6E-09	9.2E-04	7.1E-05	1.4E-05
Total	5.8E-06	5.9E-10	9.1E-10	3.5E-09	1.0E-08	9.2E-04	7.1E-05	1.4E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	7.5E-11	7.3E-11	7.5E-11	0.0E+00
Y 90	2.4E-17	2.2E-17	2.3E-17	6.8E-16
I 239	1.4E-05	3.2E-10	3.1E-10	1.4E-04
Total	1.4E-05	3.9E-10	3.8E-10	1.4E-04

External Dose by Radionuclide

Radionuclide	
SR 90	2.5E-13
Y 90	1.4E-11
PU 239	2.1E-13
Total	1.4E-11

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.9E-10	8.1E-11	8.7E-11	2.0E-10	6.2E-10	1.3E-07	5.7E-08	7.5E-11
Y 90	3.0E-13	5.4E-13	1.3E-12	6.4E-12	1.6E-11	6.9E-16	6.8E-16	2.3E-17
PU 239	5.8E-06	5.1E-10	8.2E-10	3.3E-09	9.6E-09	9.2E-04	7.1E-05	1.4E-05
Total	5.8E-06	5.9E-10	9.1E-10	3.5E-09	1.0E-08	9.2E-04	7.1E-05	1.4E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	7.5E-11	7.3E-11	7.5E-11	0.0E+00
Y 90	2.4E-17	2.2E-17	2.3E-17	6.8E-16
I 239	1.4E-05	3.2E-10	3.1E-10	1.4E-04
Total	1.4E-05	3.9E-10	3.8E-10	1.4E-04

External Dose by Radionuclide

Radionuclide	
SR 90	2.5E-13
Y 90	1.4E-11
PU 239	2.1E-13
Total	1.4E-11

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ ROSPOEV2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	1.4E-04	0.0E+00	0.0E+00
SR90	8.0E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

	Joint frequency data input.
6.7E+00	Stack height (m)
1.0E+01	Stack flow (m3/s)
5.5E-01	Stack radius (m)
4.6E+01	Effluent temperaure (degrees C)
	Building Wake Model used.
	Release from vent or short stack on building roof
0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

== ====== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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4.0E-04 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.3E-03	2.5E-01	5.7E-04
Breast	6.3E-08	1.5E-01	9.5E-09
R Marrow	1.2E-02	1.2E-01	1.4E-03
Lung	9.4E-04	1.2E-01	1.1E-04
Thyroid	6.3E-08	3.0E-02	1.9E-09
Bone Sur	1.5E-01	3.0E-02	4.5E-03
Liver	2.3E-02	6.0E-02	1.4E-03
LL Int.	1.7E-06	6.0E-02	1.0E-07
UL Int.	5.8E-07	6.0E-02	3.5E-08
S Int.	1.5E-07	6.0E-02	8.9E-09
Stomach	9.7E-08	6.0E-02	5.8E-09
Internal Effective Dose Equivalent			8.0E-03
External Dose			1.5E-09
Annual Effective Dose Equivalent			8.0E-03

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	8.0E-03
Total Ingestion EDE:	1.6E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	2.8E-04 +	1.9E-04 +	1.9E-04 +	...	=	8.0E-03	
	||	||	||				
Internal Annual Dose	2.8E-04 +	1.9E-04 +	1.9E-04 +	...	=	8.0E-03	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	1.5E-09	0.0E+00	0.0E+00	...		1.5E-09	
	||	||	||			||	
Annual Dose	2.8E-04 +	1.9E-04 +	1.9E-04 +	...	=	8.0E-03	Cumulative Dose
						2.8E-04	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.4E-04	9.6E-08	1.5E-07	5.7E-07	1.7E-06	1.5E-01	1.2E-02	2.3E-03
Soil Ing	1.7E-11	2.8E-10	6.7E-10	3.7E-09	1.1E-08	3.1E-06	2.5E-07	4.7E-08
Total	9.4E-04	9.7E-08	1.5E-07	5.8E-07	1.7E-06	1.5E-01	1.2E-02	2.3E-03

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.3E-03	6.3E-08	6.3E-08	2.3E-02
Soil Ing	4.6E-08	1.7E-11	1.7E-11	4.8E-07
Total	2.3E-03	6.3E-08	6.3E-08	2.3E-02

External Dose by Exposure Pathway

Pathway	
Plume	5.2E-12
Sur Soil	1.5E-09
Total	1.5E-09

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

C e title: Chronic (No Action) onsite Population - Elevated Release

Executed on: 10/12/95 at 11:08:36

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.4E-04	9.6E-08	1.5E-07	5.7E-07	1.7E-06	1.5E-01	1.2E-02	2.3E-03
Soil Ing	1.7E-11	2.8E-10	6.7E-10	3.7E-09	1.1E-08	3.1E-06	2.5E-07	4.7E-08
Total	9.4E-04	9.7E-08	1.5E-07	5.8E-07	1.7E-06	1.5E-01	1.2E-02	2.3E-03

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.3E-03	6.3E-08	6.3E-08	2.3E-02
Soil Ing	4.6E-08	1.7E-11	1.7E-11	4.8E-07
Total	2.3E-03	6.3E-08	6.3E-08	2.3E-02

External Dose by Exposure Pathway

Pathway	
Plume	5.2E-12
Sur Soil	1.5E-09
Total	1.5E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.8E-08	1.3E-08	1.4E-08	3.2E-08	1.0E-07	2.1E-05	9.2E-06	1.2E-08
Y 90	2.9E-09	2.2E-10	5.4E-10	2.6E-09	6.4E-09	4.9E-12	4.9E-12	1.6E-13
PU 239	9.4E-04	8.3E-08	1.3E-07	5.4E-07	1.6E-06	1.5E-01	1.2E-02	2.3E-03
Total	9.4E-04	9.7E-08	1.5E-07	5.8E-07	1.7E-06	1.5E-01	1.2E-02	2.3E-03

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.2E-08	1.2E-08	1.2E-08	0.0E+00
Y 90	1.6E-13	1.6E-13	1.6E-13	4.9E-12
: 239	2.3E-03	5.2E-08	5.1E-08	2.3E-02
Total	2.3E-03	6.3E-08	6.3E-08	2.3E-02

External Dose by Radionuclide

Radionuclide	
SR 90	2.6E-11
Y 90	1.5E-09
PU 239	2.5E-11
Total	1.5E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.8E-08	1.3E-08	1.4E-08	3.2E-08	1.0E-07	2.1E-05	9.2E-06	1.2E-08
Y 90	2.9E-09	2.2E-10	5.4E-10	2.6E-09	6.4E-09	4.9E-12	4.9E-12	1.6E-13
PU 239	9.4E-04	8.3E-08	1.3E-07	5.4E-07	1.6E-06	1.5E-01	1.2E-02	2.3E-03
Total	9.4E-04	9.7E-08	1.5E-07	5.8E-07	1.7E-06	1.5E-01	1.2E-02	2.3E-03

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.2E-08	1.2E-08	1.2E-08	0.0E+00
Y 90	1.6E-13	1.6E-13	1.6E-13	4.9E-12
' 239	2.3E-03	5.2E-08	5.1E-08	2.3E-02
Total	2.3E-03	6.3E-08	6.3E-08	2.3E-02

External Dose by Radionuclide

Radionuclide	
SR 90	2.6E-11
Y 90	1.5E-09
PU 239	2.5E-11
Total	1.5E-09

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

==-======== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMIEV2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
	----Release Terms------		
SR90	8.0E-05	0.0E+00	0.0E+00
PU239	1.4E-04	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

2.2E+04	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
6 +00	Stack height (m)
1.0E+01	Stack flow (m3/s)
5.3E-01	Stack radius (m)
4.6E+01	Effluent temperaure (degrees C)

Building Wake Model used.

Release from vent or short stack on building roof
0.0E+00 Building cross-sectional (vertical) area (m2)
0.0E+00 Building height (m)

== ====== EXTERNAL EXPOSURE ==========
8.8E+03 Hours of exposure to plume
4.4E+03 Hours of exposure to ground contamination

========== INHALATION ==========
8.8E+03 Hours of inhalation exposure per year
1 Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04 Mass loading factor (g/m3)

========== INGESTION POPULATION ==========
1 Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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3.9E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

C e title: Chronic (No Action) Offsite MI - Elevated Release

Executed on: 10/12/95 at 13:56:25

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.4E-07	2.5E-01	6.0E-08
Breast	1.4E-11	1.5E-01	2.1E-12
R Marrow	1.2E-06	1.2E-01	1.5E-07
Lung	9.4E-08	1.2E-01	1.1E-08
Thyroid	1.4E-11	3.0E-02	4.1E-13
Bone Sur	1.6E-05	3.0E-02	4.7E-07
Liver	2.4E-06	6.0E-02	1.5E-07
LL Int.	3.4E-09	6.0E-02	2.0E-10
UL Int.	1.1E-09	6.0E-02	6.6E-11
S Int.	2.1E-10	6.0E-02	1.2E-11
Stomach	9.3E-11	6.0E-02	5.6E-12
Internal Effective Dose Equivalent			8.3E-07
External Dose			2.3E-13
Annual Effective Dose Equivalent			8.3E-07

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	8.0E-07
Total Ingestion EDE:	3.9E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	2.9E-08 +	2.0E-08 +	2.0E-08 +	...	=	8.3E-07	
	||	||	||				
I ernal Annual Dose	2.9E-08 +	2.0E-08 +	2.0E-08 +	...	=	8.3E-07	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.3E-13	0.0E+00	0.0E+00	...		2.3E-13	
	||	||	||			||	
Annual Dose	2.9E-08 +	2.0E-08 +	2.0E-08 +	...	=	8.3E-07	Cumulative Dose
						2.9E-08	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.4E-08	9.6E-12	1.5E-11	5.7E-11	1.7E-10	1.5E-05	1.2E-06	2.3E-07
Leaf Veg	9.9E-13	1.5E-11	3.5E-11	1.9E-10	5.9E-10	1.7E-07	1.4E-08	2.5E-09
Oth. Veg	2.5E-12	2.8E-11	6.4E-11	3.5E-10	1.1E-09	2.4E-07	2.0E-08	3.5E-09
Fruit	2.6E-12	2.9E-11	6.6E-11	3.6E-10	1.1E-09	2.4E-07	2.0E-08	3.5E-09
Cereals	5.1E-13	8.0E-12	1.9E-11	1.0E-10	3.1E-10	8.4E-08	6.8E-09	1.3E-09
Meat	1.9E-13	1.4E-12	3.1E-12	1.6E-11	4.6E-11	4.4E-10	1.6E-10	1.5E-12
Poultry	4.6E-16	2.0E-15	4.1E-15	2.2E-14	7.1E-14	1.2E-12	3.9E-13	5.7E-15
Cow Milk	6.8E-13	2.2E-12	4.1E-12	2.3E-11	8.2E-11	1.3E-09	5.4E-10	8.1E-13
Eggs	6.5E-15	2.3E-14	4.5E-14	2.5E-13	8.7E-13	4.3E-11	7.5E-12	4.7E-13
Soil Ing	1.7E-15	2.8E-14	6.7E-14	3.7E-13	1.1E-12	3.1E-10	2.5E-11	4.7E-12
Total	9.4E-08	9.3E-11	2.1E-10	1.1E-09	3.4E-09	1.6E-05	1.2E-06	2.4E-07

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.3E-07	6.3E-12	6.2E-12	2.3E-06
Leaf Veg	2.5E-09	9.9E-13	9.9E-13	2.6E-08
Oth. Veg	3.5E-09	2.5E-12	2.5E-12	3.6E-08
Fruit	3.5E-09	2.6E-12	2.6E-12	3.6E-08
Cereals	1.3E-09	5.1E-13	5.1E-13	1.3E-08
Meat	1.4E-12	1.9E-13	1.9E-13	1.3E-11
Poultry	5.7E-15	4.6E-16	4.6E-16	5.4E-14
Cow Milk	8.1E-13	6.8E-13	6.8E-13	1.4E-12
Eggs	4.7E-13	6.5E-15	6.5E-15	4.8E-12
Soil Ing	4.6E-12	1.7E-15	1.7E-15	4.8E-11
Total	2.4E-07	1.4E-11	1.4E-11	2.4E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	4.8E-16
Sur Soil	2.3E-13
Total	2.3E-13

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.4E-08	9.6E-12	1.5E-11	5.7E-11	1.7E-10	1.5E-05	1.2E-06	2.3E-07
Leaf Veg	9.9E-13	1.5E-11	3.5E-11	1.9E-10	5.9E-10	1.7E-07	1.4E-08	2.5E-09
Oth. Veg	2.5E-12	2.8E-11	6.4E-11	3.5E-10	1.1E-09	2.4E-07	2.0E-08	3.5E-09
Fruit	2.6E-12	2.9E-11	6.6E-11	3.6E-10	1.1E-09	2.4E-07	2.0E-08	3.5E-09
Cereals	5.1E-13	8.0E-12	1.9E-11	1.0E-10	3.1E-10	8.4E-08	6.8E-09	1.3E-09
Meat	1.9E-13	1.4E-12	3.1E-12	1.6E-11	4.6E-11	4.4E-10	1.6E-10	1.5E-12
Poultry	4.6E-16	2.0E-15	4.1E-15	2.2E-14	7.1E-14	1.2E-12	3.9E-13	5.7E-15
Cow Milk	6.8E-13	2.2E-12	4.1E-12	2.3E-11	8.2E-11	1.3E-09	5.4E-10	8.1E-13
Eggs	6.5E-15	2.3E-14	4.5E-14	2.5E-13	8.7E-13	4.3E-11	7.5E-12	4.7E-13
Soil Ing	1.7E-15	2.8E-14	6.7E-14	3.7E-13	1.1E-12	3.1E-10	2.5E-11	4.7E-12
Total	9.4E-08	9.3E-11	2.1E-10	1.1E-09	3.4E-09	1.6E-05	1.2E-06	2.4E-07

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.3E-07	6.3E-12	6.2E-12	2.3E-06
Leaf Veg	2.5E-09	9.9E-13	9.9E-13	2.6E-08
Oth. Veg	3.5E-09	2.5E-12	2.5E-12	3.6E-08
Fruit	3.5E-09	2.6E-12	2.6E-12	3.6E-08
Cereals	1.3E-09	5.1E-13	5.1E-13	1.3E-08
Meat	1.4E-12	1.9E-13	1.9E-13	1.3E-11
Poultry	5.7E-15	4.6E-16	4.6E-16	5.4E-14
Cow Milk	8.1E-13	6.8E-13	6.8E-13	1.4E-12
Eggs	4.7E-13	6.5E-15	6.5E-15	4.8E-12
Soil Ing	4.6E-12	1.7E-15	1.7E-15	4.8E-11
Total	2.4E-07	1.4E-11	1.4E-11	2.4E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	4.8E-16
Sur Soil	2.3E-13
Total	2.3E-13

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.2E-11	1.7E-11	2.5E-11	1.5E-10	6.3E-10	1.6E-08	6.7E-09	8.5E-12
Y 90	4.7E-13	3.0E-11	7.2E-11	3.6E-10	8.9E-10	1.2E-14	1.2E-14	3.9E-16
PU 239	9.4E-08	4.7E-11	1.1E-10	6.0E-10	1.8E-09	1.6E-05	1.2E-06	2.4E-07
Total	9.4E-08	9.3E-11	2.1E-10	1.1E-09	3.4E-09	1.6E-05	1.2E-06	2.4E-07

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	8.5E-12	8.4E-12	8.5E-12	0.0E+00
Y 90	4.4E-16	3.8E-16	3.9E-16	1.1E-14
PU 239	2.4E-07	5.4E-12	5.3E-12	2.4E-06
Total	2.4E-07	1.4E-11	1.4E-11	2.4E-06

External Dose by Radionuclide

Radionuclide	
SR 90	4.2E-15
Y 90	2.2E-13
PU 239	3.3E-15
Total	2.3E-13

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.2E-11	1.7E-11	2.5E-11	1.5E-10	6.3E-10	1.6E-08	6.7E-09	8.5E-12
Y 90	4.7E-13	3.0E-11	7.2E-11	3.6E-10	8.9E-10	1.2E-14	1.2E-14	3.9E-16
PU 239	9.4E-08	4.7E-11	1.1E-10	6.0E-10	1.8E-09	1.6E-05	1.2E-06	2.4E-07
Total	9.4E-08	9.3E-11	2.1E-10	1.1E-09	3.4E-09	1.6E-05	1.2E-06	2.4E-07

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	8.5E-12	8.4E-12	8.5E-12	0.0E+00
Y 90	4.4E-16	3.8E-16	3.9E-16	1.1E-14
PU 239	2.4E-07	5.4E-12	5.3E-12	2.4E-06
Total	2.4E-07	1.4E-11	1.4E-11	2.4E-06

External Dose by Radionuclide

Radionuclide	
SR 90	4.2E-15
Y 90	2.2E-13
PU 239	3.3E-15
Total	2.3E-13

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

==-======== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPOEV2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
	----Release Terms------		
SR90	8.0E-05	0.0E+00	0.0E+00
PU239	1.4E-04	0.0E+00	0.0E+00

========= AIR TRANSPORT ==========

Joint frequency data input.
5.7E+00 Stack height (m)
E+01 Stack flow (m3/s)
.3E-01 Stack radius (m)
.6E+01 Effluent temperaure (degrees C)
Building Wake Model used.
Release from vent or short stack on building roof

0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

========== EXTERNAL EXPOSURE ==========

6 E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1 Atmospheric production definition: 1 - Use population-weighted chi/Q
Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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1.6E-03 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	9.3E-03	2.5E-01	2.3E-03
Breast	4.0E-07	1.5E-01	6.1E-08
R Marrow	4.8E-02	1.2E-01	5.7E-03
Lung	3.8E-03	1.2E-01	4.5E-04
Thyroid	4.0E-07	3.0E-02	1.2E-08
Bone Sur	6.1E-01	3.0E-02	1.8E-02
Liver	9.5E-02	6.0E-02	5.7E-03
LL Int.	7.4E-05	6.0E-02	4.4E-06
UL Int.	2.5E-05	6.0E-02	1.5E-06
S Int.	4.7E-06	6.0E-02	2.8E-07
Stomach	2.2E-06	6.0E-02	1.3E-07
Internal Effective Dose Equivalent			3.3E-02
External Dose			6.2E-09
Annual Effective Dose Equivalent			3.3E-02

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	3.2E-02
Total Ingestion EDE:	7.7E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	1.1E-03 +	8.0E-04 +	7.6E-04 +	...	=	3.3E-02	
	||	||	||				
Internal Annual Dose	1.1E-03 +	8.0E-04 +	7.6E-04 +	...	=	3.3E-02	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	6.2E-09	0.0E+00	0.0E+00	...		6.2E-09	
	||	||	||			||	
Annual Dose	1.1E-03 +	8.0E-04 +	7.6E-04 +	...	=	3.3E-02	Cumulative Dose
						1.1E-03	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	3.8E-03	3.9E-07	6.0E-07	2.3E-06	6.7E-06	6.0E-01	4.6E-02	9.1E-03
Leaf Veg	2.0E-08	3.1E-07	7.4E-07	4.1E-06	1.2E-05	3.4E-03	2.7E-04	5.0E-05
Oth. Veg	6.3E-08	7.6E-07	1.7E-06	9.5E-06	2.8E-05	6.0E-03	5.0E-04	8.9E-05
Fruit	2.0E-08	2.4E-07	5.5E-07	3.0E-06	8.9E-06	1.9E-03	1.6E-04	2.8E-05
Cereals	1.8E-08	2.9E-07	6.8E-07	3.7E-06	1.1E-05	3.1E-03	2.5E-04	4.7E-05
Meat	6.8E-09	5.0E-08	1.1E-07	5.6E-07	1.6E-06	1.5E-05	5.6E-06	5.1E-08
Poultry	8.5E-12	6.3E-11	1.3E-10	7.1E-10	2.1E-09	2.2E-08	7.3E-09	1.1E-10
Cow Milk	2.3E-08	1.3E-07	2.6E-07	1.4E-06	4.2E-06	4.3E-05	1.9E-05	2.8E-08
Eggs	1.7E-10	1.3E-09	2.8E-09	1.5E-08	4.3E-08	1.1E-06	2.0E-07	1.3E-08
Soil Ing	6.9E-11	1.1E-09	2.7E-09	1.5E-08	4.5E-08	1.3E-05	1.0E-06	1.9E-07
Total	3.8E-03	2.2E-06	4.7E-06	2.5E-05	7.4E-05	6.1E-01	4.8E-02	9.3E-03

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	9.0E-03	2.5E-07	2.5E-07	9.3E-02
Leaf Veg	5.0E-05	2.0E-08	2.0E-08	5.1E-04
Oth. Veg	8.9E-05	6.3E-08	6.3E-08	9.1E-04
Fruit	2.8E-05	2.0E-08	2.0E-08	2.8E-04
Cereals	4.6E-05	1.8E-08	1.8E-08	4.8E-04
Meat	5.1E-08	6.8E-09	6.8E-09	4.5E-07
Poultry	1.1E-10	8.5E-12	8.5E-12	1.0E-09
Cow Milk	2.8E-08	2.3E-08	2.3E-08	4.6E-08
Eggs	1.3E-08	1.7E-10	1.7E-10	1.3E-07
Soil Ing	1.9E-07	6.9E-11	6.9E-11	1.9E-06
Total	9.3E-03	4.0E-07	4.0E-07	9.5E-02

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	2.2E-11
Sur Soil	6.2E-09
Total	6.2E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	3.8E-03	3.9E-07	6.0E-07	2.3E-06	6.7E-06	6.0E-01	4.6E-02	9.1E-03
Leaf Veg	2.0E-08	3.1E-07	7.4E-07	4.1E-06	1.2E-05	3.4E-03	2.7E-04	5.0E-05
Oth. Veg	6.3E-08	7.6E-07	1.7E-06	9.5E-06	2.8E-05	6.0E-03	5.0E-04	8.9E-05
Fruit	2.0E-08	2.4E-07	5.5E-07	3.0E-06	8.9E-06	1.9E-03	1.6E-04	2.8E-05
Cereals	1.8E-08	2.9E-07	6.8E-07	3.7E-06	1.1E-05	3.1E-03	2.5E-04	4.7E-05
Meat	6.8E-09	5.0E-08	1.1E-07	5.6E-07	1.6E-06	1.5E-05	5.6E-06	5.1E-08
Poultry	8.5E-12	6.3E-11	1.3E-10	7.1E-10	2.1E-09	2.2E-08	7.3E-09	1.1E-10
Cow Milk	2.3E-08	1.3E-07	2.6E-07	1.4E-06	4.2E-06	4.3E-05	1.9E-05	2.8E-08
Eggs	1.7E-10	1.3E-09	2.8E-09	1.5E-08	4.3E-08	1.1E-06	2.0E-07	1.3E-08
Soil Ing	6.9E-11	1.1E-09	2.7E-09	1.5E-08	4.5E-08	1.3E-05	1.0E-06	1.9E-07
Total	3.8E-03	2.2E-06	4.7E-06	2.5E-05	7.4E-05	6.1E-01	4.8E-02	9.3E-03

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	9.0E-03	2.5E-07	2.5E-07	9.3E-02
Leaf Veg	5.0E-05	2.0E-08	2.0E-08	5.1E-04
Oth. Veg	8.9E-05	6.3E-08	6.3E-08	9.1E-04
Fruit	2.8E-05	2.0E-08	2.0E-08	2.8E-04
Cereals	4.6E-05	1.8E-08	1.8E-08	4.8E-04
Meat	5.1E-08	6.8E-09	6.8E-09	4.5E-07
Poultry	1.1E-10	8.5E-12	8.5E-12	1.0E-09
Cow Milk	2.8E-08	2.3E-08	2.3E-08	4.6E-08
Eggs	1.3E-08	1.7E-10	1.7E-10	1.3E-07
Soil Ing	1.9E-07	6.9E-11	6.9E-11	1.9E-06
Total	9.3E-03	4.0E-07	4.0E-07	9.5E-02

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	2.2E-11
Sur Soil	6.2E-09
Total	6.2E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	3.4E-07	3.6E-07	5.4E-07	3.1E-06	1.3E-05	3.6E-04	1.5E-04	1.9E-07
Y 90	6.5E-08	7.2E-07	1.7E-06	8.5E-06	2.1E-05	3.7E-10	3.6E-10	1.2E-11
PU 239	3.8E-03	1.1E-06	2.4E-06	1.3E-05	4.0E-05	6.1E-01	4.7E-02	9.3E-03
Total	3.8E-03	2.2E-06	4.7E-06	2.5E-05	7.4E-05	6.1E-01	4.8E-02	9.3E-03

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.9E-07	1.9E-07	1.9E-07	0.0E+00
Y 90	1.3E-11	1.2E-11	1.2E-11	3.6E-10
' 239	9.3E-03	2.1E-07	2.1E-07	9.5E-02
Total	9.3E-03	4.0E-07	4.0E-07	9.5E-02

External Dose by Radionuclide

Radionuclide	
SR 90	1.1E-10
Y 90	6.0E-09
PU 239	9.7E-11
Total	6.2E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	3.4E-07	3.6E-07	5.4E-07	3.1E-06	1.3E-05	3.6E-04	1.5E-04	1.9E-07
Y 90	6.5E-08	7.2E-07	1.7E-06	8.5E-06	2.1E-05	3.7E-10	3.6E-10	1.2E-11
PU 239	3.8E-03	1.1E-06	2.4E-06	1.3E-05	4.0E-05	6.1E-01	4.7E-02	9.3E-03
Total	3.8E-03	2.2E-06	4.7E-06	2.5E-05	7.4E-05	6.1E-01	4.8E-02	9.3E-03

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.9E-07	1.9E-07	1.9E-07	0.0E+00
Y 90	1.3E-11	1.2E-11	1.2E-11	3.6E-10
239	9.3E-03	2.1E-07	2.1E-07	9.5E-02
Total	9.3E-03	4.0E-07	4.0E-07	9.5E-02

External Dose by Radionuclide

Radionuclide	
SR 90	1.1E-10
Y 90	6.0E-09
PU 239	9.7E-11
Total	6.2E-09

Emissions for Gravel Fill Operations					
	Ci/hr	by 10	for 3 days	for 22 out of 177 tan	
				Ci/yr	
Total Alpha	3.30E-12	3.3E-11	7.91E-10	9.83E-11	
Total Beta	9.03E-11	9.03E-10	2.17E-08	2.69E-09	
Sr-90	9.76E-10	9.76E-09	2.34E-07	2.91E-08	
Cs-137	6.05E-09	6.05E-08	1.45E-06	1.81E-07	
I-129	5.25E-09	5.25E-08	1.26E-06	1.57E-07	
10/13/95					

544

Person-Rem chi/Q (8 yr) Dose Risk

NIW-pop
NIW-MEI
GP-Pop
GP-MEI

S44 Grawl
FUI
Grandkeln

OFF SITE

MEI	χ/Q	6.0E-8
	Dose	1.1E-10
POP	χ/Q	2.9E-3
	Dose	3.7E-6

ON SITE

MEI	χ/Q	4.0E-4
	Dose	1.0E-8
POP	χ/Q	1.6 E-3
	Dose	4.0E-8

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMIGFN.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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----Release Terms------

Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	9.8E-11	0.0E+00	0.0E+00
SR90	2.7E-09	0.0E+00	0.0E+00
SR90	2.9E-08	0.0E+00	0.0E+00
CS137	1.8E-07	0.0E+00	0.0E+00
I 129	1.6E-07	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.
2.2E+04 Maximum individual distance from release point (m)
1.4E+01 Maximum individual sector index (Wind Toward ESE)
Ground level release.

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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6.0E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic Offsite (Gravel Fill) MI - Ground Release

Executed on: 10/16/95 at 11:45:01

Release period:		1.0
Uptake/exposure period:		1.0
Dose commitment period:		70.0
Dose units:	Rem	

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.8E-12	2.5E-01	9.6E-13
Breast	3.6E-12	1.5E-01	5.3E-13
R Marrow	8.4E-12	1.2E-01	1.0E-12
Lung	3.5E-12	1.2E-01	4.2E-13
Thyroid	3.5E-09	3.0E-02	1.0E-10
Bone Sur	2.9E-11	3.0E-02	8.6E-13
LL Int.	4.5E-12	6.0E-02	2.7E-13
UL Int.	3.9E-12	6.0E-02	2.3E-13
Stomach	3.7E-12	6.0E-02	2.2E-13
S Int.	3.7E-12	6.0E-02	2.2E-13
Liver	2.6E-12	6.0E-02	1.6E-13
Internal Effective Dose Equivalent			1.1E-10
External Dose			7.6E-14
Annual Effective Dose Equivalent			1.1E-10

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 129
Total Inhalation EDE:	1.4E-12
Total Ingestion EDE:	1.1E-10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	9.6E-11 +	1.1E-11 +	1.3E-12 +	...	=	1.1E-10	
	||	||	||				
Internal Annual Dose	9.6E-11 +	1.1E-11 +	1.3E-12 +	...	=	1.1E-10	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	7.6E-14	0.0E+00	0.0E+00	...		7.6E-14	
	||	||	||			||	
Annual Dose	9.6E-11 +	1.1E-11 +	1.3E-12 +	...	=	1.1E-10	Cumulative Dose
						9.6E-11	Maximum Annual Dose Occurred In Year 1

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic Offsite (Gravel Fill) MI - Ground Release

Executed on: 10/16/95 at 11:45:01

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	6.6E-15	9.1E-15	1.4E-14	8.4E-14	3.5E-13	8.5E-12	3.7E-12	4.7E-15
Y 90	2.4E-16	1.7E-14	4.0E-14	2.0E-13	4.9E-13	6.5E-18	6.4E-18	2.1E-19
I 129	2.3E-13	3.3E-13	2.0E-13	2.0E-13	2.0E-13	2.6E-13	2.8E-13	1.9E-13
CS 137	3.1E-12	3.4E-12	3.4E-12	3.4E-12	3.4E-12	3.1E-12	3.2E-12	3.4E-12
PU 239	1.0E-13	5.0E-17	1.2E-16	6.4E-16	2.0E-15	1.7E-11	1.3E-12	2.5E-13
Total	3.5E-12	3.7E-12	3.7E-12	3.9E-12	4.5E-12	2.9E-11	8.4E-12	3.8E-12

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	4.7E-15	4.6E-15	4.7E-15	0.0E+00
Y 90	2.4E-19	2.1E-19	2.1E-19	6.2E-18
I 129	2.0E-13	4.7E-13	3.5E-09	0.0E+00
CS 137	3.1E-12	3.1E-12	3.1E-12	0.0E+00
PU 239	2.5E-13	5.8E-18	5.6E-18	2.6E-12
Total	3.6E-12	3.6E-12	3.5E-09	2.6E-12

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Radio-nuclide	Inhalation Effective Dose Equivalent	Ingestion Effective Dose Equivalent	External Dose	Internal Effective Dose Equivalent	Annual Effective Dose Equivalent
SR 90	9.6E-14	6.3E-13	2.2E-18	7.3E-13	7.3E-13
Y 90	5.9E-17	4.5E-14	1.2E-16	4.5E-14	4.5E-14
I 129	3.9E-13	1.0E-10	1.4E-15	1.0E-10	1.0E-10
CS 137	8.7E-14	3.0E-12	7.4E-14	3.1E-12	3.1E-12
PU 239	8.5E-13	4.0E-14	3.4E-21	8.9E-13	8.9E-13

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPOGFN.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	9.8E-11	0.0E+00	0.0E+00
SR90	2.7E-09	0.0E+00	0.0E+00
SR90	2.9E-08	0.0E+00	0.0E+00
CS137	1.8E-07	0.0E+00	0.0E+00
I 129	1.6E-07	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
Ground level release.

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1 Atmospheric production definition: 1 - Use population-weighted chi/Q
Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	S *	--IRRIGATION-- RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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2.9E-03 Population-weighted chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic Offsite (Gravel Fill) Population - Ground Release

Executed on: 10/16/95 at 11:59:35

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.4E-07	2.5E-01	3.5E-08
Breast	1.3E-07	1.5E-01	1.9E-08
R Marrow	2.9E-07	1.2E-01	3.4E-08
Lung	1.3E-07	1.2E-01	1.5E-08
Thyroid	1.2E-04	3.0E-02	3.5E-06
Bone Sur	1.1E-06	3.0E-02	3.4E-08
LL Int.	1.5E-07	6.0E-02	9.1E-09
UL Int.	1.4E-07	6.0E-02	8.2E-09
Stomach	1.3E-07	6.0E-02	8.0E-09
S Int.	1.3E-07	6.0E-02	7.9E-09
Liver	1.2E-07	6.0E-02	7.3E-09
Internal Effective Dose Equivalent			3.7E-06
External Dose			2.4E-09
Annual Effective Dose Equivalent			3.7E-06

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 129
Total Inhalation EDE:	6.9E-08
Total Ingestion EDE:	3.6E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	3.3E-06 +	3.6E-07 +	4.3E-08 +	...	=	3.7E-06	
	||	||	||				
Internal Annual Dose	3.3E-06 +	3.6E-07 +	4.3E-08 +	...	=	3.7E-06	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.4E-09	0.0E+00	0.0E+00	...		2.4E-09	
	||	||	||			||	
Annual Dose	3.3E-06 +	3.6E-07 +	4.3E-08 +	...	=	3.7E-06	Cumulative Dose
						3.3E-06	Maximum Annual Dose Occurred In Year 1

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic Offsite (Gravel Fill) Population - Ground Release

Executed on: 10/16/95 at 11:59:35

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.8E-09	4.6E-09	4.8E-09	4.8E-09	5.1E-09	8.3E-07	8.9E-08	1.6E-08
Leaf Veg	5.1E-09	5.7E-09	5.6E-09	6.5E-09	8.4E-09	3.2E-08	1.5E-08	5.4E-09
Oth. Veg	9.3E-09	1.1E-08	1.1E-08	1.3E-08	2.0E-08	9.3E-08	4.3E-08	9.9E-09
Fruit	2.9E-09	3.3E-09	3.3E-09	4.2E-09	6.2E-09	3.0E-08	1.4E-08	3.1E-09
Cereals	4.7E-09	5.4E-09	5.2E-09	6.0E-09	7.8E-09	3.0E-08	1.4E-08	5.1E-09
Meat	5.9E-08	6.4E-08	6.4E-08	6.5E-08	6.5E-08	6.7E-08	6.3E-08	6.4E-08
Poultry	2.6E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.7E-10	2.7E-10	2.9E-10
Cow Milk	3.5E-08	3.9E-08	3.7E-08	3.7E-08	3.9E-08	6.4E-08	4.8E-08	3.6E-08
Eggs	1.1E-10	1.4E-10	1.2E-10	1.2E-10	1.4E-10	3.3E-10	2.1E-10	1.1E-10
Soil Ing	1.8E-11	2.0E-11	2.0E-11	2.3E-11	3.0E-11	1.1E-10	5.4E-11	2.0E-11
Total	1.3E-07	1.3E-07	1.3E-07	1.4E-07	1.5E-07	1.1E-06	2.9E-07	1.4E-07

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.6E-08	4.3E-09	6.6E-07	1.2E-07
Leaf Veg	5.1E-09	5.5E-09	7.1E-06	6.6E-10
Oth. Veg	9.3E-09	1.0E-08	1.4E-05	1.2E-09
Fruit	2.9E-09	3.2E-09	4.4E-06	3.6E-10
Cereals	4.7E-09	5.1E-09	7.1E-06	6.2E-10
Meat	5.9E-08	5.9E-08	6.4E-06	6.0E-13
Poultry	2.6E-10	2.6E-10	2.1E-09	1.3E-15
Cow Milk	3.4E-08	3.9E-08	7.7E-05	7.9E-14
Eggs	1.1E-10	1.6E-10	6.7E-07	1.7E-13
Soil Ing	1.8E-11	1.9E-11	1.7E-08	2.4E-12
Total	1.3E-07	1.3E-07	1.2E-04	1.2E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	3.3E-11
Sur Soil	2.4E-09
Total	2.4E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.8E-09	4.6E-09	4.8E-09	4.8E-09	5.1E-09	8.3E-07	8.9E-08	1.6E-08
Leaf Veg	5.1E-09	5.7E-09	5.6E-09	6.5E-09	8.4E-09	3.2E-08	1.5E-08	5.4E-09
Oth. Veg	9.3E-09	1.1E-08	1.1E-08	1.3E-08	2.0E-08	9.3E-08	4.3E-08	9.9E-09
Fruit	2.9E-09	3.3E-09	3.3E-09	4.2E-09	6.2E-09	3.0E-08	1.4E-08	3.1E-09
Cereals	4.7E-09	5.4E-09	5.2E-09	6.0E-09	7.8E-09	3.0E-08	1.4E-08	5.1E-09
Meat	5.9E-08	6.4E-08	6.4E-08	6.5E-08	6.5E-08	6.7E-08	6.3E-08	6.4E-08
Poultry	2.6E-10	2.9E-10	2.9E-10	2.9E-10	2.9E-10	2.7E-10	2.7E-10	2.9E-10
Cow Milk	3.5E-08	3.9E-08	3.7E-08	3.7E-08	3.9E-08	6.4E-08	4.8E-08	3.6E-08
Eggs	1.1E-10	1.4E-10	1.2E-10	1.2E-10	1.4E-10	3.3E-10	2.1E-10	1.1E-10
Soil Ing	1.8E-11	2.0E-11	2.0E-11	2.3E-11	3.0E-11	1.1E-10	5.4E-11	2.0E-11
Total	1.3E-07	1.3E-07	1.3E-07	1.4E-07	1.5E-07	1.1E-06	2.9E-07	1.4E-07

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.6E-08	4.3E-09	6.6E-07	1.2E-07
Leaf Veg	5.1E-09	5.5E-09	7.1E-06	6.6E-10
Oth. Veg	9.3E-09	1.0E-08	1.4E-05	1.2E-09
Fruit	2.9E-09	3.2E-09	4.4E-06	3.6E-10
Cereals	4.7E-09	5.1E-09	7.1E-06	6.2E-10
Meat	5.9E-08	5.9E-08	6.4E-06	6.0E-13
Poultry	2.6E-10	2.6E-10	2.1E-09	1.3E-15
Cow Milk	3.4E-08	3.9E-08	7.7E-05	7.9E-14
Eggs	1.1E-10	1.6E-10	6.7E-07	1.7E-13
Soil Ing	1.8E-11	1.9E-11	1.7E-08	2.4E-12
Total	1.3E-07	1.3E-07	1.2E-04	1.2E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	3.3E-11
Sur Soil	2.4E-09
Total	2.4E-09

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic Offsite (Gravel Fill) Population - Ground Release

Executed on: 10/16/95 at 11:59:35

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.3E-10	2.4E-10	3.6E-10	2.1E-09	8.7E-09	2.4E-07	1.0E-07	1.3E-10
Y 90	4.3E-11	4.9E-10	1.1E-09	5.7E-09	1.4E-08	2.5E-13	2.4E-13	8.1E-15
I 129	8.0E-09	1.1E-08	6.8E-09	6.8E-09	6.8E-09	8.9E-09	9.4E-09	6.3E-09
CS 137	1.1E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.1E-07	1.1E-07	1.2E-07
PU 239	4.8E-09	1.4E-12	3.1E-12	1.6E-11	5.1E-11	7.9E-07	6.1E-08	1.2E-08
Total	1.3E-07	1.3E-07	1.3E-07	1.4E-07	1.5E-07	1.1E-06	2.9E-07	1.4E-07

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.3E-10	1.3E-10	1.3E-10	0.0E+00
Y 90	9.0E-15	8.0E-15	8.1E-15	2.4E-13
I 129	6.8E-09	1.6E-08	1.2E-04	0.0E+00
CS 137	1.1E-07	1.1E-07	1.1E-07	0.0E+00
PU 239	1.2E-08	2.7E-13	2.7E-13	1.2E-07
Total	1.3E-07	1.3E-07	1.2E-04	1.2E-07

External Dose by Radionuclide

Radionuclide	
SR 90	7.3E-14
Y 90	3.9E-12
I 129	4.6E-11
CS 137	2.4E-09
PU 239	1.2E-16
Total	2.4E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.3E-10	2.4E-10	3.6E-10	2.1E-09	8.7E-09	2.4E-07	1.0E-07	1.3E-10
Y 90	4.3E-11	4.9E-10	1.1E-09	5.7E-09	1.4E-08	2.5E-13	2.4E-13	8.1E-15
I 129	8.0E-09	1.1E-08	6.8E-09	6.8E-09	6.8E-09	8.9E-09	9.4E-09	6.3E-09
CS 137	1.1E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.1E-07	1.1E-07	1.2E-07
PU 239	4.8E-09	1.4E-12	3.1E-12	1.6E-11	5.1E-11	7.9E-07	6.1E-08	1.2E-08
Total	1.3E-07	1.3E-07	1.3E-07	1.4E-07	1.5E-07	1.1E-06	2.9E-07	1.4E-07

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.3E-10	1.3E-10	1.3E-10	0.0E+00
Y 90	9.0E-15	8.0E-15	8.1E-15	2.4E-13
I 129	6.8E-09	1.6E-08	1.2E-04	0.0E+00
CS 137	1.1E-07	1.1E-07	1.1E-07	0.0E+00
PU 239	1.2E-08	2.7E-13	2.7E-13	1.2E-07
Total	1.3E-07	1.3E-07	1.2E-04	1.2E-07

External Dose by Radionuclide

Radionuclide	
SR 90	7.3E-14
Y 90	3.9E-12
I 129	4.6E-11
CS 137	2.4E-09
PU 239	1.2E-16
Total	2.4E-09

S44 Grand Falls Grand Valley

OFF SITE

HEI
- χ/Q 6.0E-8
- Dose 1.1E-10

POP
- χ/Q 2.9E-3
- Dose 3.7E-6

ON SITE

HEI
- χ/Q 4.0E-4
- Dose 1.0E-8

POP
- χ/Q 1.6E-3
- Dose 4.0E-8

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMIGFN.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	9.8E-11	0.0E+00	0.0E+00
SR90	2.7E-09	0.0E+00	0.0E+00
SR90	2.9E-08	0.0E+00	0.0E+00
CS137	1.8E-07	0.0E+00	0.0E+00
I 129	1.6E-07	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
1.0E+02 Maximum individual distance from release point (m)
1.4E+01 Maximum individual sector index (Wind Toward ESE)
Ground level release.

========== EXTERNAL EXPOSURE ==========
8.8E+03 Hours of exposure to plume
4.4E+03 Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

4.0E-04 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic onsite (Gravel Fill) MI - Ground Release

Executed on: 10/16/95 at 12:06:28

Release period:		1.0
Uptake/exposure period:		1.0
Dose commitment period:		70.0
Dose units:	Rem	

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	2.3E-09	2.5E-01	5.8E-10
Breast	6.1E-10	1.5E-01	9.1E-11
R Marrow	1.3E-08	1.2E-01	1.5E-09
Lung	1.4E-09	1.2E-01	1.7E-10
Thyroid	8.8E-08	3.0E-02	2.7E-09
Bone Sur	1.2E-07	3.0E-02	3.5E-09
Liver	1.7E-08	6.0E-02	1.0E-09
LL Int.	7.2E-10	6.0E-02	4.3E-11
S Int.	6.8E-10	6.0E-02	4.1E-11
UL Int.	6.8E-10	6.0E-02	4.1E-11
Stomach	6.6E-10	6.0E-02	3.9E-11
Internal Effective Dose Equivalent			9.7E-09
External Dose			5.1E-10
Annual Effective Dose Equivalent			1.0E-08

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	9.7E-09
Total Ingestion EDE:	7.8E-11

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	3.2E-09 +	5.4E-10 +	2.3E-10 +	...	=	9.7E-09	
	||	||	||				
Internal Annual Dose	3.2E-09 +	5.4E-10 +	2.3E-10 +	...	=	9.7E-09	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	5.1E-10	0.0E+00	0.0E+00	...		5.1E-10	
	||	||	||			||	
Annual Dose	3.7E-09 +	5.4E-10 +	2.3E-10 +	...	=	1.0E-08	Cumulative Dose
						3.7E-09	Maximum Annual Dose Occurred In Year 1

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic onsite (Gravel Fill) MI - Ground Release

Executed on: 10/16/95 at 12:06:28

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.4E-09	6.5E-10	6.8E-10	6.8E-10	7.1E-10	1.2E-07	1.3E-08	2.3E-09
Soil Ing	2.5E-12	2.8E-12	2.8E-12	3.2E-12	4.1E-12	1.6E-11	7.5E-12	2.7E-12
Total	1.4E-09	6.6E-10	6.8E-10	6.8E-10	7.2E-10	1.2E-07	1.3E-08	2.3E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.3E-09	6.1E-10	8.6E-08	1.7E-08
Soil Ing	2.5E-12	2.6E-12	2.5E-09	3.3E-13
Total	2.3E-09	6.1E-10	8.8E-08	1.7E-08

External Dose by Exposure Pathway

Pathway	
Plume	2.8E-13
Sur Soil	5.1E-10
Total	5.1E-10

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic onsite (Gravel Fill) MI - Ground Release

Executed on: 10/16/95 at 12:06:28

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.4E-09	6.5E-10	6.8E-10	6.8E-10	7.1E-10	1.2E-07	1.3E-08	2.3E-09
Soil Ing	2.5E-12	2.8E-12	2.8E-12	3.2E-12	4.1E-12	1.6E-11	7.5E-12	2.7E-12
Total	1.4E-09	6.6E-10	6.8E-10	6.8E-10	7.2E-10	1.2E-07	1.3E-08	2.3E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	2.3E-09	6.1E-10	8.6E-08	1.7E-08
Soil Ing	2.5E-12	2.6E-12	2.5E-09	3.3E-13
Total	2.3E-09	6.1E-10	8.8E-08	1.7E-08

External Dose by Exposure Pathway

Pathway	
Plume	2.8E-13
Sur Soil	5.1E-10
Total	5.1E-10

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.8E-11	4.9E-12	5.2E-12	1.2E-11	3.7E-11	7.9E-09	3.4E-09	4.5E-12
Y 90	9.0E-15	3.1E-14	7.4E-14	3.7E-13	9.1E-13	2.6E-17	2.6E-17	8.7E-19
I 129	1.9E-11	6.1E-12	5.1E-12	5.1E-12	5.1E-12	7.1E-12	7.7E-12	4.7E-12
CS 137	6.6E-10	6.5E-10	6.7E-10	6.7E-10	6.7E-10	6.0E-10	6.2E-10	6.6E-10
PU 239	6.9E-10	6.1E-14	9.8E-14	4.0E-13	1.1E-12	1.1E-07	8.5E-09	1.7E-09
Total	1.4E-09	6.6E-10	6.8E-10	6.8E-10	7.2E-10	1.2E-07	1.3E-08	2.3E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	4.5E-12	4.4E-12	4.5E-12	0.0E+00
Y 90	9.1E-19	8.5E-19	8.6E-19	2.5E-17
I 129	5.1E-12	1.2E-11	8.8E-08	0.0E+00
CS 137	6.1E-10	5.9E-10	5.9E-10	0.0E+00
PU 239	1.7E-09	3.8E-14	3.7E-14	1.7E-08
Total	2.3E-09	6.1E-10	8.8E-08	1.7E-08

External Dose by Radionuclide

Radionuclide	
SR 90	1.5E-14
Y 90	8.3E-13
I 129	9.0E-12
CS 137	5.0E-10
PU 239	2.1E-17
Total	5.1E-10

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic onsite (Gravel Fill) MI - Ground Release

Executed on: 10/16/95 at 12:06:28

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	1.8E-11	4.9E-12	5.2E-12	1.2E-11	3.7E-11	7.9E-09	3.4E-09	4.5E-12
Y 90	9.0E-15	3.1E-14	7.4E-14	3.7E-13	9.1E-13	2.6E-17	2.6E-17	8.7E-19
I 129	1.9E-11	6.1E-12	5.1E-12	5.1E-12	5.1E-12	7.1E-12	7.7E-12	4.7E-12
CS 137	6.6E-10	6.5E-10	6.7E-10	6.7E-10	6.7E-10	6.0E-10	6.2E-10	6.6E-10
PU 239	6.9E-10	6.1E-14	9.8E-14	4.0E-13	1.1E-12	1.1E-07	8.5E-09	1.7E-09
Total	1.4E-09	6.6E-10	6.8E-10	6.8E-10	7.2E-10	1.2E-07	1.3E-08	2.3E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	4.5E-12	4.4E-12	4.5E-12	0.0E+00
Y 90	9.1E-19	8.5E-19	8.6E-19	2.5E-17
I 129	5.1E-12	1.2E-11	8.8E-08	0.0E+00
CS 137	6.1E-10	5.9E-10	5.9E-10	0.0E+00
PU 239	1.7E-09	3.8E-14	3.7E-14	1.7E-08
Total	2.3E-09	6.1E-10	8.8E-08	1.7E-08

External Dose by Radionuclide

Radionuclide	
SR 90	1.5E-14
Y 90	8.3E-13
I 129	9.0E-12
CS 137	5.0E-10
PU 239	2.1E-17
Total	5.1E-10

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ ROSPOGFN.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

==========

Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	9.8E-11	0.0E+00	0.0E+00
SR90	2.7E-09	0.0E+00	0.0E+00
SR90	2.9E-08	0.0E+00	0.0E+00
CS137	1.8E-07	0.0E+00	0.0E+00
I 129	1.6E-07	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
Ground level release.

========== EXTERNAL EXPOSURE ==========
8.8E+03 Hours of exposure to plume
2.9E+03 Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

1.6E-03 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	9.2E-09	2.5E-01	2.3E-09
Breast	2.4E-09	1.5E-01	3.6E-10
R Marrow	5.0E-08	1.2E-01	6.0E-09
Lung	5.5E-09	1.2E-01	6.6E-10
Thyroid	3.6E-07	3.0E-02	1.1E-08
Bone Sur	4.6E-07	3.0E-02	1.4E-08
Liver	6.6E-08	6.0E-02	4.0E-09
LL Int.	2.8E-09	6.0E-02	1.7E-10
S Int.	2.7E-09	6.0E-02	1.6E-10
UL Int.	2.7E-09	6.0E-02	1.6E-10
Stomach	2.6E-09	6.0E-02	1.6E-10
Internal Effective Dose Equivalent			3.9E-08
External Dose			1.4E-09
Annual Effective Dose Equivalent			4.0E-08

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	3.8E-08
Total Ingestion EDE:	3.1E-10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	1.3E-08 +	2.2E-09 +	9.1E-10 +	...	=	3.9E-08	
	||	||	||				
Internal Annual Dose	1.3E-08 +	2.2E-09 +	9.1E-10 +	...	=	3.9E-08	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	1.4E-09	0.0E+00	0.0E+00	...		1.4E-09	
	||	||	||			||	
Annual Dose	1.4E-08 +	2.2E-09 +	9.1E-10 +	...	=	4.0E-08	Cumulative Dose
						1.4E-08	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.5E-09	2.6E-09	2.7E-09	2.7E-09	2.8E-09	4.6E-07	5.0E-08	9.1E-09
Soil Ing	1.0E-11	1.1E-11	1.1E-11	1.3E-11	1.6E-11	6.4E-11	3.0E-11	1.1E-11
Total	5.5E-09	2.6E-09	2.7E-09	2.7E-09	2.8E-09	4.6E-07	5.0E-08	9.2E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	8.9E-09	2.4E-09	3.5E-07	6.6E-08
Soil Ing	1.0E-11	1.0E-11	1.0E-08	1.4E-12
Total	8.9E-09	2.4E-09	3.6E-07	6.6E-08

External Dose by Exposure Pathway

Pathway	
Plume	1.0E-11
Sur Soil	1.4E-09
Total	1.4E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.5E-09	2.6E-09	2.7E-09	2.7E-09	2.8E-09	4.6E-07	5.0E-08	9.1E-09
Soil Ing	1.0E-11	1.1E-11	1.1E-11	1.3E-11	1.6E-11	6.4E-11	3.0E-11	1.1E-11
Total	5.5E-09	2.6E-09	2.7E-09	2.7E-09	2.8E-09	4.6E-07	5.0E-08	9.2E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	8.9E-09	2.4E-09	3.5E-07	6.6E-08
Soil Ing	1.0E-11	1.0E-11	1.0E-08	1.4E-12
Total	8.9E-09	2.4E-09	3.6E-07	6.6E-08

External Dose by Exposure Pathway

Pathway	
Plume	1.0E-11
Sur Soil	1.4E-09
Total	1.4E-09

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic onsite (Gravel Fill) Population - Ground Trlease

Executed on: 10/16/95 at 12:17:52

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	7.2E-11	2.0E-11	2.1E-11	4.9E-11	1.5E-10	3.2E-08	1.4E-08	1.8E-11
Y 90	2.2E-12	2.2E-13	5.4E-13	2.7E-12	6.6E-12	3.6E-15	3.6E-15	1.2E-16
I 129	7.8E-11	2.5E-11	2.1E-11	2.1E-11	2.1E-11	2.9E-11	3.2E-11	1.9E-11
CS 137	2.6E-09	2.6E-09	2.7E-09	2.6E-09	2.7E-09	2.4E-09	2.5E-09	2.6E-09
PU 239	2.7E-09	2.4E-13	3.8E-13	1.6E-12	4.5E-12	4.3E-07	3.3E-08	6.5E-09
Total	5.5E-09	2.6E-09	2.7E-09	2.7E-09	2.8E-09	4.6E-07	5.0E-08	9.2E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.8E-11	1.8E-11	1.8E-11	0.0E+00
Y 90	1.2E-16	1.2E-16	1.2E-16	3.6E-15
I 129	2.1E-11	5.1E-11	3.6E-07	0.0E+00
CS 137	2.4E-09	2.3E-09	2.3E-09	0.0E+00
PU 239	6.5E-09	1.5E-13	1.4E-13	6.6E-08
Total	8.9E-09	2.4E-09	3.6E-07	6.6E-08

External Dose by Radionuclide

Radionuclide	
SR 90	3.9E-14
Y 90	2.2E-12
I 129	2.4E-11
CS 137	1.3E-09
PU 239	6.2E-17
Total	1.4E-09

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic onsite (Gravel Fill) Population - Ground Trlease

Executed on: 10/16/95 at 12:17:52

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	7.2E-11	2.0E-11	2.1E-11	4.9E-11	1.5E-10	3.2E-08	1.4E-08	1.8E-11
Y 90	2.2E-12	2.2E-13	5.4E-13	2.7E-12	6.6E-12	3.6E-15	3.6E-15	1.2E-16
I 129	7.8E-11	2.5E-11	2.1E-11	2.1E-11	2.1E-11	2.9E-11	3.2E-11	1.9E-11
CS 137	2.6E-09	2.6E-09	2.7E-09	2.6E-09	2.7E-09	2.4E-09	2.5E-09	2.6E-09
PU 239	2.7E-09	2.4E-13	3.8E-13	1.6E-12	4.5E-12	4.3E-07	3.3E-08	6.5E-09
Total	5.5E-09	2.6E-09	2.7E-09	2.7E-09	2.8E-09	4.6E-07	5.0E-08	9.2E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.8E-11	1.8E-11	1.8E-11	0.0E+00
Y 90	1.2E-16	1.2E-16	1.2E-16	3.6E-15
I 129	2.1E-11	5.1E-11	3.6E-07	0.0E+00
CS 137	2.4E-09	2.3E-09	2.3E-09	0.0E+00
PU 239	6.5E-09	1.5E-13	1.4E-13	6.6E-08
Total	8.9E-09	2.4E-09	3.6E-07	6.6E-08

External Dose by Radionuclide

Radionuclide	
SR 90	3.9E-14
Y 90	2.2E-12
I 129	2.4E-11
CS 137	1.3E-09
PU 239	6.2E-17
Total	1.4E-09

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Table D4.4-6. Atmospheric Radiological Operating Emissions for Treatment, Extensive Retrieval (Ex Situ Vitrification) Alternative, No Separation Subalternative.[1]

Radionuclide	Air Release (Ci/yr)
Am-241	5.3E-03
C-14	3.8E+02 58 Ci/yr
Cs-137	1.8E+00
I-129	3.6E+00
Pu-239	1.2E-03
Ru-106	8.3E-07
Sm-151	2.5E-02
Sr-90	2.5E+00
Tc-99	1.5E-03
Zr-93	1.4E-02

[1] Source: WHC (1994a)

D4.4.5.1.3 Storage and Disposal

Storage and disposal operations would involve interim onsite storage of treated HLW pending shipment to an offsite geologic repository (WHC 1994a). No waste would be disposed of onsite. Following are the storage and disposal source terms for each receptor.

Involved Worker

The worst case and nominal case exposures for involved workers performing this operation are assumed to be 200 mrem/yr and 25 mrem/yr, respectively (Section D2.2.3).

Noninvolved Worker and General Public

As in the main alternative (Section D4.4.1.3.2, Noninvolved Worker and General Public), atmospheric emissions from storage and disposal operations are expected to be negligible compared to emissions from the other two major actions (Murray 1995, 1995a). For purposes of this assessment, the storage and disposal source term for both the noninvolved worker and general public is assumed to be zero.

D4.4.5.2 Transport

Transport for the no separation subalternative is analyzed with the aid of the computer code GENII using the same air transport modeling approach used for the main alternative (Section

Construction Equipment Emissions Summary (kg)
Backup to Table 10-12
Tri-Party Agreement Preferred Alternative Case

Period of Release During Construction	Carbon Monoxide (CO)	Exhaust[1] Hydrocarbons (Hydrocarbons)	Fugitive[1] Hydrocarbons (Hydrocarbons)	Nitrogen Oxides as NO_2 (NOx)	Aldehydes as HCHO (Aldehydes)	Sulfur Oxides as SO_2 (SOx)	Particulate Matter (PM_{10})[2] (Particulate)
Year 1 (pg 2)	46510.8	6431.14	217.577	92510.6	2817.39	2834.9	7746.52
Years 2-4 (pg 3)	40398.5	5331.53	2.478	96685.2	2492.64	1752.9	6135.2
5-Year Duration (pg 4)	344346	49170.9	3080.9	404620	8113.84	4730.6	33157.6
5-Year Duration (pg 5)	31869115	1091332	478297	1121044	39606.6	1709.3	73430.4
5-Year Duration (pg 6)	83749.8	8484.49	5466.72	21206.6	0	3075.0	0
Totals	32384120.1	1160750.06	487064.68	1736066.4	53030.47	14102.7	120469.72

[1]AP-42 emission factors present separate exhaust hydrocarbon and fugitive hydrocarbons emission factors for gasoline powered engines. The total hydrocarbon emissions is the sum of these two emissions.
[2]Exhaust particulate is assumed to be PM_{10}.

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OFF site

MEI
- χ/Q 7.7E-9
- Dose 3.4E-4

POP
- χ/Q 5.0E-4
- Dose 1.6E+1

Onsite

MEI
- χ/Q 2.9E-8
- Dose 3.7E-5

POP
- χ/Q 5.0E-5
- Dose 6.4E-2

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMINS2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

==========

Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	5.3E-03	0.0E+00	0.0E+00
C 14	5.8E+01	0.0E+00	0.0E+00
CS137	1.8E+00	0.0E+00	0.0E+00
I 129	3.6E+00	0.0E+00	0.0E+00
PU239	1.2E-03	0.0E+00	0.0E+00
RU106	8.3E-07	0.0E+00	0.0E+00
SM151	2.5E-02	0.0E+00	0.0E+00
SR90	2.5E+00	0.0E+00	0.0E+00
TC99	1.5E-03	0.0E+00	0.0E+00
ZR93	1.4E-02	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

	Joint frequency data input.
2.2E+04	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
5.5E+01	Stack height (m)
3.3E+01	Stack flow (m3/s)
8.8E-01	Stack radius (m)
1.6E+02	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

7.7E-09 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Calcination) Offsite MI - Elevated Release

Executed on: 10/14/95 at 14:33:14

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.2E-05	2.5E-01	7.9E-06
Breast	3.0E-05	1.5E-01	4.5E-06
R Marrow	8.7E-05	1.2E-01	1.0E-05
Lung	3.0E-05	1.2E-01	3.6E-06
Thyroid	9.9E-03	3.0E-02	3.0E-04
Bone Sur	2.7E-04	3.0E-02	8.1E-06
LL Int.	3.9E-05	6.0E-02	2.3E-06
UL Int.	3.3E-05	6.0E-02	2.0E-06
Stomach	3.0E-05	6.0E-02	1.8E-06
S Int.	3.0E-05	6.0E-02	1.8E-06
Liver	2.2E-05	6.0E-02	1.3E-06
Internal Effective Dose Equivalent			3.4E-04
External Dose			1.0E-07
Annual Effective Dose Equivalent			3.4E-04

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 129
Total Inhalation EDE:	9.8E-06
Total Ingestion EDE:	3.3E-04

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

	Dose Commitment Year 1	2	3	...		
Internal Intake Year: 3			0.0E+00	...		
			+			
2		0.0E+00	0.0E+00	...		Internal Effective Dose Equivalent
		+	+			
1	2.9E-04 +	3.1E-05 +	4.1E-06 +	...	= 3.4E-04	
	||	||	||			
Internal Annual Dose	2.9E-04 +	3.1E-05 +	4.1E-06 +	...	= 3.4E-04	Cumulative Internal Dose
	+	+	+		+	
External Annual Dose	1.0E-07	0.0E+00	0.0E+00	...	1.0E-07	
	||	||	||		||	
Annual Dose	2.9E-04 +	3.1E-05 +	4.1E-06 +	...	= 3.4E-04	Cumulative Dose
					2.9E-04	Maximum Annual Dose Occurred In Year 1

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Calcination) Offsite MI - Elevated Release

Executed on: 10/14/95 at 14:33:14

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.3E-06	3.8E-07	3.9E-07	4.0E-07	4.4E-07	1.5E-04	1.7E-05	2.4E-06
Leaf Veg	8.1E-07	8.9E-07	9.0E-07	1.2E-06	2.1E-06	1.3E-05	5.6E-06	8.5E-07
Oth. Veg	4.0E-06	4.2E-06	4.2E-06	5.1E-06	7.2E-06	3.4E-05	1.7E-05	4.1E-06
Fruit	5.9E-06	6.1E-06	6.2E-06	7.1E-06	9.3E-06	3.8E-05	2.0E-05	6.0E-06
Cereals	6.1E-06	6.1E-06	6.1E-06	6.3E-06	6.8E-06	1.4E-05	9.9E-06	6.1E-06
Meat	5.5E-06	5.7E-06	5.7E-06	5.7E-06	5.9E-06	8.5E-06	7.3E-06	5.6E-06
Poultry	6.9E-07	6.9E-07	6.9E-07	6.9E-07	6.9E-07	8.5E-07	8.6E-07	6.9E-07
Cow Milk	4.9E-06	5.1E-06	4.9E-06	5.1E-06	5.4E-06	1.3E-05	9.1E-06	4.9E-06
Eggs	8.5E-07	8.5E-07	8.5E-07	8.5E-07	8.6E-07	1.1E-06	1.1E-06	8.5E-07
Soil Ing	5.3E-10	6.6E-10	7.1E-10	1.4E-09	3.0E-09	2.2E-08	8.8E-09	5.9E-10
Total	3.0E-05	3.0E-05	3.0E-05	3.3E-05	3.9E-05	2.7E-04	8.7E-05	3.2E-05

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
Inhale	2.4E-06	3.8E-07	3.8E-05	8.3E-17	2.1E-05	8.8E-17
Leaf Veg	8.3E-07	8.7E-07	8.3E-04	1.3E-14	2.4E-07	1.3E-14
Oth. Veg	4.1E-06	4.2E-06	1.3E-03	2.4E-14	3.2E-07	2.4E-14
Fruit	6.0E-06	6.1E-06	1.3E-03	2.5E-14	3.4E-07	2.5E-14
Cereals	6.1E-06	6.2E-06	4.8E-04	6.5E-14	1.2E-07	6.5E-14
Meat	5.5E-06	5.5E-06	4.4E-04	7.8E-18	1.0E-09	7.8E-18
Poultry	6.9E-07	7.0E-07	9.1E-07	5.5E-19	6.4E-13	5.5E-19
Cow Milk	4.8E-06	5.3E-06	5.4E-03	2.4E-18	3.5E-11	2.4E-18
Eggs	8.5E-07	8.7E-07	6.0E-05	3.8E-18	5.0E-11	3.8E-18
Soil Ing	5.6E-10	5.9E-10	1.1E-06	2.1E-16	4.4E-10	2.1E-16
Total	3.1E-05	3.0E-05	9.9E-03	1.3E-13	2.2E-05	1.3E-13

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	2.1E-09
Sur Soil	1.0E-07
Total	1.0E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.3E-06	3.8E-07	3.9E-07	4.0E-07	4.4E-07	1.5E-04	1.7E-05	2.4E-06
Leaf Veg	8.1E-07	8.9E-07	9.0E-07	1.2E-06	2.1E-06	1.3E-05	5.6E-06	8.5E-07
Oth. Veg	4.0E-06	4.2E-06	4.2E-06	5.1E-06	7.2E-06	3.4E-05	1.7E-05	4.1E-06
Fruit	5.9E-06	6.1E-06	6.2E-06	7.1E-06	9.3E-06	3.8E-05	2.0E-05	6.0E-06
Cereals	6.1E-06	6.1E-06	6.1E-06	6.3E-06	6.8E-06	1.4E-05	9.9E-06	6.1E-06
Meat	5.5E-06	5.7E-06	5.7E-06	5.7E-06	5.9E-06	8.5E-06	7.3E-06	5.6E-06
Poultry	6.9E-07	6.9E-07	6.9E-07	6.9E-07	6.9E-07	8.5E-07	8.6E-07	6.9E-07
Cow Milk	4.9E-06	5.1E-06	4.9E-06	5.1E-06	5.4E-06	1.3E-05	9.1E-06	4.9E-06
Eggs	8.5E-07	8.5E-07	8.5E-07	8.5E-07	8.6E-07	1.1E-06	1.1E-06	8.5E-07
Soil Ing	5.3E-10	6.6E-10	7.1E-10	1.4E-09	3.0E-09	2.2E-08	8.8E-09	5.9E-10
Total	3.0E-05	3.0E-05	3.0E-05	3.3E-05	3.9E-05	2.7E-04	8.7E-05	3.2E-05

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
Inhale	2.4E-06	3.8E-07	3.8E-05	8.3E-17	2.1E-05	8.8E-17
Leaf Veg	8.3E-07	8.7E-07	8.3E-04	1.3E-14	2.4E-07	1.3E-14
Oth. Veg	4.1E-06	4.2E-06	1.3E-03	2.4E-14	3.2E-07	2.4E-14
Fruit	6.0E-06	6.1E-06	1.3E-03	2.5E-14	3.4E-07	2.5E-14
Cereals	6.1E-06	6.2E-06	4.8E-04	6.5E-14	1.2E-07	6.5E-14
Meat	5.5E-06	5.5E-06	4.4E-04	7.8E-18	1.0E-09	7.8E-18
Poultry	6.9E-07	7.0E-07	9.1E-07	5.5E-19	6.4E-13	5.5E-19
Cow Milk	4.8E-06	5.3E-06	5.4E-03	2.4E-18	3.5E-11	2.4E-18
Eggs	8.5E-07	8.7E-07	6.0E-05	3.8E-18	5.0E-11	3.8E-18
Soil Ing	5.6E-10	5.9E-10	1.1E-06	2.1E-16	4.4E-10	2.1E-16
Total	3.1E-05	3.0E-05	9.9E-03	1.3E-13	2.2E-05	1.3E-13

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	2.1E-09
Sur Soil	1.0E-07
Total	1.0E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	2.4E-05	2.4E-05	2.4E-05	2.4E-05	2.4E-05	3.0E-05	3.0E-05	2.4E-05
SR 90	7.3E-08	1.0E-07	1.5E-07	9.3E-07	3.9E-06	9.5E-05	4.1E-05	5.2E-08
Y 90	1.7E-09	1.9E-07	4.4E-07	2.2E-06	5.4E-06	7.1E-11	6.9E-11	2.3E-12
ZR 93	9.7E-12	1.7E-11	3.8E-11	2.2E-10	6.6E-10	2.7E-07	2.2E-08	1.2E-12
NB 93M	4.4E-14	1.3E-13	3.3E-13	1.9E-12	5.6E-12	2.2E-13	9.0E-14	9.4E-15
TC 99	2.4E-10	5.4E-09	9.5E-11	3.3E-10	8.7E-10	5.9E-11	5.9E-11	5.0E-11
RU 106	6.5E-12	1.4E-13	2.4E-13	1.0E-12	3.1E-12	7.7E-14	8.4E-14	6.7E-14
I 129	6.7E-07	9.2E-07	5.7E-07	5.7E-07	5.7E-07	7.5E-07	7.9E-07	5.3E-07
CS 137	4.0E-06	4.3E-06	4.3E-06	4.3E-06	4.3E-06	4.0E-06	4.0E-06	4.3E-06
SM 151	6.4E-10	3.5E-11	8.9E-11	5.2E-10	1.5E-09	2.7E-08	2.2E-09	3.3E-14
AM 241	7.4E-07	4.7E-10	9.6E-10	5.0E-09	1.5E-08	1.1E-04	9.0E-06	1.8E-06
PU 239	1.6E-07	7.8E-11	1.8E-10	1.0E-09	3.1E-09	2.6E-05	2.0E-06	4.0E-07
Total	3.0E-05	3.0E-05	3.0E-05	3.3E-05	3.9E-05	2.7E-04	8.7E-05	3.2E-05

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
C 14	2.4E-05	2.5E-05	2.4E-05	0.0E+00	0.0E+00	0.0E+00
SR 90	5.2E-08	5.1E-08	5.2E-08	0.0E+00	0.0E+00	0.0E+00
Y 90	2.6E-12	2.3E-12	2.3E-12	0.0E+00	6.7E-11	0.0E+00
ZR 93	2.6E-12	5.9E-12	2.1E-12	0.0E+00	0.0E+00	0.0E+00
NB 93M	2.2E-14	9.8E-15	9.4E-15	1.3E-13	0.0E+00	1.3E-13
TC 99	5.0E-11	5.0E-11	1.3E-09	0.0E+00	6.8E-11	0.0E+00
RU 106	7.1E-14	6.5E-14	6.6E-14	0.0E+00	0.0E+00	0.0E+00
I 129	5.7E-07	1.3E-06	9.9E-03	0.0E+00	0.0E+00	0.0E+00
CS 137	4.0E-06	3.9E-06	3.9E-06	0.0E+00	0.0E+00	0.0E+00
SM 151	7.1E-14	6.4E-14	3.5E-14	0.0E+00	7.3E-09	0.0E+00
AM 241	1.7E-06	1.3E-10	7.2E-11	0.0E+00	1.8E-05	0.0E+00
PU 239	3.9E-07	9.0E-12	8.8E-12	0.0E+00	4.0E-06	0.0E+00
Total	3.1E-05	3.0E-05	9.9E-03	1.3E-13	2.2E-05	1.3E-13

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	2.5E-11
Y 90	1.4E-09
ZR 93	5.3E-17
NB 93M	5.0E-16

TC 99	1.5E-15
RU 106	1.3E-14
I 129	4.0E-09
CS 137	9.6E-08
SM 151	1.8E-15
AM 241	2.4E-12
PU 239	6.2E-15
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Total	1.0E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	2.4E-05	2.4E-05	2.4E-05	2.4E-05	2.4E-05	3.0E-05	3.0E-05	2.4E-05
SR 90	7.3E-08	1.0E-07	1.5E-07	9.3E-07	3.9E-06	9.5E-05	4.1E-05	5.2E-08
Y 90	1.7E-09	1.9E-07	4.4E-07	2.2E-06	5.4E-06	7.1E-11	6.9E-11	2.3E-12
ZR 93	9.7E-12	1.7E-11	3.8E-11	2.2E-10	6.6E-10	2.7E-07	2.2E-08	1.2E-12
NB 93M	4.4E-14	1.3E-13	3.3E-13	1.9E-12	5.6E-12	2.2E-13	9.0E-14	9.4E-15
TC 99	2.4E-10	5.4E-09	9.5E-11	3.3E-10	8.7E-10	5.9E-11	5.9E-11	5.0E-11
RU 106	6.5E-12	1.4E-13	2.4E-13	1.0E-12	3.1E-12	7.7E-14	8.4E-14	6.7E-14
I 129	6.7E-07	9.2E-07	5.7E-07	5.7E-07	5.7E-07	7.5E-07	7.9E-07	5.3E-07
CS 137	4.0E-06	4.3E-06	4.3E-06	4.3E-06	4.3E-06	4.0E-06	4.0E-06	4.3E-06
SM 151	6.4E-10	3.5E-11	8.9E-11	5.2E-10	1.5E-09	2.7E-08	2.2E-09	3.3E-14
AM 241	7.4E-07	4.7E-10	9.6E-10	5.0E-09	1.5E-08	1.1E-04	9.0E-06	1.8E-06
PU 239	1.6E-07	7.8E-11	1.8E-10	1.0E-09	3.1E-09	2.6E-05	2.0E-06	4.0E-07
Total	3.0E-05	3.0E-05	3.0E-05	3.3E-05	3.9E-05	2.7E-04	8.7E-05	3.2E-05

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
C 14	2.4E-05	2.5E-05	2.4E-05	0.0E+00	0.0E+00	0.0E+00
SR 90	5.2E-08	5.1E-08	5.2E-08	0.0E+00	0.0E+00	0.0E+00
Y 90	2.6E-12	2.3E-12	2.3E-12	0.0E+00	6.7E-11	0.0E+00
ZR 93	2.6E-12	5.9E-12	2.1E-12	0.0E+00	0.0E+00	0.0E+00
NB 93M	2.2E-14	9.8E-15	9.4E-15	1.3E-13	0.0E+00	1.3E-13
TC 99	5.0E-11	5.0E-11	1.3E-09	0.0E+00	6.8E-11	0.0E+00
RU 106	7.1E-14	6.5E-14	6.6E-14	0.0E+00	0.0E+00	0.0E+00
I 129	5.7E-07	1.3E-06	9.9E-03	0.0E+00	0.0E+00	0.0E+00
CS 137	4.0E-06	3.9E-06	3.9E-06	0.0E+00	0.0E+00	0.0E+00
SM 151	7.1E-14	6.4E-14	3.5E-14	0.0E+00	7.3E-09	0.0E+00
AM 241	1.7E-06	1.3E-10	7.2E-11	0.0E+00	1.8E-05	0.0E+00
PU 239	3.9E-07	9.0E-12	8.8E-12	0.0E+00	4.0E-06	0.0E+00
Total	3.1E-05	3.0E-05	9.9E-03	1.3E-13	2.2E-05	1.3E-13

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	2.5E-11
Y 90	1.4E-09
ZR 93	5.3E-17
NB 93M	5.0E-16

TC 99	1.5E-15
RU 106	1.3E-14
I 129	4.0E-09
CS 137	9.6E-08
SM 151	1.8E-15
AM 241	2.4E-12
PU 239	6.2E-15
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Total	1.0E-07

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPONS2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	5.3E-03	0.0E+00	0.0E+00
C 14	5.8E+01	0.0E+00	0.0E+00
CS137	1.8E+00	0.0E+00	0.0E+00
I 129	3.6E+00	0.0E+00	0.0E+00
PU239	1.2E-03	0.0E+00	0.0E+00
RU106	8.3E-07	0.0E+00	0.0E+00
SM151	2.5E-02	0.0E+00	0.0E+00
SR90	2.5E+00	0.0E+00	0.0E+00
TC99	1.5E-03	0.0E+00	0.0E+00
ZR93	1.4E-02	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

5.5E+01	Stack height (m)
3.3E+01	Stack flow (m3/s)
8.8E-01	Stack radius (m)
1.6E+02	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1 Atmospheric production definition: 1 - Use population-weighted chi/Q
Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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5.0E-04 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.5E+00	2.5E-01	3.6E-01
Breast	1.4E+00	1.5E-01	2.0E-01
R Marrow	3.8E+00	1.2E-01	4.6E-01
Lung	1.4E+00	1.2E-01	1.6E-01
Thyroid	4.6E+02	3.0E-02	1.4E+01
Bone Sur	1.4E+01	3.0E-02	4.2E-01
LL Int.	1.7E+00	6.0E-02	9.9E-02
UL Int.	1.4E+00	6.0E-02	8.6E-02
Liver	1.4E+00	6.0E-02	8.6E-02
Stomach	1.3E+00	6.0E-02	8.1E-02
S Int.	1.3E+00	6.0E-02	8.0E-02
Internal Effective Dose Equivalent			1.6E+01
External Dose			4.5E-03
Annual Effective Dose Equivalent			1.6E+01

Controlling Organ:	Thyroid
Controlling Pathway:	Ing
Controlling Radionuclide:	I 129
Total Inhalation EDE:	6.4E-01
Total Ingestion EDE:	1.5E+01

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	1.3E+01 +	1.4E+00 +	1.9E-01 +	...	=	1.6E+01	
	||	||	||				
Internal Annual Dose	1.3E+01 +	1.4E+00 +	1.9E-01 +	...	=	1.6E+01	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	4.5E-03	0.0E+00	0.0E+00	...		4.5E-03	
	||	||	||			||	
Annual Dose	1.3E+01 +	1.4E+00 +	1.9E-01 +	...	=	1.6E+01	Cumulative Dose
						1.3E+01	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	8.6E-02	2.5E-02	2.5E-02	2.6E-02	2.9E-02	9.7E+00	1.1E+00	1.6E-01
Leaf Veg	2.6E-02	2.9E-02	3.0E-02	4.2E-02	7.1E-02	4.2E-01	1.8E-01	2.7E-02
Oth. Veg	1.7E-01	1.8E-01	1.8E-01	2.2E-01	3.2E-01	1.4E+00	7.0E-01	1.7E-01
Fruit	7.6E-02	7.8E-02	7.9E-02	9.2E-02	1.2E-01	4.8E-01	2.5E-01	7.6E-02
Cereals	3.7E-01	3.7E-01	3.7E-01	3.8E-01	4.1E-01	8.1E-01	6.0E-01	3.7E-01
Meat	3.1E-01	3.2E-01	3.2E-01	3.3E-01	3.4E-01	4.8E-01	4.2E-01	3.2E-01
Poultry	2.1E-02	2.1E-02	2.1E-02	2.1E-02	2.1E-02	2.6E-02	2.6E-02	2.1E-02
Cow Milk	2.7E-01	2.8E-01	2.7E-01	2.8E-01	3.1E-01	7.3E-01	5.0E-01	2.7E-01
Eggs	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.7E-02	4.8E-02	4.6E-02	3.6E-02
Soil Ing	3.5E-05	4.3E-05	4.6E-05	8.9E-05	1.9E-04	1.4E-03	5.6E-04	3.9E-05
Total	1.4E+00	1.3E+00	1.3E+00	1.4E+00	1.7E+00	1.4E+01	3.8E+00	1.5E+00

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
Inhale	1.6E-01	2.5E-02	2.5E+00	2.4E-11	1.4E+00	2.5E-11
Leaf Veg	2.7E-02	2.8E-02	2.7E+01	6.9E-10	7.8E-03	6.9E-10
Oth. Veg	1.7E-01	1.8E-01	5.4E+01	1.4E-09	1.4E-02	1.4E-09
Fruit	7.6E-02	7.8E-02	1.8E+01	4.3E-10	4.3E-03	4.3E-10
Cereals	3.7E-01	3.8E-01	2.8E+01	3.9E-09	7.2E-03	3.9E-09
Meat	3.1E-01	3.2E-01	2.4E+01	6.5E-13	6.0E-05	6.5E-13
Poultry	2.1E-02	2.2E-02	2.8E-02	1.8E-14	2.0E-08	1.8E-14
Cow Milk	2.6E-01	2.9E-01	3.0E+02	1.6E-13	2.2E-06	1.6E-13
Eggs	3.6E-02	3.7E-02	2.6E+00	1.6E-13	2.1E-06	1.6E-13
Soil Ing	3.7E-05	3.9E-05	6.9E-02	1.4E-11	2.9E-05	1.4E-11
Total	1.4E+00	1.4E+00	4.6E+02	6.4E-09	1.4E+00	6.4E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	1.3E-04
Sur Soil	4.4E-03
Total	4.5E-03

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	8.6E-02	2.5E-02	2.5E-02	2.6E-02	2.9E-02	9.7E+00	1.1E+00	1.6E-01
Leaf Veg	2.6E-02	2.9E-02	3.0E-02	4.2E-02	7.1E-02	4.2E-01	1.8E-01	2.7E-02
Oth. Veg	1.7E-01	1.8E-01	1.8E-01	2.2E-01	3.2E-01	1.4E+00	7.0E-01	1.7E-01
Fruit	7.6E-02	7.8E-02	7.9E-02	9.2E-02	1.2E-01	4.8E-01	2.5E-01	7.6E-02
Cereals	3.7E-01	3.7E-01	3.7E-01	3.8E-01	4.1E-01	8.1E-01	6.0E-01	3.7E-01
Meat	3.1E-01	3.2E-01	3.2E-01	3.3E-01	3.4E-01	4.8E-01	4.2E-01	3.2E-01
Poultry	2.1E-02	2.1E-02	2.1E-02	2.1E-02	2.1E-02	2.6E-02	2.6E-02	2.1E-02
Cow Milk	2.7E-01	2.8E-01	2.7E-01	2.8E-01	3.1E-01	7.3E-01	5.0E-01	2.7E-01
Eggs	3.6E-02	3.6E-02	3.6E-02	3.6E-02	3.7E-02	4.8E-02	4.6E-02	3.6E-02
Soil Ing	3.5E-05	4.3E-05	4.6E-05	8.9E-05	1.9E-04	1.4E-03	5.6E-04	3.9E-05
Total	1.4E+00	1.3E+00	1.3E+00	1.4E+00	1.7E+00	1.4E+01	3.8E+00	1.5E+00

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
Inhale	1.6E-01	2.5E-02	2.5E+00	2.4E-11	1.4E+00	2.5E-11
Leaf Veg	2.7E-02	2.8E-02	2.7E+01	6.9E-10	7.8E-03	6.9E-10
Oth. Veg	1.7E-01	1.8E-01	5.4E+01	1.4E-09	1.4E-02	1.4E-09
Fruit	7.6E-02	7.8E-02	1.8E+01	4.3E-10	4.3E-03	4.3E-10
Cereals	3.7E-01	3.8E-01	2.8E+01	3.9E-09	7.2E-03	3.9E-09
Meat	3.1E-01	3.2E-01	2.4E+01	6.5E-13	6.0E-05	6.5E-13
Poultry	2.1E-02	2.2E-02	2.8E-02	1.8E-14	2.0E-08	1.8E-14
Cow Milk	2.6E-01	2.9E-01	3.0E+02	1.6E-13	2.2E-06	1.6E-13
Eggs	3.6E-02	3.7E-02	2.6E+00	1.6E-13	2.1E-06	1.6E-13
Soil Ing	3.7E-05	3.9E-05	6.9E-02	1.4E-11	2.9E-05	1.4E-11
Total	1.4E+00	1.4E+00	4.6E+02	6.4E-09	1.4E+00	6.4E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	1.3E-04
Sur Soil	4.4E-03
Total	4.5E-03

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.3E+00	1.3E+00	1.1E+00
SR 90	3.3E-03	3.6E-03	5.4E-03	3.1E-02	1.3E-01	3.5E+00	1.5E+00	1.9E-03
Y 90	5.0E-04	7.2E-03	1.7E-02	8.5E-02	2.1E-01	3.4E-06	3.4E-06	1.1E-07
ZR 93	6.4E-07	6.3E-07	1.3E-06	7.5E-06	2.2E-05	1.8E-02	1.4E-03	7.8E-08
NB 93M	1.0E-08	6.8E-09	1.7E-08	9.4E-08	2.8E-07	1.1E-08	4.5E-09	4.7E-10
TC 99	1.4E-05	1.7E-04	3.0E-06	1.0E-05	2.7E-05	1.8E-06	1.8E-06	1.6E-06
RU 106	4.2E-07	5.1E-09	8.5E-09	3.6E-08	1.1E-07	2.8E-09	3.1E-09	2.4E-09
I 129	3.1E-02	4.2E-02	2.6E-02	2.6E-02	2.6E-02	3.4E-02	3.6E-02	2.4E-02
CS 137	2.0E-01	2.1E-01	2.2E-01	2.2E-01	2.2E-01	2.0E-01	2.0E-01	2.1E-01
SM 151	4.2E-05	1.4E-06	3.5E-06	2.1E-05	6.1E-05	1.8E-03	1.4E-04	2.2E-09
AM 241	4.8E-02	2.0E-05	3.7E-05	1.8E-04	5.3E-04	7.3E+00	5.7E-01	1.1E-01
PU 239	1.0E-02	2.9E-06	6.5E-06	3.5E-05	1.1E-04	1.6E+00	1.3E-01	2.5E-02
Total	1.4E+00	1.3E+00	1.3E+00	1.4E+00	1.7E+00	1.4E+01	3.8E+00	1.5E+00

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
C 14	1.1E+00	1.1E+00	1.1E+00	0.0E+00	0.0E+00	0.0E+00
SR 90	1.9E-03	1.9E-03	1.9E-03	0.0E+00	0.0E+00	0.0E+00
Y 90	1.3E-07	1.1E-07	1.1E-07	0.0E+00	3.3E-06	0.0E+00
ZR 93	1.7E-07	3.8E-07	1.4E-07	0.0E+00	0.0E+00	0.0E+00
NB 93M	1.1E-09	5.0E-10	4.7E-10	6.4E-09	0.0E+00	6.4E-09
TC 99	1.6E-06	1.6E-06	4.0E-05	0.0E+00	2.1E-06	0.0E+00
RU 106	2.5E-09	2.5E-09	2.5E-09	0.0E+00	0.0E+00	0.0E+00
I 129	2.6E-02	6.1E-02	4.5E+02	0.0E+00	0.0E+00	0.0E+00
CS 137	2.0E-01	1.9E-01	1.9E-01	0.0E+00	0.0E+00	0.0E+00
SM 151	3.8E-09	4.1E-09	2.3E-09	0.0E+00	4.8E-04	0.0E+00
AM 241	1.1E-01	8.2E-06	4.6E-06	0.0E+00	1.2E+00	0.0E+00
PU 239	2.5E-02	5.6E-07	5.5E-07	0.0E+00	2.5E-01	0.0E+00
Total	1.4E+00	1.4E+00	4.6E+02	6.4E-09	1.4E+00	6.4E-09

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	1.1E-06
Y 90	6.0E-05
ZR 93	2.3E-12
NB 93M	2.1E-11

TC 99	6.3E-11
RU 106	5.8E-10
I 129	1.8E-04
CS 137	4.3E-03
SM 151	8.9E-11
AM 241	1.1E-07
PU 239	2.9E-10
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Total	4.5E-03

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.3E+00	1.3E+00	1.1E+00
SR 90	3.3E-03	3.6E-03	5.4E-03	3.1E-02	1.3E-01	3.5E+00	1.5E+00	1.9E-03
Y 90	5.0E-04	7.2E-03	1.7E-02	8.5E-02	2.1E-01	3.4E-06	3.4E-06	1.1E-07
ZR 93	6.4E-07	6.3E-07	1.3E-06	7.5E-06	2.2E-05	1.8E-02	1.4E-03	7.8E-08
NB 93M	1.0E-08	6.8E-09	1.7E-08	9.4E-08	2.8E-07	1.1E-08	4.5E-09	4.7E-10
TC 99	1.4E-05	1.7E-04	3.0E-06	1.0E-05	2.7E-05	1.8E-06	1.8E-06	1.6E-06
RU 106	4.2E-07	5.1E-09	8.5E-09	3.6E-08	1.1E-07	2.8E-09	3.1E-09	2.4E-09
I 129	3.1E-02	4.2E-02	2.6E-02	2.6E-02	2.6E-02	3.4E-02	3.6E-02	2.4E-02
CS 137	2.0E-01	2.1E-01	2.2E-01	2.2E-01	2.2E-01	2.0E-01	2.0E-01	2.1E-01
SM 151	4.2E-05	1.4E-06	3.5E-06	2.1E-05	6.1E-05	1.8E-03	1.4E-04	2.2E-09
AM 241	4.8E-02	2.0E-05	3.7E-05	1.8E-04	5.3E-04	7.3E+00	5.7E-01	1.1E-01
PU 239	1.0E-02	2.9E-06	6.5E-06	3.5E-05	1.1E-04	1.6E+00	1.3E-01	2.5E-02
Total	1.4E+00	1.3E+00	1.3E+00	1.4E+00	1.7E+00	1.4E+01	3.8E+00	1.5E+00

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
C 14	1.1E+00	1.1E+00	1.1E+00	0.0E+00	0.0E+00	0.0E+00
SR 90	1.9E-03	1.9E-03	1.9E-03	0.0E+00	0.0E+00	0.0E+00
Y 90	1.3E-07	1.1E-07	1.1E-07	0.0E+00	3.3E-06	0.0E+00
ZR 93	1.7E-07	3.8E-07	1.4E-07	0.0E+00	0.0E+00	0.0E+00
NB 93M	1.1E-09	5.0E-10	4.7E-10	6.4E-09	0.0E+00	6.4E-09
TC 99	1.6E-06	1.6E-06	4.0E-05	0.0E+00	2.1E-06	0.0E+00
RU 106	2.5E-09	2.5E-09	2.5E-09	0.0E+00	0.0E+00	0.0E+00
I 129	2.6E-02	6.1E-02	4.5E+02	0.0E+00	0.0E+00	0.0E+00
CS 137	2.0E-01	1.9E-01	1.9E-01	0.0E+00	0.0E+00	0.0E+00
SM 151	3.8E-09	4.1E-09	2.3E-09	0.0E+00	4.8E-04	0.0E+00
AM 241	1.1E-01	8.2E-06	4.6E-06	0.0E+00	1.2E+00	0.0E+00
PU 239	2.5E-02	5.6E-07	5.5E-07	0.0E+00	2.5E-01	0.0E+00
Total	1.4E+00	1.4E+00	4.6E+02	6.4E-09	1.4E+00	6.4E-09

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	1.1E-06
Y 90	6.0E-05
ZR 93	2.3E-12
NB 93M	2.1E-11

TC 99	6.3E-11
RU 106	5.8E-10
I 129	1.8E-04
CS 137	4.3E-03
SM 151	8.9E-11
AM 241	1.1E-07
PU 239	2.9E-10
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Total	4.5E-03

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMINS2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	5.3E-03	0.0E+00	0.0E+00
C 14	5.8E+01	0.0E+00	0.0E+00
CS137	1.8E+00	0.0E+00	0.0E+00
I 129	3.6E+00	0.0E+00	0.0E+00
PU239	1.2E-03	0.0E+00	0.0E+00
RU106	8.3E-07	0.0E+00	0.0E+00
SM151	2.5E-02	0.0E+00	0.0E+00
SR90	2.5E+00	0.0E+00	0.0E+00
TC99	1.5E-03	0.0E+00	0.0E+00
ZR93	1.4E-02	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.
8.0E+02 Maximum individual distance from release point (m)
1.5E+01 Maximum individual sector index (Wind Toward SE)

5.5E+01	Stack height (m)
3.3E+01	Stack flow (m3/s)
8.8E-01	Stack radius (m)
1.6E+02	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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2.9E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Calcination) onsite MI - Elevated Release

Executed on: 10/14/95 at 14:50:43

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	9.1E-06	2.5E-01	2.3E-06
Breast	1.4E-06	1.5E-01	2.1E-07
R Marrow	6.1E-05	1.2E-01	7.4E-06
Lung	4.9E-06	1.2E-01	5.9E-07
Thyroid	1.5E-04	3.0E-02	4.4E-06
Bone Sur	5.5E-04	3.0E-02	1.7E-05
Liver	8.0E-05	6.0E-02	4.8E-06
LL Int.	1.7E-06	6.0E-02	1.0E-07
UL Int.	1.5E-06	6.0E-02	9.0E-08
S Int.	1.5E-06	6.0E-02	8.8E-08
Stomach	1.4E-06	6.0E-02	8.7E-08
Internal Effective Dose Equivalent			3.7E-05
External Dose			4.0E-07
Annual Effective Dose Equivalent			3.7E-05

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	AM241
Total Inhalation EDE:	3.6E-05
Total Ingestion EDE:	1.3E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	6.7E-06 +	1.6E-06 +	1.1E-06 +	...	=	3.7E-05	
	||	||	||				
Internal Annual Dose	6.7E-06 +	1.6E-06 +	1.1E-06 +	...	=	3.7E-05	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	4.0E-07	0.0E+00	0.0E+00	...		4.0E-07	
	||	||	||			||	
Annual Dose	7.1E-06 +	1.6E-06 +	1.1E-06 +	...	=	3.7E-05	Cumulative Dose
						7.1E-06	Maximum Annual Dose Occurred In Year 1

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Calcination) onsite MI - Elevated Release

Executed on: 10/14/95 at 14:50:43

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	4.9E-06	1.4E-06	1.5E-06	1.5E-06	1.7E-06	5.5E-04	6.1E-05	9.1E-06
Soil Ing	2.0E-09	2.4E-09	2.6E-09	5.1E-09	1.1E-08	8.0E-08	3.2E-08	2.2E-09
Total	4.9E-06	1.4E-06	1.5E-06	1.5E-06	1.7E-06	5.5E-04	6.1E-05	9.1E-06

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
Inhale	9.0E-06	1.4E-06	1.4E-04	3.4E-17	8.0E-05	3.6E-17
Soil Ing	2.1E-09	2.2E-09	4.0E-06	7.9E-16	1.6E-09	7.9E-16
Total	9.0E-06	1.4E-06	1.5E-04	8.3E-16	8.0E-05	8.3E-16

External Dose by Exposure Pathway

Pathway	
Plume	2.1E-08
Sur Soil	3.8E-07
Total	4.0E-07

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	4.9E-06	1.4E-06	1.5E-06	1.5E-06	1.7E-06	5.5E-04	6.1E-05	9.1E-06
Soil Ing	2.0E-09	2.4E-09	2.6E-09	5.1E-09	1.1E-08	8.0E-08	3.2E-08	2.2E-09
Total	4.9E-06	1.4E-06	1.5E-06	1.5E-06	1.7E-06	5.5E-04	6.1E-05	9.1E-06

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
Inhale	9.0E-06	1.4E-06	1.4E-04	3.4E-17	8.0E-05	3.6E-17
Soil Ing	2.1E-09	2.2E-09	4.0E-06	7.9E-16	1.6E-09	7.9E-16
Total	9.0E-06	1.4E-06	1.5E-04	8.3E-16	8.0E-05	8.3E-16

External Dose by Exposure Pathway

Pathway	
Plume	2.1E-08
Sur Soil	3.8E-07
Total	4.0E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	9.5E-07	9.5E-07	9.5E-07	9.5E-07	9.5E-07	1.2E-06	1.2E-06	9.5E-07
SR 90	1.1E-07	2.9E-08	3.1E-08	7.1E-08	2.2E-07	4.7E-05	2.0E-05	2.7E-08
Y 90	3.0E-10	2.0E-10	4.9E-10	2.4E-09	6.0E-09	5.6E-13	5.6E-13	1.9E-14
ZR 93	3.7E-11	9.4E-12	1.3E-11	3.2E-11	8.6E-11	1.0E-06	8.2E-08	4.5E-12
NB 93M	1.5E-14	8.5E-16	2.1E-15	1.2E-14	3.5E-14	1.5E-15	5.9E-16	6.1E-17
TC 99	7.5E-10	2.0E-10	3.2E-12	9.8E-12	2.6E-11	2.2E-12	2.2E-12	1.8E-12
RU 106	2.4E-11	6.9E-14	8.1E-14	3.1E-13	8.8E-13	4.3E-14	4.7E-14	2.8E-14
I 129	3.1E-08	1.0E-08	8.4E-09	8.4E-09	8.4E-09	1.2E-08	1.3E-08	7.8E-09
CS 137	4.6E-07	4.5E-07	4.7E-07	4.7E-07	4.7E-07	4.2E-07	4.4E-07	4.6E-07
SM 151	2.3E-09	8.5E-12	2.1E-11	1.2E-10	3.7E-10	9.8E-08	7.8E-09	1.2E-13
AM 241	2.8E-06	5.3E-10	6.7E-10	2.0E-09	4.9E-09	4.1E-04	3.2E-05	6.3E-06
PU 239	5.8E-07	5.2E-11	8.3E-11	3.4E-10	9.7E-10	9.3E-05	7.2E-06	1.4E-06
Total	4.9E-06	1.4E-06	1.5E-06	1.5E-06	1.7E-06	5.5E-04	6.1E-05	9.1E-06

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
C 14	9.5E-07	9.7E-07	9.5E-07	0.0E+00	0.0E+00	0.0E+00
SR 90	2.7E-08	2.6E-08	2.7E-08	0.0E+00	0.0E+00	0.0E+00
Y 90	1.9E-14	1.8E-14	1.9E-14	0.0E+00	5.6E-13	0.0E+00
ZR 93	9.8E-12	2.2E-11	7.7E-12	0.0E+00	0.0E+00	0.0E+00
NB 93M	1.4E-16	7.0E-17	6.1E-17	8.3E-16	0.0E+00	8.3E-16
TC 99	1.8E-12	1.8E-12	4.9E-11	0.0E+00	2.5E-12	0.0E+00
RU 106	3.1E-14	4.3E-14	4.0E-14	0.0E+00	0.0E+00	0.0E+00
I 129	8.4E-09	2.0E-08	1.4E-04	0.0E+00	0.0E+00	0.0E+00
CS 137	4.3E-07	4.1E-07	4.1E-07	0.0E+00	0.0E+00	0.0E+00
SM 151	1.5E-13	2.2E-13	1.3E-13	0.0E+00	2.6E-08	0.0E+00
AM 241	6.2E-06	4.6E-10	2.6E-10	0.0E+00	6.5E-05	0.0E+00
PU 239	1.4E-06	3.2E-11	3.1E-11	0.0E+00	1.4E-05	0.0E+00
Total	9.0E-06	1.4E-06	1.5E-04	8.3E-16	8.0E-05	8.3E-16

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	9.2E-11
Y 90	5.1E-09
ZR 93	2.0E-16
NB 93M	1.8E-15

TC 99	5.6E-15
RU 106	5.1E-14
I 129	1.6E-08
CS 137	3.8E-07
SM 151	9.6E-15
AM 241	1.1E-11
PU 239	3.1E-14
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Total	4.0E-07

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	9.5E-07	9.5E-07	9.5E-07	9.5E-07	9.5E-07	1.2E-06	1.2E-06	9.5E-07
SR 90	1.1E-07	2.9E-08	3.1E-08	7.1E-08	2.2E-07	4.7E-05	2.0E-05	2.7E-08
Y 90	3.0E-10	2.0E-10	4.9E-10	2.4E-09	6.0E-09	5.6E-13	5.6E-13	1.9E-14
ZR 93	3.7E-11	9.4E-12	1.3E-11	3.2E-11	8.6E-11	1.0E-06	8.2E-08	4.5E-12
NB 93M	1.5E-14	8.5E-16	2.1E-15	1.2E-14	3.5E-14	1.5E-15	5.9E-16	6.1E-17
TC 99	7.5E-10	2.0E-10	3.2E-12	9.8E-12	2.6E-11	2.2E-12	2.2E-12	1.8E-12
RU 106	2.4E-11	6.9E-14	8.1E-14	3.1E-13	8.8E-13	4.3E-14	4.7E-14	2.8E-14
I 129	3.1E-08	1.0E-08	8.4E-09	8.4E-09	8.4E-09	1.2E-08	1.3E-08	7.8E-09
CS 137	4.6E-07	4.5E-07	4.7E-07	4.7E-07	4.7E-07	4.2E-07	4.4E-07	4.6E-07
SM 151	2.3E-09	8.5E-12	2.1E-11	1.2E-10	3.7E-10	9.8E-08	7.8E-09	1.2E-13
AM 241	2.8E-06	5.3E-10	6.7E-10	2.0E-09	4.9E-09	4.1E-04	3.2E-05	6.3E-06
PU 239	5.8E-07	5.2E-11	8.3E-11	3.4E-10	9.7E-10	9.3E-05	7.2E-06	1.4E-06
Total	4.9E-06	1.4E-06	1.5E-06	1.5E-06	1.7E-06	5.5E-04	6.1E-05	9.1E-06

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
C 14	9.5E-07	9.7E-07	9.5E-07	0.0E+00	0.0E+00	0.0E+00
SR 90	2.7E-08	2.6E-08	2.7E-08	0.0E+00	0.0E+00	0.0E+00
Y 90	1.9E-14	1.8E-14	1.9E-14	0.0E+00	5.6E-13	0.0E+00
ZR 93	9.8E-12	2.2E-11	7.7E-12	0.0E+00	0.0E+00	0.0E+00
NB 93M	1.4E-16	7.0E-17	6.1E-17	8.3E-16	0.0E+00	8.3E-16
TC 99	1.8E-12	1.8E-12	4.9E-11	0.0E+00	2.5E-12	0.0E+00
RU 106	3.1E-14	4.3E-14	4.0E-14	0.0E+00	0.0E+00	0.0E+00
I 129	8.4E-09	2.0E-08	1.4E-04	0.0E+00	0.0E+00	0.0E+00
CS 137	4.3E-07	4.1E-07	4.1E-07	0.0E+00	0.0E+00	0.0E+00
SM 151	1.5E-13	2.2E-13	1.3E-13	0.0E+00	2.6E-08	0.0E+00
AM 241	6.2E-06	4.6E-10	2.6E-10	0.0E+00	6.5E-05	0.0E+00
PU 239	1.4E-06	3.2E-11	3.1E-11	0.0E+00	1.4E-05	0.0E+00
Total	9.0E-06	1.4E-06	1.5E-04	8.3E-16	8.0E-05	8.3E-16

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	9.2E-11
Y 90	5.1E-09
ZR 93	2.0E-16
NB 93M	1.8E-15

TC 99	5.6E-15
RU 106	5.1E-14
I 129	1.6E-08
CS 137	3.8E-07
SM 151	9.6E-15
AM 241	1.1E-11
PU 239	3.1E-14
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Total	4.0E-07

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ ROSPONS2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	5.3E-03	0.0E+00	0.0E+00
C 14	5.8E+01	0.0E+00	0.0E+00
CS137	1.8E+00	0.0E+00	0.0E+00
I 129	3.6E+00	0.0E+00	0.0E+00
PU239	1.2E-03	0.0E+00	0.0E+00
RU106	8.3E-07	0.0E+00	0.0E+00
SM151	2.5E-02	0.0E+00	0.0E+00
SR90	2.5E+00	0.0E+00	0.0E+00
TC99	1.5E-03	0.0E+00	0.0E+00
ZR93	1.4E-02	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
5.5E+01 Stack height (m)

3.3E+01	Stack flow (m3/s)
8.8E-01	Stack radius (m)
1.6E+02	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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5.0E-05 Population-weighted chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Calcination) onsite Population - Elevated Release

Executed on: 10/14/95 at 14:54:21

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.6E-02	2.5E-01	4.0E-03
Breast	2.5E-03	1.5E-01	3.7E-04
R Marrow	1.1E-01	1.2E-01	1.3E-02
Lung	8.5E-03	1.2E-01	1.0E-03
Thyroid	2.6E-01	3.0E-02	7.7E-03
Bone Sur	9.7E-01	3.0E-02	2.9E-02
Liver	1.4E-01	6.0E-02	8.4E-03
LL Int.	2.9E-03	6.0E-02	1.7E-04
UL Int.	2.6E-03	6.0E-02	1.6E-04
S Int.	2.5E-03	6.0E-02	1.5E-04
Stomach	2.5E-03	6.0E-02	1.5E-04
Internal Effective Dose Equivalent			6.4E-02
External Dose			4.6E-04
Annual Effective Dose Equivalent			6.4E-02

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	AM241
Total Inhalation EDE:	6.4E-02
Total Ingestion EDE:	2.2E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	1.2E-02 +	2.8E-03 +	1.9E-03 +	...	=	6.4E-02	
	||	||	||				
Internal Annual Dose	1.2E-02 +	2.8E-03 +	1.9E-03 +	...	=	6.4E-02	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	4.6E-04	0.0E+00	0.0E+00	...		4.6E-04	
	||	||	||			||	
Annual Dose	1.2E-02 +	2.8E-03 +	1.9E-03 +	...	=	6.4E-02	Cumulative Dose
						1.2E-02	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	8.5E-03	2.5E-03	2.5E-03	2.6E-03	2.9E-03	9.7E-01	1.1E-01	1.6E-02
Soil Ing	3.5E-06	4.3E-06	4.6E-06	8.9E-06	1.9E-05	1.4E-04	5.6E-05	3.9E-06
Total	8.5E-03	2.5E-03	2.5E-03	2.6E-03	2.9E-03	9.7E-01	1.1E-01	1.6E-02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
Inhale	1.6E-02	2.5E-03	2.5E-01	7.1E-13	1.4E-01	7.5E-13
Soil Ing	3.7E-06	3.9E-06	6.9E-03	1.4E-12	2.9E-06	1.4E-12
Total	1.6E-02	2.5E-03	2.6E-01	2.1E-12	1.4E-01	2.1E-12

External Dose by Exposure Pathway

Pathway	
Plume	2.0E-05
Sur Soil	4.4E-04
Total	4.6E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	8.5E-03	2.5E-03	2.5E-03	2.6E-03	2.9E-03	9.7E-01	1.1E-01	1.6E-02
Soil Ing	3.5E-06	4.3E-06	4.6E-06	8.9E-06	1.9E-05	1.4E-04	5.6E-05	3.9E-06
Total	8.5E-03	2.5E-03	2.5E-03	2.6E-03	2.9E-03	9.7E-01	1.1E-01	1.6E-02

Pathway	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
Inhale	1.6E-02	2.5E-03	2.5E-01	7.1E-13	1.4E-01	7.5E-13
Soil Ing	3.7E-06	3.9E-06	6.9E-03	1.4E-12	2.9E-06	1.4E-12
Total	1.6E-02	2.5E-03	2.6E-01	2.1E-12	1.4E-01	2.1E-12

External Dose by Exposure Pathway

Pathway	
Plume	2.0E-05
Sur Soil	4.4E-04
Total	4.6E-04

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	1.6E-03	1.6E-03	1.6E-03	1.6E-03	1.6E-03	2.0E-03	2.1E-03	1.6E-03
SR 90	1.9E-04	5.2E-05	5.6E-05	1.3E-04	4.0E-04	8.4E-02	3.6E-02	4.8E-05
Y 90	1.4E-05	9.7E-07	2.4E-06	1.2E-05	2.8E-05	2.3E-08	2.3E-08	7.8E-10
ZR 93	6.3E-08	1.6E-08	2.2E-08	5.5E-08	1.5E-07	1.8E-03	1.4E-04	7.7E-09
NB 93M	3.0E-10	1.6E-12	3.9E-12	2.2E-11	6.5E-11	3.7E-12	1.5E-12	1.5E-13
TC 99	1.3E-06	3.4E-07	5.3E-09	1.6E-08	4.3E-08	3.6E-09	3.6E-09	3.0E-09
RU 106	4.2E-08	1.2E-10	1.4E-10	5.3E-10	1.5E-09	7.3E-11	8.2E-11	4.9E-11
I 129	5.5E-05	1.8E-05	1.5E-05	1.5E-05	1.5E-05	2.0E-05	2.2E-05	1.4E-05
CS 137	7.9E-04	7.8E-04	8.1E-04	8.0E-04	8.1E-04	7.2E-04	7.5E-04	7.9E-04
SM 151	4.2E-06	1.5E-08	3.8E-08	2.1E-07	6.6E-07	1.8E-04	1.4E-05	2.1E-10
AM 241	4.8E-03	9.3E-07	1.2E-06	3.5E-06	8.6E-06	7.2E-01	5.6E-02	1.1E-02
PU 239	1.0E-03	8.9E-08	1.4E-07	5.8E-07	1.7E-06	1.6E-01	1.2E-02	2.4E-03
Total	8.5E-03	2.5E-03	2.5E-03	2.6E-03	2.9E-03	9.7E-01	1.1E-01	1.6E-02

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
C 14	1.6E-03	1.7E-03	1.6E-03	0.0E+00	0.0E+00	0.0E+00
SR 90	4.8E-05	4.7E-05	4.8E-05	0.0E+00	0.0E+00	0.0E+00
Y 90	7.7E-10	7.5E-10	7.7E-10	0.0E+00	2.3E-08	0.0E+00
ZR 93	1.7E-08	3.8E-08	1.3E-08	0.0E+00	0.0E+00	0.0E+00
NB 93M	3.0E-13	3.1E-13	1.6E-13	2.1E-12	0.0E+00	2.1E-12
TC 99	3.0E-09	3.0E-09	8.2E-08	0.0E+00	4.2E-09	0.0E+00
RU 106	5.3E-11	7.3E-11	6.9E-11	0.0E+00	0.0E+00	0.0E+00
I 129	1.5E-05	3.5E-05	2.5E-01	0.0E+00	0.0E+00	0.0E+00
CS 137	7.3E-04	7.1E-04	7.1E-04	0.0E+00	0.0E+00	0.0E+00
SM 151	2.6E-10	4.0E-10	2.3E-10	0.0E+00	4.7E-05	0.0E+00
AM 241	1.1E-02	8.0E-07	4.5E-07	0.0E+00	1.1E-01	0.0E+00
PU 239	2.4E-03	5.5E-08	5.4E-08	0.0E+00	2.5E-02	0.0E+00
Total	1.6E-02	2.5E-03	2.6E-01	2.1E-12	1.4E-01	2.1E-12

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	1.1E-07
Y 90	6.0E-06
ZR 93	2.3E-13
NB 93M	2.1E-12

TC 99	6.3E-12
RU 106	5.9E-11
I 129	1.8E-05
CS 137	4.3E-04
SM 151	1.0E-11
AM 241	1.2E-08
PU 239	3.3E-11
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Total	4.6E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	1.6E-03	1.6E-03	1.6E-03	1.6E-03	1.6E-03	2.0E-03	2.1E-03	1.6E-03
SR 90	1.9E-04	5.2E-05	5.6E-05	1.3E-04	4.0E-04	8.4E-02	3.6E-02	4.8E-05
Y 90	1.4E-05	9.7E-07	2.4E-06	1.2E-05	2.8E-05	2.3E-08	2.3E-08	7.8E-10
ZR 93	6.3E-08	1.6E-08	2.2E-08	5.5E-08	1.5E-07	1.8E-03	1.4E-04	7.7E-09
NB 93M	3.0E-10	1.6E-12	3.9E-12	2.2E-11	6.5E-11	3.7E-12	1.5E-12	1.5E-13
TC 99	1.3E-06	3.4E-07	5.3E-09	1.6E-08	4.3E-08	3.6E-09	3.6E-09	3.0E-09
RU 106	4.2E-08	1.2E-10	1.4E-10	5.3E-10	1.5E-09	7.3E-11	8.2E-11	4.9E-11
I 129	5.5E-05	1.8E-05	1.5E-05	1.5E-05	1.5E-05	2.0E-05	2.2E-05	1.4E-05
CS 137	7.9E-04	7.8E-04	8.1E-04	8.0E-04	8.1E-04	7.2E-04	7.5E-04	7.9E-04
SM 151	4.2E-06	1.5E-08	3.8E-08	2.1E-07	6.6E-07	1.8E-04	1.4E-05	2.1E-10
AM 241	4.8E-03	9.3E-07	1.2E-06	3.5E-06	8.6E-06	7.2E-01	5.6E-02	1.1E-02
PU 239	1.0E-03	8.9E-08	1.4E-07	5.8E-07	1.7E-06	1.6E-01	1.2E-02	2.4E-03
Total	8.5E-03	2.5E-03	2.5E-03	2.6E-03	2.9E-03	9.7E-01	1.1E-01	1.6E-02

Radionuclide	Ovaries	Muscle	Thyroid	Kidneys	Liver	Spleen
C 14	1.6E-03	1.7E-03	1.6E-03	0.0E+00	0.0E+00	0.0E+00
SR 90	4.8E-05	4.7E-05	4.8E-05	0.0E+00	0.0E+00	0.0E+00
Y 90	7.7E-10	7.5E-10	7.7E-10	0.0E+00	2.3E-08	0.0E+00
ZR 93	1.7E-08	3.8E-08	1.3E-08	0.0E+00	0.0E+00	0.0E+00
NB 93M	3.0E-13	3.1E-13	1.6E-13	2.1E-12	0.0E+00	2.1E-12
TC 99	3.0E-09	3.0E-09	8.2E-08	0.0E+00	4.2E-09	0.0E+00
RU 106	5.3E-11	7.3E-11	6.9E-11	0.0E+00	0.0E+00	0.0E+00
I 129	1.5E-05	3.5E-05	2.5E-01	0.0E+00	0.0E+00	0.0E+00
CS 137	7.3E-04	7.1E-04	7.1E-04	0.0E+00	0.0E+00	0.0E+00
SM 151	2.6E-10	4.0E-10	2.3E-10	0.0E+00	4.7E-05	0.0E+00
AM 241	1.1E-02	8.0E-07	4.5E-07	0.0E+00	1.1E-01	0.0E+00
PU 239	2.4E-03	5.5E-08	5.4E-08	0.0E+00	2.5E-02	0.0E+00
Total	1.6E-02	2.5E-03	2.6E-01	2.1E-12	1.4E-01	2.1E-12

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	1.1E-07
Y 90	6.0E-06
ZR 93	2.3E-13
NB 93M	2.1E-12

TC 99	6.3E-12
RU 106	5.9E-11
I 129	1.8E-05
CS 137	4.3E-04
SM 151	1.0E-11
AM 241	1.2E-08
PU 239	3.3E-11
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Total	4.6E-04

S101
S111
S121
S131

(**)

Worker MEI ~~sett~~ 200, 300, 400
Public MEI at 22km

WESF Continued Operations Emissions				
Stack Height = 70 feet (was 75 ft. in prior communications)			= 21.3 m	
Stack diameter= 3.5 feet			= 1.1 m	
Stack exit velocity 33.4 ft/sec			= 10.2 m/sec	
Stack gas temperature = 20 degrees C			0-	
Volumetric Flow rate 9.17 cubic meters /sec			C,	
Releases occur 365 days/yr, 24 hrs/day				
Stack coordinates = N136433 , E573361				
Isotope	Annual Emission	Average Concentration		
	Ci/yr	uCi/ml		
Sr-90	5.10E-06	1.74E-14		
Cs-137	2.60E-06	8.70E-15		
Pu-239/240	2.40E-07	8.00E-16		
Total Beta	4.70E-09	7.70E-14		
Based on 1994 Emissions , Emissions assumed to be the same for 1997-2006				

Alternative	1.0 No Action		2.0 Long Term Managment		3.0 In Situ Vitrification		4.0 In Situ Gravel and Fill	
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
Construction	NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Operation								
Continued Operations	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE
-Monitor SSTs, DSTs, and MUSTs								
-Operate 242A Evaporator	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE
Retrieval	NOT APPLICABLE		100 m ESE	22 km ESE	NOT APPLICABLE		NOT APPLICABLE	
Evaporate DSTS (a)	NOT APPLICABLE		200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE
Separations	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Vitrify Tank Waste	NOT APPLICABLE		NOT APPLICABLE		300 m ESE	22 km ESE	NOT APPLICABLE	
(or Gravel Fill for Alt4)							100 m ESE	22 km ESE
Process Capsules	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Storage and Disposal	NOT APPLICABLE		NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS	
Monitoring and Maintenance	NOT APPLICABLE		NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS	
Post Remediation								
Closure	NOT APPLICABLE		NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS	
Monitoring of Final Waste Form	NOT APPLICABLE		NOT APPLICABLE		NO EMISSIONS		NO EMISSIONS	

Alternative	6.0 Selective Retrieval		7.0 Extensive Retrieval		8.0 No Separations		9.0 Extensive Separations	
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
Construction	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Operation								
Continued Operations	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE
-Monitor SSTs, DSTs, and MUSTs								
-Operate 242A Evaporator	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE
Retrieval	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE	100 m ESE	22 km ESE
Evaporate DSTS (a)	200 m ESE	22 km ESE	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Separations	INCLUDED IN VITRIFICAT		INCLUDED IN VITRIFICAT		NOT APPLICABLE		INCLUDED IN VITRIFICATIO	
Vitrify Tank Waste	800 m ESE	22 km ESE	800 m ESE	22 km ESE	800 m ESE	22 km ESE	800 m ESE	22 km ESE
(or Gravel Fill for Alt4)	100 m ESE	22 km ESE						
Process Capsules	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Storage and Disposal	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Monitoring and Maintenance	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Post Remediation								
Closure	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	
Monitoring of Final Waste Form	NO EMISSIONS		NO EMISSIONS		NO EMISSIONS		NO EMISSIONS	

Alternative	*10.0 Capsule-No Action*		*11. Capsule-Onsite*		*12.0 Capsule-Overpack*		*13.0 Capsule-Vitrify*	
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI	Worker MEI	Public MEI
Construction	NOT APPLICABLE		NO EMISSIONS		NOT APPLICABLE		NO EMISSIONS	
Operation								
Continued Operations	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
-Monitor SSTs, DSTs, and MUSTs								
-Operate 242A Evaporator	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Retrieval	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Evaporate DSTS (a)	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Separations	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Vitrify Tank Waste	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
(or Gravel Fill for Alt4)								
Process Capsules	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE	200 m ESE	22 km ESE
Storage and Disposal	NOT APPLICABLE		NO EMISSIONS		NOT APPLICABLE		NOT APPLICABLE	
Monitoring and Maintenance	NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE		NOT APPLICABLE	
Post Remediation								
Closure	NOT APPLICABLE		NO EMISSIONS		NOT APPLICABLE		NOT APPLICABLE	
Monitoring of Final Waste Form	NOT APPLICABLE		NO EMISSIONS		NOT APPLICABLE		NOT APPLICABLE	

Convert to liters

Diesel	4,587,800 x 3.788	=	17,378,586
	Say		17.4 MM liters
Gas	2,004,300 x 3.788	=	7,592,288
	Say		7.6 MM liters

Item 106 Contaminated Material
From No PT, Item 9

	No Pretreatment m^3	Factor	TPA Preferred m^3
Concrete (Crushed)	35,930	1^{51}	54,254
Steel (VR)	3,818	1^{56}	5,956
			60,210 m^3
		Say	60 M

Item 107 Transportation of Other Construction Mtrl
From No PT, Item 10

	No Pretreatment Loads	Factor	TPA Preferred Loads
Concrete Sand	7,782	1^{51}	11,751
Constr Consumables	5,000	1^{51}	7,550
			19,301
	Say		19,000
Steel items from Portland and Seattle			
Steel	5,000	1^{56}	7,800
	Say		8,000

Item 107 Construction Equipment
From no PT, Equipment Tables (pgs. 11, 17, 18, 19, 20)

Pg	HDD	LDD	LDG	SGE	Factor	HDD	LDD	LDG	SGE
11	30	2	1	1	1^{53}	41	3	2	2
17	21	4	1	0	1^{51}	32	6	2	0
18	2	22	125	0	1^{50}	3	33	188	0
19	8	64	10	70	1^{50}	12	96	15	105
20	0	50	0	345	1^{50}	0	75	0	518
	61	142	137	416		88	213	207	625
			Say			90	215	210	630

S101, 111, 121, 131

OFFSITE

MEI
- χ/Q 3.4E-8
- Dose 1.3E-9

Pop
- χ/Q 1.7E-3
- Dose 6.3E-5

ONSITE

MEI
- χ/Q 5.4E-7
- Dose 1.9E-8

Pop
- χ/Q 3.7 E-4
- Dose 1.3E-5

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMICSN.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	2.4E-07	0.0E+00	0.0E+00
SR90	4.7E-09	0.0E+00	0.0E+00
SR90	5.1E-06	0.0E+00	0.0E+00
CS137	2.6E-06	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

1.0E+02	Maximum individual distance from release point (m)
1.5E+01	Maximum individual sector index (Wind Toward SE)
2.1E+01	Stack height (m)
9.2E+00	Stack flow (m3/s)
5.3E-01	Stack radius (m)
2.0E+01	Effluent temperaure (degrees C)

Building Wake Model used.
Release from vent or short stack on building roof

0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

5.4E-07 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Capsule) onsite MI - Elevated Release

Executed on: 10/14/95 at 15:39:26

Release period:		1.0
Uptake/exposure period:		1.0
Dose commitment period:		70.0
Dose units:	Rem	

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	5.3E-09	2.5E-01	1.3E-09
Breast	1.2E-11	1.5E-01	1.9E-12
R Marrow	2.8E-08	1.2E-01	3.3E-09
Lung	2.2E-09	1.2E-01	2.7E-10
Thyroid	1.2E-11	3.0E-02	3.7E-13
Bone Sur	3.5E-07	3.0E-02	1.1E-08
Liver	5.4E-08	6.0E-02	3.2E-09
LL Int.	2.5E-11	6.0E-02	1.5E-12
UL Int.	1.7E-11	6.0E-02	1.0E-12
S Int.	1.4E-11	6.0E-02	8.6E-13
Stomach	1.4E-11	6.0E-02	8.2E-13
Internal Effective Dose Equivalent			1.9E-08
External Dose			1.0E-11
Annual Effective Dose Equivalent			1.9E-08

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	1.9E-08
Total Ingestion EDE:	6.6E-13

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	6.8E-10 +	4.7E-10 +	4.5E-10 +	...	=	1.9E-08	
	||	||	||				
Internal Annual Dose	6.8E-10 +	4.7E-10 +	4.5E-10 +	...	=	1.9E-08	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	1.0E-11	0.0E+00	0.0E+00	...		1.0E-11	
	||	||	||			||	
Annual Dose	6.9E-10 +	4.7E-10 +	4.5E-10 +	...	=	1.9E-08	Cumulative Dose
						6.9E-10	Maximum Annual Dose Occurred In Year 1

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Capsule) onsite MI - Elevated Release

Executed on: 10/14/95 at 15:39:26

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	2.2E-09	1.4E-11	1.4E-11	1.7E-11	2.5E-11	3.5E-07	2.8E-08	5.3E-09
Soil Ing	4.7E-14	6.0E-14	7.2E-14	1.7E-13	4.0E-13	9.8E-12	1.7E-12	1.6E-13
Total	2.2E-09	1.4E-11	1.4E-11	1.7E-11	2.5E-11	3.5E-07	2.8E-08	5.3E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	5.3E-09	1.2E-11	1.2E-11	5.4E-08
Soil Ing	1.5E-13	4.6E-14	4.6E-14	1.1E-12
Total	5.3E-09	1.2E-11	1.2E-11	5.4E-08

External Dose by Exposure Pathway

Pathway	
Plume	2.4E-13
Sur Soil	9.8E-12
Total	1.0E-11

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Capsule) onsite MI - Elevated Release

Executed on: 10/14/95 at 15:39:26

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	2.2E-09	1.4E-11	1.4E-11	1.7E-11	2.5E-11	3.5E-07	2.8E-08	5.3E-09
Soil Ing	4.7E-14	6.0E-14	7.2E-14	1.7E-13	4.0E-13	9.8E-12	1.7E-12	1.6E-13
Total	2.2E-09	1.4E-11	1.4E-11	1.7E-11	2.5E-11	3.5E-07	2.8E-08	5.3E-09

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	5.3E-09	1.2E-11	1.2E-11	5.4E-08
Soil Ing	1.5E-13	4.6E-14	4.6E-14	1.1E-12
Total	5.3E-09	1.2E-11	1.2E-11	5.4E-08

External Dose by Exposure Pathway

Pathway	
Plume	2.4E-13
Sur Soil	9.8E-12
Total	1.0E-11

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Capsule) onsite MI - Elevated Release

Executed on: 10/14/95 at 15:39:26

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.1E-12	1.1E-12	1.2E-12	2.8E-12	8.6E-12	1.8E-09	7.9E-10	1.0E-12
Y 90	2.0E-15	7.4E-15	1.8E-14	8.8E-14	2.2E-13	6.0E-18	6.0E-18	2.0E-19
CS 137	1.3E-11	1.2E-11	1.3E-11	1.3E-11	1.3E-11	1.1E-11	1.2E-11	1.3E-11
PU 239	2.2E-09	1.9E-13	3.1E-13	1.3E-12	3.6E-12	3.5E-07	2.7E-08	5.3E-09
Total	2.2E-09	1.4E-11	1.4E-11	1.7E-11	2.5E-11	3.5E-07	2.8E-08	5.3E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.0E-12	1.0E-12	1.0E-12	0.0E+00
Y 90	2.1E-19	2.0E-19	2.0E-19	5.9E-18
CS 137	1.2E-11	1.1E-11	1.1E-11	0.0E+00
PU 239	5.3E-09	1.2E-13	1.2E-13	5.4E-08
Total	5.3E-09	1.2E-11	1.2E-11	5.4E-08

External Dose by Radionuclide

Radionuclide	
SR 90	3.7E-15
Y 90	1.9E-13
CS 137	9.8E-12
PU 239	9.8E-17
Total	1.0E-11

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	4.1E-12	1.1E-12	1.2E-12	2.8E-12	8.6E-12	1.8E-09	7.9E-10	1.0E-12
Y 90	2.0E-15	7.4E-15	1.8E-14	8.8E-14	2.2E-13	6.0E-18	6.0E-18	2.0E-19
CS 137	1.3E-11	1.2E-11	1.3E-11	1.3E-11	1.3E-11	1.1E-11	1.2E-11	1.3E-11
PU 239	2.2E-09	1.9E-13	3.1E-13	1.3E-12	3.6E-12	3.5E-07	2.7E-08	5.3E-09
Total	2.2E-09	1.4E-11	1.4E-11	1.7E-11	2.5E-11	3.5E-07	2.8E-08	5.3E-09

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.0E-12	1.0E-12	1.0E-12	0.0E+00
Y 90	2.1E-19	2.0E-19	2.0E-19	5.9E-18
CS 137	1.2E-11	1.1E-11	1.1E-11	0.0E+00
PU 239	5.3E-09	1.2E-13	1.2E-13	5.4E-08
Total	5.3E-09	1.2E-11	1.2E-11	5.4E-08

External Dose by Radionuclide

Radionuclide	
SR 90	3.7E-15
Y 90	1.9E-13
CS 137	9.8E-12
PU 239	9.8E-17
Total	1.0E-11

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ ROSPOCSN.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

==========

Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
	----Release Terms------		
PU239	2.4E-07	0.0E+00	0.0E+00
SR90	4.7E-09	0.0E+00	0.0E+00
SR90	5.1E-06	0.0E+00	0.0E+00
CS137	2.6E-06	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

2.1E+01	Stack height (m)
9.2E+00	Stack flow (m3/s)
5.3E-01	Stack radius (m)
2.0E+01	Effluent temperaure (degrees C)
	Building Wake Model used.
	Release from vent or short stack on building roof
0.0E+00	Building cross-sectional (vertical) area (m2)

```
0.0E+00    Building height (m)

========== EXTERNAL EXPOSURE ==================================================
 8.8E+03   Hours of exposure to plume
 2.9E+03   Hours of exposure to ground contamination

========== INHALATION =========================================================
 8.8E+03   Hours of inhalation exposure per year
       1   Resuspension model:  1-Mass Loading, 2-Anspaugh
 1.0E-04   Mass loading factor (g/m3)

==============================================================================
```

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

3.7E-04 Population-weighted chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (cAPSULE) onsite Population - Elevated Release

Executed on: 10/14/95 at 15:43:41

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.6E-06	2.5E-01	9.1E-07
Breast	8.5E-09	1.5E-01	1.3E-09
R Marrow	1.9E-05	1.2E-01	2.3E-06
Lung	1.5E-06	1.2E-01	1.8E-07
Thyroid	8.5E-09	3.0E-02	2.5E-10
Bone Sur	2.4E-04	3.0E-02	7.2E-06
Liver	3.7E-05	6.0E-02	2.2E-06
LL Int.	1.8E-08	6.0E-02	1.1E-09
UL Int.	1.2E-08	6.0E-02	6.9E-10
S Int.	9.8E-09	6.0E-02	5.9E-10
Stomach	9.3E-09	6.0E-02	5.6E-10
Internal Effective Dose Equivalent			1.3E-05
External Dose			4.6E-09
Annual Effective Dose Equivalent			1.3E-05

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	1.3E-05
Total Ingestion EDE:	4.5E-10

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (cAPSULE) onsite Population - Elevated Release

Executed on: 10/14/95 at 15:43:41

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	4.7E-07 +	3.2E-07 +	3.1E-07 +	...	=	1.3E-05	
	||	||	||				
Internal Annual Dose	4.7E-07 +	3.2E-07 +	3.1E-07 +	...	=	1.3E-05	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	4.6E-09	0.0E+00	0.0E+00	...		4.6E-09	
	||	||	||			||	
Annual Dose	4.7E-07 +	3.2E-07 +	3.1E-07 +	...	=	1.3E-05	Cumulative Dose
						4.7E-07	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.5E-06	9.3E-09	9.8E-09	1.1E-08	1.7E-08	2.4E-04	1.9E-05	3.6E-06
Soil Ing	3.2E-11	4.1E-11	4.9E-11	1.1E-10	2.7E-10	6.7E-09	1.2E-09	1.1E-10
Total	1.5E-06	9.3E-09	9.8E-09	1.2E-08	1.8E-08	2.4E-04	1.9E-05	3.6E-06

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.6E-06	8.4E-09	8.5E-09	3.7E-05
Soil Ing	1.1E-10	3.2E-11	3.2E-11	7.7E-10
Total	3.6E-06	8.5E-09	8.5E-09	3.7E-05

External Dose by Exposure Pathway

Pathway	
Plume	7.0E-11
Sur Soil	4.5E-09
Total	4.6E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.5E-06	9.3E-09	9.8E-09	1.1E-08	1.7E-08	2.4E-04	1.9E-05	3.6E-06
Soil Ing	3.2E-11	4.1E-11	4.9E-11	1.1E-10	2.7E-10	6.7E-09	1.2E-09	1.1E-10
Total	1.5E-06	9.3E-09	9.8E-09	1.2E-08	1.8E-08	2.4E-04	1.9E-05	3.6E-06

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.6E-06	8.4E-09	8.5E-09	3.7E-05
Soil Ing	1.1E-10	3.2E-11	3.2E-11	7.7E-10
Total	3.6E-06	8.5E-09	8.5E-09	3.7E-05

External Dose by Exposure Pathway

Pathway	
Plume	7.0E-11
Sur Soil	4.5E-09
Total	4.6E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.8E-09	7.8E-10	8.3E-10	1.9E-09	5.9E-09	1.3E-06	5.5E-07	7.2E-10
Y 90	1.4E-10	1.1E-11	2.8E-11	1.4E-10	3.3E-10	2.4E-13	2.4E-13	8.0E-15
CS 137	8.6E-09	8.4E-09	8.8E-09	8.7E-09	8.8E-09	7.8E-09	8.1E-09	8.6E-09
PU 239	1.5E-06	1.3E-10	2.1E-10	8.7E-10	2.5E-09	2.4E-04	1.9E-05	3.6E-06
Total	1.5E-06	9.3E-09	9.8E-09	1.2E-08	1.8E-08	2.4E-04	1.9E-05	3.6E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	7.2E-10	7.0E-10	7.2E-10	0.0E+00
Y 90	7.9E-15	7.8E-15	7.9E-15	2.4E-13
CS 137	7.9E-09	7.7E-09	7.7E-09	0.0E+00
PU 239	3.6E-06	8.3E-11	8.1E-11	3.7E-05
Total	3.6E-06	8.5E-09	8.5E-09	3.7E-05

External Dose by Radionuclide

Radionuclide	
SR 90	1.6E-12
Y 90	9.1E-11
CS 137	4.5E-09
PU 239	3.9E-14
Total	4.6E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.8E-09	7.8E-10	8.3E-10	1.9E-09	5.9E-09	1.3E-06	5.5E-07	7.2E-10
Y 90	1.4E-10	1.1E-11	2.8E-11	1.4E-10	3.3E-10	2.4E-13	2.4E-13	8.0E-15
CS 137	8.6E-09	8.4E-09	8.8E-09	8.7E-09	8.8E-09	7.8E-09	8.1E-09	8.6E-09
PU 239	1.5E-06	1.3E-10	2.1E-10	8.7E-10	2.5E-09	2.4E-04	1.9E-05	3.6E-06
Total	1.5E-06	9.3E-09	9.8E-09	1.2E-08	1.8E-08	2.4E-04	1.9E-05	3.6E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	7.2E-10	7.0E-10	7.2E-10	0.0E+00
Y 90	7.9E-15	7.8E-15	7.9E-15	2.4E-13
CS 137	7.9E-09	7.7E-09	7.7E-09	0.0E+00
PU 239	3.6E-06	8.3E-11	8.1E-11	3.7E-05
Total	3.6E-06	8.5E-09	8.5E-09	3.7E-05

External Dose by Radionuclide

Radionuclide	
SR 90	1.6E-12
Y 90	9.1E-11
CS 137	4.5E-09
PU 239	3.9E-14
Total	4.6E-09

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMICSN.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	2.4E-07	0.0E+00	0.0E+00
SR90	4.7E-09	0.0E+00	0.0E+00
SR90	5.1E-06	0.0E+00	0.0E+00
CS137	2.6E-06	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

2.2E+04	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
2.1E+01	Stack height (m)
9.2E+00	Stack flow (m3/s)
5.3E-01	Stack radius (m)

2.0E+01	Effluent temperaure (degrees C)
	Building Wake Model used.
	Release from vent or short stack on building roof
0.0E+00	Building cross-sectional (vertical) area (m2)
0.0E+00	Building height (m)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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3.4E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Capsule) Offsite MI - Elevated Release

Executed on: 10/14/95 at 15:52:04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.8E-10	2.5E-01	9.4E-11
Breast	2.5E-11	1.5E-01	3.8E-12
R Marrow	2.2E-09	1.2E-01	2.6E-10
Lung	1.6E-10	1.2E-01	2.0E-11
Thyroid	2.5E-11	3.0E-02	7.6E-13
Bone Sur	2.4E-08	3.0E-02	7.2E-10
Liver	3.6E-09	6.0E-02	2.1E-10
LL Int.	1.1E-10	6.0E-02	6.8E-12
UL Int.	5.6E-11	6.0E-02	3.4E-12
S Int.	3.3E-11	6.0E-02	2.0E-12
Stomach	3.0E-11	6.0E-02	1.8E-12
Internal Effective Dose Equivalent			1.3E-09
External Dose			6.3E-13
Annual Effective Dose Equivalent			1.3E-09

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	1.2E-09
Total Ingestion EDE:	1.5E-10

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Capsule) Offsite MI - Elevated Release

Executed on: 10/14/95 at 15:52:04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	8.1E-11 +	3.9E-11 +	3.5E-11 +	...	=	1.3E-09	
	||	||	||				
Internal Annual Dose	8.1E-11 +	3.9E-11 +	3.5E-11 +	...	=	1.3E-09	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	6.3E-13	0.0E+00	0.0E+00	...		6.3E-13	
	||	||	||			||	
Annual Dose	8.2E-11 +	3.9E-11 +	3.5E-11 +	...	=	1.3E-09	Cumulative Dose
						8.2E-11	Maximum Annual Dose Occurred In Year 1

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.4E-10	8.6E-13	9.0E-13	1.1E-12	1.6E-12	2.2E-08	1.7E-09	3.3E-10
Leaf Veg	1.6E-12	2.0E-12	2.4E-12	5.6E-12	1.3E-11	3.4E-10	6.1E-11	5.4E-12
Oth. Veg	2.3E-12	3.2E-12	4.2E-12	1.2E-11	3.1E-11	5.9E-10	1.3E-10	7.7E-12
Fruit	2.4E-12	3.4E-12	4.4E-12	1.3E-11	3.3E-11	6.1E-10	1.4E-10	7.9E-12
Cereals	8.1E-13	1.0E-12	1.3E-12	3.1E-12	7.4E-12	1.7E-10	3.1E-11	2.8E-12
Meat	1.2E-11	1.3E-11	1.3E-11	1.4E-11	1.5E-11	3.2E-11	2.0E-11	1.3E-11
Poultry	9.3E-14	1.0E-13	1.0E-13	1.0E-13	1.1E-13	1.4E-13	1.1E-13	1.0E-13
Cow Milk	5.9E-12	6.5E-12	6.6E-12	7.7E-12	1.1E-11	7.5E-11	3.5E-11	6.4E-12
Eggs	1.8E-14	2.0E-14	2.1E-14	3.2E-14	6.3E-14	7.2E-13	3.0E-13	2.0E-14
Soil Ing	2.9E-15	3.7E-15	4.5E-15	1.0E-14	2.5E-14	6.2E-13	1.1E-13	1.0E-14
Total	1.6E-10	3.0E-11	3.3E-11	5.6E-11	1.1E-10	2.4E-08	2.2E-09	3.8E-10

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.3E-10	7.8E-13	7.8E-13	3.4E-09
Leaf Veg	5.2E-12	1.6E-12	1.6E-12	3.7E-11
Oth. Veg	7.5E-12	2.3E-12	2.3E-12	5.3E-11
Fruit	7.6E-12	2.4E-12	2.4E-12	5.4E-11
Cereals	2.7E-12	8.0E-13	8.0E-13	1.9E-11
Meat	1.2E-11	1.2E-11	1.2E-11	1.9E-14
Poultry	9.3E-14	9.1E-14	9.1E-14	8.0E-17
Cow Milk	5.9E-12	5.8E-12	5.8E-12	2.1E-15
Eggs	1.9E-14	1.8E-14	1.8E-14	7.1E-15
Soil Ing	9.8E-15	2.9E-15	2.9E-15	7.1E-14
Total	3.7E-10	2.5E-11	2.5E-11	3.6E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	5.6E-15
Sur Soil	6.2E-13
Total	6.3E-13

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.4E-10	8.6E-13	9.0E-13	1.1E-12	1.6E-12	2.2E-08	1.7E-09	3.3E-10
Leaf Veg	1.6E-12	2.0E-12	2.4E-12	5.6E-12	1.3E-11	3.4E-10	6.1E-11	5.4E-12
Oth. Veg	2.3E-12	3.2E-12	4.2E-12	1.2E-11	3.1E-11	5.9E-10	1.3E-10	7.7E-12
Fruit	2.4E-12	3.4E-12	4.4E-12	1.3E-11	3.3E-11	6.1E-10	1.4E-10	7.9E-12
Cereals	8.1E-13	1.0E-12	1.3E-12	3.1E-12	7.4E-12	1.7E-10	3.1E-11	2.8E-12
Meat	1.2E-11	1.3E-11	1.3E-11	1.4E-11	1.5E-11	3.2E-11	2.0E-11	1.3E-11
Poultry	9.3E-14	1.0E-13	1.0E-13	1.0E-13	1.1E-13	1.4E-13	1.1E-13	1.0E-13
Cow Milk	5.9E-12	6.5E-12	6.6E-12	7.7E-12	1.1E-11	7.5E-11	3.5E-11	6.4E-12
Eggs	1.8E-14	2.0E-14	2.1E-14	3.2E-14	6.3E-14	7.2E-13	3.0E-13	2.0E-14
Soil Ing	2.9E-15	3.7E-15	4.5E-15	1.0E-14	2.5E-14	6.2E-13	1.1E-13	1.0E-14
Total	1.6E-10	3.0E-11	3.3E-11	5.6E-11	1.1E-10	2.4E-08	2.2E-09	3.8E-10

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	3.3E-10	7.8E-13	7.8E-13	3.4E-09
Leaf Veg	5.2E-12	1.6E-12	1.6E-12	3.7E-11
Oth. Veg	7.5E-12	2.3E-12	2.3E-12	5.3E-11
Fruit	7.6E-12	2.4E-12	2.4E-12	5.4E-11
Cereals	2.7E-12	8.0E-13	8.0E-13	1.9E-11
Meat	1.2E-11	1.2E-11	1.2E-11	1.9E-14
Poultry	9.3E-14	9.1E-14	9.1E-14	8.0E-17
Cow Milk	5.9E-12	5.8E-12	5.8E-12	2.1E-15
Eggs	1.9E-14	1.8E-14	1.8E-14	7.1E-15
Soil Ing	9.8E-15	2.9E-15	2.9E-15	7.1E-14
Total	3.7E-10	2.5E-11	2.5E-11	3.6E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	5.6E-15
Sur Soil	6.2E-13
Total	6.3E-13

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	6.6E-13	9.1E-13	1.4E-12	8.3E-12	3.5E-11	8.5E-10	3.7E-10	4.7E-13
Y 90	2.0E-14	1.7E-12	3.9E-12	2.0E-11	4.8E-11	6.3E-16	6.2E-16	2.1E-17
CS 137	2.5E-11	2.7E-11	2.8E-11	2.8E-11	2.8E-11	2.5E-11	2.5E-11	2.7E-11
PU 239	1.4E-10	6.9E-14	1.6E-13	8.8E-13	2.7E-12	2.3E-08	1.8E-09	3.5E-10
Total	1.6E-10	3.0E-11	3.3E-11	5.6E-11	1.1E-10	2.4E-08	2.2E-09	3.8E-10

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	4.7E-13	4.6E-13	4.7E-13	0.0E+00
Y 90	2.4E-17	2.1E-17	2.1E-17	6.0E-16
CS 137	2.5E-11	2.5E-11	2.5E-11	0.0E+00
PU 239	3.5E-10	7.9E-15	7.8E-15	3.6E-09
Total	3.7E-10	2.5E-11	2.5E-11	3.6E-09

External Dose by Radionuclide

Radionuclide	
SR 90	2.2E-16
Y 90	1.2E-14
CS 137	6.2E-13
PU 239	4.9E-18
Total	6.3E-13

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	6.6E-13	9.1E-13	1.4E-12	8.3E-12	3.5E-11	8.5E-10	3.7E-10	4.7E-13
Y 90	2.0E-14	1.7E-12	3.9E-12	2.0E-11	4.8E-11	6.3E-16	6.2E-16	2.1E-17
CS 137	2.5E-11	2.7E-11	2.8E-11	2.8E-11	2.8E-11	2.5E-11	2.5E-11	2.7E-11
PU 239	1.4E-10	6.9E-14	1.6E-13	8.8E-13	2.7E-12	2.3E-08	1.8E-09	3.5E-10
Total	1.6E-10	3.0E-11	3.3E-11	5.6E-11	1.1E-10	2.4E-08	2.2E-09	3.8E-10

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	4.7E-13	4.6E-13	4.7E-13	0.0E+00
Y 90	2.4E-17	2.1E-17	2.1E-17	6.0E-16
CS 137	2.5E-11	2.5E-11	2.5E-11	0.0E+00
PU 239	3.5E-10	7.9E-15	7.8E-15	3.6E-09
Total	3.7E-10	2.5E-11	2.5E-11	3.6E-09

External Dose by Radionuclide

Radionuclide	
SR 90	2.2E-16
Y 90	1.2E-14
CS 137	6.2E-13
PU 239	4.9E-18
Total	6.3E-13

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPOCSN.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 10 M - Pasquill A - G (1983 - 1991 Average)

==========

	----Release Terms------		
Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
PU239	2.4E-07	0.0E+00	0.0E+00
SR90	4.7E-09	0.0E+00	0.0E+00
SR90	5.1E-06	0.0E+00	0.0E+00
CS137	2.6E-06	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

2.1E+01	Stack height (m)
9.2E+00	Stack flow (m3/s)
5.3E-01	Stack radius (m)
2.0E+01	Effluent temperaure (degrees C)

```
          Building Wake Model used.
          Release from vent or short stack on building roof
0.0E+00   Building cross-sectional (vertical) area (m2)
0.0E+00   Building height (m)

========== EXTERNAL EXPOSURE ==============================================
 8.8E+03  Hours of exposure to plume
 2.9E+03  Hours of exposure to ground contamination

========== INHALATION =====================================================
 8.8E+03  Hours of inhalation exposure per year
       1  Resuspension model:  1-Mass Loading, 2-Anspaugh
 1.0E-04  Mass loading factor (g/m3)

========== INGESTION POPULATION ===========================================
       1  Atmospheric production definition: 1 - Use population-weighted chi/Q
          Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION =====================================
```

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

```
========== ANIMAL FOOD INGESTION ==========================================
```

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

1.7E-03 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.8E-05	2.5E-01	4.5E-06
Breast	9.9E-07	1.5E-01	1.5E-07
R Marrow	9.9E-05	1.2E-01	1.2E-05
Lung	7.9E-06	1.2E-01	9.5E-07
Thyroid	9.9E-07	3.0E-02	3.0E-08
Bone Sur	1.1E-03	3.0E-02	3.4E-05
Liver	1.7E-04	6.0E-02	1.0E-05
LL Int.	3.5E-06	6.0E-02	2.1E-07
UL Int.	1.9E-06	6.0E-02	1.1E-07
S Int.	1.2E-06	6.0E-02	7.5E-08
Stomach	1.2E-06	6.0E-02	6.9E-08
Internal Effective Dose Equivalent			6.3E-05
External Dose			2.2E-08
Annual Effective Dose Equivalent			6.3E-05

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	PU239
Total Inhalation EDE:	5.9E-05
Total Ingestion EDE:	4.1E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	3.4E-06 +	1.8E-06 +	1.6E-06 +	...	=	6.3E-05	
	||	||	||				
Internal Annual Dose	3.4E-06 +	1.8E-06 +	1.6E-06 +	...	=	6.3E-05	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.2E-08	0.0E+00	0.0E+00	...		2.2E-08	
	||	||	||			||	
Annual Dose	3.5E-06 +	1.8E-06 +	1.6E-06 +	...	=	6.3E-05	Cumulative Dose
						3.5E-06	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	7.0E-06	4.3E-08	4.6E-08	5.5E-08	8.4E-08	1.1E-03	8.8E-05	1.7E-05
Leaf Veg	4.0E-08	5.2E-08	6.4E-08	1.6E-07	3.7E-07	8.6E-06	1.6E-06	1.4E-07
Oth. Veg	7.3E-08	1.1E-07	1.4E-07	4.3E-07	1.1E-06	1.9E-05	4.3E-06	2.4E-07
Fruit	2.3E-08	3.4E-08	4.5E-08	1.4E-07	3.5E-07	6.0E-06	1.4E-06	7.7E-08
Cereals	3.7E-08	4.8E-08	5.9E-08	1.4E-07	3.3E-07	7.9E-06	1.4E-06	1.3E-07
Meat	5.4E-07	5.9E-07	5.9E-07	6.3E-07	7.0E-07	1.4E-06	9.1E-07	5.8E-07
Poultry	2.2E-09	2.4E-09	2.5E-09	2.5E-09	2.6E-09	3.4E-09	2.7E-09	2.4E-09
Cow Milk	2.5E-07	2.8E-07	2.9E-07	3.7E-07	5.7E-07	3.3E-06	1.5E-06	2.7E-07
Eggs	6.0E-10	7.2E-10	8.2E-10	1.6E-09	3.4E-09	2.4E-08	9.9E-09	6.7E-10
Soil Ing	1.5E-10	1.9E-10	2.3E-10	5.4E-10	1.3E-09	3.1E-08	5.4E-09	5.0E-10
Total	7.9E-06	1.2E-06	1.2E-06	1.9E-06	3.5E-06	1.1E-03	9.9E-05	1.8E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.7E-05	3.9E-08	3.9E-08	1.7E-04
Leaf Veg	1.3E-07	4.0E-08	4.0E-08	9.5E-07
Oth. Veg	2.4E-07	7.2E-08	7.2E-08	1.7E-06
Fruit	7.5E-08	2.3E-08	2.3E-08	5.3E-07
Cereals	1.2E-07	3.7E-08	3.7E-08	8.9E-07
Meat	5.4E-07	5.3E-07	5.3E-07	8.5E-10
Poultry	2.2E-09	2.2E-09	2.2E-09	1.9E-12
Cow Milk	2.5E-07	2.5E-07	2.5E-07	8.8E-11
Eggs	6.2E-10	5.9E-10	5.9E-10	2.3E-10
Soil Ing	4.8E-10	1.4E-10	1.4E-10	3.5E-09
Total	1.8E-05	9.9E-07	9.9E-07	1.7E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	3.1E-10
Sur Soil	2.1E-08
Total	2.2E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	7.0E-06	4.3E-08	4.6E-08	5.5E-08	8.4E-08	1.1E-03	8.8E-05	1.7E-05
Leaf Veg	4.0E-08	5.2E-08	6.4E-08	1.6E-07	3.7E-07	8.6E-06	1.6E-06	1.4E-07
Oth. Veg	7.3E-08	1.1E-07	1.4E-07	4.3E-07	1.1E-06	1.9E-05	4.3E-06	2.4E-07
Fruit	2.3E-08	3.4E-08	4.5E-08	1.4E-07	3.5E-07	6.0E-06	1.4E-06	7.7E-08
Cereals	3.7E-08	4.8E-08	5.9E-08	1.4E-07	3.3E-07	7.9E-06	1.4E-06	1.3E-07
Meat	5.4E-07	5.9E-07	5.9E-07	6.3E-07	7.0E-07	1.4E-06	9.1E-07	5.8E-07
Poultry	2.2E-09	2.4E-09	2.5E-09	2.5E-09	2.6E-09	3.4E-09	2.7E-09	2.4E-09
Cow Milk	2.5E-07	2.8E-07	2.9E-07	3.7E-07	5.7E-07	3.3E-06	1.5E-06	2.7E-07
Eggs	6.0E-10	7.2E-10	8.2E-10	1.6E-09	3.4E-09	2.4E-08	9.9E-09	6.7E-10
Soil Ing	1.5E-10	1.9E-10	2.3E-10	5.4E-10	1.3E-09	3.1E-08	5.4E-09	5.0E-10
Total	7.9E-06	1.2E-06	1.2E-06	1.9E-06	3.5E-06	1.1E-03	9.9E-05	1.8E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.7E-05	3.9E-08	3.9E-08	1.7E-04
Leaf Veg	1.3E-07	4.0E-08	4.0E-08	9.5E-07
Oth. Veg	2.4E-07	7.2E-08	7.2E-08	1.7E-06
Fruit	7.5E-08	2.3E-08	2.3E-08	5.3E-07
Cereals	1.2E-07	3.7E-08	3.7E-08	8.9E-07
Meat	5.4E-07	5.3E-07	5.3E-07	8.5E-10
Poultry	2.2E-09	2.2E-09	2.2E-09	1.9E-12
Cow Milk	2.5E-07	2.5E-07	2.5E-07	8.8E-11
Eggs	6.2E-10	5.9E-10	5.9E-10	2.3E-10
Soil Ing	4.8E-10	1.4E-10	1.4E-10	3.5E-09
Total	1.8E-05	9.9E-07	9.9E-07	1.7E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	3.1E-10
Sur Soil	2.1E-08
Total	2.2E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.4E-08	2.5E-08	3.8E-08	2.2E-07	9.1E-07	2.5E-05	1.1E-05	1.4E-08
Y 90	3.6E-09	5.0E-08	1.2E-07	5.9E-07	1.5E-06	2.4E-11	2.4E-11	7.9E-13
CS 137	1.0E-06	1.1E-06	1.1E-06	1.1E-06	1.1E-06	9.9E-07	1.0E-06	1.1E-06
PU 239	6.9E-06	2.0E-09	4.5E-09	2.4E-08	7.3E-08	1.1E-03	8.7E-05	1.7E-05
Total	7.9E-06	1.2E-06	1.2E-06	1.9E-06	3.5E-06	1.1E-03	9.9E-05	1.8E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.4E-08	1.4E-08	1.4E-08	0.0E+00
Y 90	8.7E-13	7.8E-13	7.8E-13	2.3E-11
CS 137	9.9E-07	9.8E-07	9.8E-07	0.0E+00
PU 239	1.7E-05	3.9E-10	3.8E-10	1.7E-04
Total	1.8E-05	9.9E-07	9.9E-07	1.7E-04

External Dose by Radionuclide

Radionuclide	
SR 90	7.6E-12
Y 90	4.1E-10
CS 137	2.1E-08
PU 239	1.8E-13
Total	2.2E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
SR 90	2.4E-08	2.5E-08	3.8E-08	2.2E-07	9.1E-07	2.5E-05	1.1E-05	1.4E-08
Y 90	3.6E-09	5.0E-08	1.2E-07	5.9E-07	1.5E-06	2.4E-11	2.4E-11	7.9E-13
CS 137	1.0E-06	1.1E-06	1.1E-06	1.1E-06	1.1E-06	9.9E-07	1.0E-06	1.1E-06
PU 239	6.9E-06	2.0E-09	4.5E-09	2.4E-08	7.3E-08	1.1E-03	8.7E-05	1.7E-05
Total	7.9E-06	1.2E-06	1.2E-06	1.9E-06	3.5E-06	1.1E-03	9.9E-05	1.8E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
SR 90	1.4E-08	1.4E-08	1.4E-08	0.0E+00
Y 90	8.7E-13	7.8E-13	7.8E-13	2.3E-11
CS 137	9.9E-07	9.8E-07	9.8E-07	0.0E+00
PU 239	1.7E-05	3.9E-10	3.8E-10	1.7E-04
Total	1.8E-05	9.9E-07	9.9E-07	1.7E-04

External Dose by Radionuclide

Radionuclide	
SR 90	7.6E-12
Y 90	4.1E-10
CS 137	2.1E-08
PU 239	1.8E-13
Total	2.2E-08

phased implementation								
		x2.8	per yr		x2.8	per yr		
am241	3.26E-06	9.13E-06	9.13E-07	1.44E-03	4.03E-03	4.03E-04		
c14	4.00E+02	1.12E+03	1.12E+02	4.20E+02	1.18E+03	1.18E+02		
cs137	1.87E-02	5.24E-02	5.24E-03	1.04E+00	2.91E+00	2.91E-01		
pu239/240	7.90E-07	2.21E-06	2.21E-07	1.58E-03	4.42E-03	4.42E-04		
sr90	7.20E-04	2.02E-03	2.02E-04	1.60E+00	4.48E+00	4.48E-01		
tc99	9.83E-06	2.75E-05	2.75E-06	9.95E-05	2.79E-04	2.79E-05		
at 100% capacity							10 yr	
		source sep/law				dose/yr	tot dose	risk
am241	3.26E-06	9.13E-06	9.13E-07		onsite pop	7.10E-03	7.10E-02	2.84E-05
c14	4.00E+02	1.12E+03	1.12E+02		onsite me	5.80E-06	5.80E-05	2.32E-08
cs137	1.87E-02	5.24E-02	5.24E-03		offsite pop	3.2	3.20E+01	0.016
pu239/240	7.90E-07	2.21E-06	2.21E-07		offsite me	9.10E-05	9.10E-04	4.55E-07
sr90	7.20E-04	2.02E-03	2.02E-04					
tc99	9.83E-06	2.75E-05	2.75E-06				4 yr	
						dose/yr	tot dose	risk
					onsite pop	7.10E-03	2.84E-02	1.14E-05
					onsite me	5.80E-06	2.32E-05	9.28E-09
					offsite pop	3.2	1.28E+01	0.0064
					offsite me	9.10E-05	3.64E-04	1.82E-07
		source sep/law/hlw					6 yr	
am241	1.44E-03	4.03E-03	4.03E-04			dose/yr	tot dose	risk
c14	4.20E+02	1.18E+03	1.18E+02		onsite pop	2.50E-02	1.50E-01	0.00006
cs137	1.04E+00	2.91E+00	2.91E-01		onsite me	2.00E-05	1.20E-04	4.8E-08
pu239/240	1.58E-03	4.42E-03	4.42E-04		offsite pop	3.7	2.22E+01	0.0111
sr90	1.60E+00	4.48E+00	4.48E-01		offsite me	1.10E-04	6.60E-04	3.3E-07
tc99	9.95E-05	2.79E-04	2.79E-05					

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPOPI1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	9.1E-07	0.0E+00	0.0E+00
C 14	1.1E+02	0.0E+00	0.0E+00
CS137	5.2E-03	0.0E+00	0.0E+00
PU239	2.2E-07	0.0E+00	0.0E+00
SR90	2.0E-04	0.0E+00	0.0E+00
TC99	2.8E-06	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.
4.6E+01 Stack height (m)
1.1E+01 Stack flow (m3/s)

5.0E-01	Stack radius (m)
6.6E+01	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q
	Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

8.0E-04 Population-weighted chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) Offsite Population - Elevated Stack

Executed on: 10/26/95 at 08:07:41

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.2E+00	2.5E-01	8.1E-01
Breast	3.3E+00	1.5E-01	4.9E-01
R Marrow	4.0E+00	1.2E-01	4.8E-01
Lung	3.2E+00	1.2E-01	3.9E-01
Thyroid	3.2E+00	3.0E-02	9.7E-02
Bone Sur	4.0E+00	3.0E-02	1.2E-01
LL Int.	3.2E+00	6.0E-02	1.9E-01
UL Int.	3.2E+00	6.0E-02	1.9E-01
S Int.	3.2E+00	6.0E-02	1.9E-01
Stomach	3.2E+00	6.0E-02	1.9E-01
Liver	4.0E-04	6.0E-02	2.4E-05
Internal Effective Dose Equivalent			3.2E+00
External Dose			2.0E-05
Annual Effective Dose Equivalent			3.2E+00

Controlling Organ:	R Marrow
Controlling Pathway:	Ing
Controlling Radionuclide:	C 14
Total Inhalation EDE:	5.0E-02
Total Ingestion EDE:	3.1E+00

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	3.2E+00 +	7.1E-03 +	2.4E-05 +	...	=	3.2E+00	
	||	||	||				
Internal Annual Dose	3.2E+00 +	7.1E-03 +	2.4E-05 +	...	=	3.2E+00	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.0E-05	0.0E+00	0.0E+00	...		2.0E-05	
	||	||	||			||	
Annual Dose	3.2E+00 +	7.1E-03 +	2.4E-05 +	...	=	3.2E+00	Cumulative Dose
						3.2E+00	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.1E-02	5.1E-02	5.1E-02	5.1E-02	5.1E-02	6.5E-02	6.3E-02	5.1E-02
Leaf Veg	5.1E-02	5.1E-02	5.1E-02	5.1E-02	5.1E-02	6.2E-02	6.3E-02	5.1E-02
Oth. Veg	4.6E-01	4.6E-01	4.6E-01	4.6E-01	4.6E-01	5.7E-01	5.8E-01	4.6E-01
Fruit	2.1E-01	2.1E-01	2.1E-01	2.1E-01	2.1E-01	2.6E-01	2.6E-01	2.1E-01
Cereals	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.3E+00	1.3E+00	1.1E+00
Meat	6.1E-01	6.1E-01	6.1E-01	6.1E-01	6.1E-01	7.5E-01	7.6E-01	6.1E-01
Poultry	6.3E-02	6.3E-02	6.3E-02	6.3E-02	6.3E-02	7.8E-02	7.9E-02	6.3E-02
Cow Milk	5.9E-01	5.9E-01	5.9E-01	5.9E-01	5.9E-01	7.3E-01	7.4E-01	5.9E-01
Eggs	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.4E-01	1.4E-01	1.1E-01
Soil Ing	1.4E-07	1.5E-07	1.5E-07	1.6E-07	1.7E-07	3.5E-07	2.1E-07	1.5E-07
Total	3.2E+00	3.2E+00	3.2E+00	3.2E+00	3.2E+00	4.0E+00	4.0E+00	3.2E+00

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	5.1E-02	5.2E-02	5.1E-02	3.9E-04
Leaf Veg	5.1E-02	5.2E-02	5.1E-02	2.1E-06
Oth. Veg	4.6E-01	4.7E-01	4.6E-01	3.8E-06
Fruit	2.1E-01	2.1E-01	2.1E-01	1.2E-06
Cereals	1.1E+00	1.1E+00	1.1E+00	2.0E-06
Meat	6.1E-01	6.2E-01	6.1E-01	1.6E-08
Poultry	6.3E-02	6.4E-02	6.3E-02	6.0E-12
Cow Milk	5.9E-01	6.0E-01	5.9E-01	6.5E-10
Eggs	1.1E-01	1.1E-01	1.1E-01	7.2E-10
Soil Ing	1.4E-07	1.3E-07	1.3E-07	8.0E-09
Total	3.2E+00	3.3E+00	3.2E+00	4.0E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	4.2E-07
Sur Soil	1.9E-05
Total	2.0E-05

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	5.1E-02	5.1E-02	5.1E-02	5.1E-02	5.1E-02	6.5E-02	6.3E-02	5.1E-02
Leaf Veg	5.1E-02	5.1E-02	5.1E-02	5.1E-02	5.1E-02	6.2E-02	6.3E-02	5.1E-02
Oth. Veg	4.6E-01	4.6E-01	4.6E-01	4.6E-01	4.6E-01	5.7E-01	5.8E-01	4.6E-01
Fruit	2.1E-01	2.1E-01	2.1E-01	2.1E-01	2.1E-01	2.6E-01	2.6E-01	2.1E-01
Cereals	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.1E+00	1.3E+00	1.3E+00	1.1E+00
Meat	6.1E-01	6.1E-01	6.1E-01	6.1E-01	6.1E-01	7.5E-01	7.6E-01	6.1E-01
Poultry	6.3E-02	6.3E-02	6.3E-02	6.3E-02	6.3E-02	7.8E-02	7.9E-02	6.3E-02
Cow Milk	5.9E-01	5.9E-01	5.9E-01	5.9E-01	5.9E-01	7.3E-01	7.4E-01	5.9E-01
Eggs	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.1E-01	1.4E-01	1.4E-01	1.1E-01
Soil Ing	1.4E-07	1.5E-07	1.5E-07	1.6E-07	1.7E-07	3.5E-07	2.1E-07	1.5E-07
Total	3.2E+00	3.2E+00	3.2E+00	3.2E+00	3.2E+00	4.0E+00	4.0E+00	3.2E+00

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	5.1E-02	5.2E-02	5.1E-02	3.9E-04
Leaf Veg	5.1E-02	5.2E-02	5.1E-02	2.1E-06
Oth. Veg	4.6E-01	4.7E-01	4.6E-01	3.8E-06
Fruit	2.1E-01	2.1E-01	2.1E-01	1.2E-06
Cereals	1.1E+00	1.1E+00	1.1E+00	2.0E-06
Meat	6.1E-01	6.2E-01	6.1E-01	1.6E-08
Poultry	6.3E-02	6.4E-02	6.3E-02	6.0E-12
Cow Milk	5.9E-01	6.0E-01	5.9E-01	6.5E-10
Eggs	1.1E-01	1.1E-01	1.1E-01	7.2E-10
Soil Ing	1.4E-07	1.3E-07	1.3E-07	8.0E-09
Total	3.2E+00	3.3E+00	3.2E+00	4.0E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	4.2E-07
Sur Soil	1.9E-05
Total	2.0E-05

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	3.2E+00	3.2E+00	3.2E+00	3.2E+00	3.2E+00	4.0E+00	4.0E+00	3.2E+00
SR 90	4.3E-07	4.6E-07	6.9E-07	4.0E-06	1.7E-05	4.5E-04	1.9E-04	2.5E-07
Y 90	6.5E-08	9.2E-07	2.2E-06	1.1E-05	2.7E-05	4.4E-10	4.3E-10	1.4E-11
TC 99	4.3E-08	5.0E-07	8.8E-09	3.0E-08	8.0E-08	5.4E-09	5.4E-09	4.6E-09
CS 137	9.2E-04	9.9E-04	1.0E-03	1.0E-03	1.0E-03	9.1E-04	9.2E-04	9.9E-04
AM 241	1.3E-05	5.5E-09	1.0E-08	4.9E-08	1.4E-07	2.0E-03	1.6E-04	3.1E-05
PU 239	3.0E-06	8.8E-10	1.9E-09	1.0E-08	3.2E-08	4.9E-04	3.8E-05	7.4E-06
Total	3.2E+00	3.2E+00	3.2E+00	3.2E+00	3.2E+00	4.0E+00	4.0E+00	3.2E+00

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	3.2E+00	3.3E+00	3.2E+00	0.0E+00
SR 90	2.5E-07	2.5E-07	2.5E-07	0.0E+00
Y 90	1.6E-11	1.4E-11	1.4E-11	4.2E-10
TC 99	4.6E-09	4.6E-09	1.2E-07	6.3E-09
CS 137	9.1E-04	9.0E-04	9.0E-04	0.0E+00
AM 241	3.1E-05	2.3E-09	1.3E-09	3.3E-04
PU 239	7.4E-06	1.7E-10	1.7E-10	7.6E-05
Total	3.2E+00	3.3E+00	3.2E+00	4.0E-04

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	1.4E-10
Y 90	7.6E-09
TC 99	1.9E-13
CS 137	2.0E-05
AM 241	2.9E-11
PU 239	8.1E-14
Total	2.0E-05

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	3.2E+00	3.2E+00	3.2E+00	3.2E+00	3.2E+00	4.0E+00	4.0E+00	3.2E+00
SR 90	4.3E-07	4.6E-07	6.9E-07	4.0E-06	1.7E-05	4.5E-04	1.9E-04	2.5E-07
Y 90	6.5E-08	9.2E-07	2.2E-06	1.1E-05	2.7E-05	4.4E-10	4.3E-10	1.4E-11
TC 99	4.3E-08	5.0E-07	8.8E-09	3.0E-08	8.0E-08	5.4E-09	5.4E-09	4.6E-09
CS 137	9.2E-04	9.9E-04	1.0E-03	1.0E-03	1.0E-03	9.1E-04	9.2E-04	9.9E-04
AM 241	1.3E-05	5.5E-09	1.0E-08	4.9E-08	1.4E-07	2.0E-03	1.6E-04	3.1E-05
PU 239	3.0E-06	8.8E-10	1.9E-09	1.0E-08	3.2E-08	4.9E-04	3.8E-05	7.4E-06
Total	3.2E+00	3.2E+00	3.2E+00	3.2E+00	3.2E+00	4.0E+00	4.0E+00	3.2E+00

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	3.2E+00	3.3E+00	3.2E+00	0.0E+00
SR 90	2.5E-07	2.5E-07	2.5E-07	0.0E+00
Y 90	1.6E-11	1.4E-11	1.4E-11	4.2E-10
TC 99	4.6E-09	4.6E-09	1.2E-07	6.3E-09
CS 137	9.1E-04	9.0E-04	9.0E-04	0.0E+00
AM 241	3.1E-05	2.3E-09	1.3E-09	3.3E-04
PU 239	7.4E-06	1.7E-10	1.7E-10	7.6E-05
Total	3.2E+00	3.3E+00	3.2E+00	4.0E-04

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	1.4E-10
Y 90	7.6E-09
TC 99	1.9E-13
CS 137	2.0E-05
AM 241	2.9E-11
PU 239	8.1E-14
Total	2.0E-05

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ ROSPOPI1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
	----Release Terms------		
AM241	9.1E-07	0.0E+00	0.0E+00
C 14	1.1E+02	0.0E+00	0.0E+00
CS137	5.2E-03	0.0E+00	0.0E+00
PU239	2.2E-07	0.0E+00	0.0E+00
SR90	2.0E-04	0.0E+00	0.0E+00
TC99	2.8E-06	0.0E+00	0.0E+00

========= AIR TRANSPORT ==========
Joint frequency data input.

1.6E+01	Stack height (m)
1.1E+01	Stack flow (m3/s)
5.0E-01	Stack radius (m)
7.6E+01	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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1.2E-04 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	7.2E-03	2.5E-01	1.8E-03
Breast	7.3E-03	1.5E-01	1.1E-03
R Marrow	9.0E-03	1.2E-01	1.1E-03
Lung	7.2E-03	1.2E-01	8.6E-04
Thyroid	7.2E-03	3.0E-02	2.2E-04
Bone Sur	9.2E-03	3.0E-02	2.8E-04
LL Int.	7.2E-03	6.0E-02	4.3E-04
S Int.	7.2E-03	6.0E-02	4.3E-04
UL Int.	7.2E-03	6.0E-02	4.3E-04
Stomach	7.2E-03	6.0E-02	4.3E-04
Liver	5.5E-05	6.0E-02	3.3E-06
Internal Effective Dose Equivalent			7.1E-03
External Dose			2.9E-06
Annual Effective Dose Equivalent			7.1E-03

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	C 14
Total Inhalation EDE:	7.1E-03
Total Ingestion EDE:	2.2E-08

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) onsite Population - Elevated Release

Executed on: 10/25/95 at 17:05:03

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	7.0E-03 +	1.7E-05 +	6.1E-07 +	...	=	7.1E-03	
	||	||	||				
Internal Annual Dose	7.0E-03 +	1.7E-05 +	6.1E-07 +	...	=	7.1E-03	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	2.9E-06	0.0E+00	0.0E+00	...		2.9E-06	
	||	||	||			||	
Annual Dose	7.0E-03 +	1.7E-05 +	6.1E-07 +	...	=	7.1E-03	Cumulative Dose
						7.0E-03	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	7.2E-03	7.2E-03	7.2E-03	7.2E-03	7.2E-03	9.2E-03	9.0E-03	7.2E-03
Soil Ing	2.0E-08	2.1E-08	2.2E-08	2.2E-08	2.4E-08	4.8E-08	3.0E-08	2.1E-08
Total	7.2E-03	7.2E-03	7.2E-03	7.2E-03	7.2E-03	9.2E-03	9.0E-03	7.2E-03

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	7.2E-03	7.3E-03	7.2E-03	5.5E-05
Soil Ing	2.0E-08	1.9E-08	1.9E-08	1.1E-09
Total	7.2E-03	7.3E-03	7.2E-03	5.5E-05

External Dose by Exposure Pathway

Pathway	
Plume	7.8E-08
Sur Soil	2.8E-06
Total	2.9E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	7.2E-03	7.2E-03	7.2E-03	7.2E-03	7.2E-03	9.2E-03	9.0E-03	7.2E-03
Soil Ing	2.0E-08	2.1E-08	2.2E-08	2.2E-08	2.4E-08	4.8E-08	3.0E-08	2.1E-08
Total	7.2E-03	7.2E-03	7.2E-03	7.2E-03	7.2E-03	9.2E-03	9.0E-03	7.2E-03

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	7.2E-03	7.3E-03	7.2E-03	5.5E-05
Soil Ing	2.0E-08	1.9E-08	1.9E-08	1.1E-09
Total	7.2E-03	7.3E-03	7.2E-03	5.5E-05

External Dose by Exposure Pathway

Pathway	
Plume	7.8E-08
Sur Soil	2.8E-06
Total	2.9E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	7.2E-03	7.2E-03	7.2E-03	7.2E-03	7.2E-03	8.8E-03	8.9E-03	7.2E-03
SR 90	3.4E-08	9.4E-09	1.0E-08	2.3E-08	7.2E-08	1.5E-05	6.7E-06	8.7E-09
Y 90	2.1E-09	1.6E-10	3.8E-10	1.9E-09	4.6E-09	3.5E-12	3.5E-12	1.2E-13
TC 99	5.5E-09	1.5E-09	2.3E-11	7.1E-11	1.9E-10	1.6E-11	1.6E-11	1.3E-11
CS 137	5.3E-06	5.2E-06	5.4E-06	5.3E-06	5.4E-06	4.8E-06	5.0E-06	5.3E-06
AM 241	1.9E-06	3.6E-10	4.6E-10	1.4E-09	3.3E-09	2.8E-04	2.2E-05	4.3E-06
PU 239	4.3E-07	3.8E-11	6.1E-11	2.5E-10	7.2E-10	6.9E-05	5.3E-06	1.0E-06
Total	7.2E-03	7.2E-03	7.2E-03	7.2E-03	7.2E-03	9.2E-03	9.0E-03	7.2E-03

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	7.2E-03	7.3E-03	7.2E-03	0.0E+00
SR 90	8.7E-09	8.5E-09	8.7E-09	0.0E+00
Y 90	1.1E-13	1.1E-13	1.1E-13	3.5E-12
TC 99	1.3E-11	1.3E-11	3.5E-10	1.8E-11
CS 137	4.9E-06	4.7E-06	4.7E-06	0.0E+00
AM 241	4.2E-06	3.1E-10	1.8E-10	4.5E-05
PU 239	1.0E-06	2.4E-11	2.3E-11	1.1E-05
Total	7.2E-03	7.3E-03	7.2E-03	5.5E-05

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	2.0E-11
Y 90	1.1E-09
TC 99	2.7E-14
CS 137	2.9E-06
AM 241	4.4E-12
PU 239	1.2E-14
Total	2.9E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	7.2E-03	7.2E-03	7.2E-03	7.2E-03	7.2E-03	8.8E-03	8.9E-03	7.2E-03
SR 90	3.4E-08	9.4E-09	1.0E-08	2.3E-08	7.2E-08	1.5E-05	6.7E-06	8.7E-09
Y 90	2.1E-09	1.6E-10	3.8E-10	1.9E-09	4.6E-09	3.5E-12	3.5E-12	1.2E-13
TC 99	5.5E-09	1.5E-09	2.3E-11	7.1E-11	1.9E-10	1.6E-11	1.6E-11	1.3E-11
CS 137	5.3E-06	5.2E-06	5.4E-06	5.3E-06	5.4E-06	4.8E-06	5.0E-06	5.3E-06
AM 241	1.9E-06	3.6E-10	4.6E-10	1.4E-09	3.3E-09	2.8E-04	2.2E-05	4.3E-06
PU 239	4.3E-07	3.8E-11	6.1E-11	2.5E-10	7.2E-10	6.9E-05	5.3E-06	1.0E-06
Total	7.2E-03	7.2E-03	7.2E-03	7.2E-03	7.2E-03	9.2E-03	9.0E-03	7.2E-03

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	7.2E-03	7.3E-03	7.2E-03	0.0E+00
SR 90	8.7E-09	8.5E-09	8.7E-09	0.0E+00
Y 90	1.1E-13	1.1E-13	1.1E-13	3.5E-12
TC 99	1.3E-11	1.3E-11	3.5E-10	1.8E-11
CS 137	4.9E-06	4.7E-06	4.7E-06	0.0E+00
AM 241	4.2E-06	3.1E-10	1.8E-10	4.5E-05
PU 239	1.0E-06	2.4E-11	2.3E-11	1.1E-05
Total	7.2E-03	7.3E-03	7.2E-03	5.5E-05

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	2.0E-11
Y 90	1.1E-09
TC 99	2.7E-14
CS 137	2.9E-06
AM 241	4.4E-12
PU 239	1.2E-14
Total	2.9E-06

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMIPI1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	9.1E-07	0.0E+00	0.0E+00
C 14	1.1E+02	0.0E+00	0.0E+00
CS137	5.2E-03	0.0E+00	0.0E+00
PU239	2.2E-07	0.0E+00	0.0E+00
SR90	2.0E-04	0.0E+00	0.0E+00
TC99	2.8E-06	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

2.2E+04	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
4.6E+01	Stack height (m)

1.1E+01	Stack flow (m3/s)
5.0E-01	Stack radius (m)
6.6E+01	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

==========

1.5E-08 Individual chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	9.3E-05	2.5E-01	2.3E-05
Breast	9.5E-05	1.5E-01	1.4E-05
R Marrow	1.2E-04	1.2E-01	1.4E-05
Lung	9.3E-05	1.2E-01	1.1E-05
Thyroid	9.3E-05	3.0E-02	2.8E-06
Bone Sur	1.1E-04	3.0E-02	3.4E-06
LL Int.	9.3E-05	6.0E-02	5.6E-06
UL Int.	9.3E-05	6.0E-02	5.6E-06
S Int.	9.3E-05	6.0E-02	5.6E-06
Stomach	9.3E-05	6.0E-02	5.6E-06
Liver	7.6E-09	6.0E-02	4.6E-10
Internal Effective Dose Equivalent			9.1E-05
External Dose			5.5E-10
Annual Effective Dose Equivalent			9.1E-05

Controlling Organ:	R Marrow
Controlling Pathway:	Ing
Controlling Radionuclide:	C 14
Total Inhalation EDE:	9.3E-07
Total Ingestion EDE:	9.0E-05

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	9.1E-05 +	2.1E-07 +	6.0E-10 +	...	=	9.1E-05	
	||	||	||				
Internal Annual Dose	9.1E-05 +	2.1E-07 +	6.0E-10 +	...	=	9.1E-05	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	5.5E-10	0.0E+00	0.0E+00	...		5.5E-10	
	||	||	||			||	
Annual Dose	9.1E-05 +	2.1E-07 +	6.0E-10 +	...	=	9.1E-05	Cumulative Dose
						9.1E-05	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.5E-07	9.5E-07	9.5E-07	9.5E-07	9.5E-07	1.2E-06	1.2E-06	9.5E-07
Leaf Veg	1.9E-06	1.9E-06	1.9E-06	1.9E-06	1.9E-06	2.3E-06	2.3E-06	1.9E-06
Oth. Veg	1.4E-05	1.4E-05	1.4E-05	1.4E-05	1.4E-05	1.7E-05	1.7E-05	1.4E-05
Fruit	2.1E-05	2.1E-05	2.1E-05	2.1E-05	2.1E-05	2.5E-05	2.6E-05	2.1E-05
Cereals	2.3E-05	2.3E-05	2.3E-05	2.3E-05	2.3E-05	2.8E-05	2.9E-05	2.3E-05
Meat	1.4E-05	1.4E-05	1.4E-05	1.4E-05	1.4E-05	1.7E-05	1.7E-05	1.4E-05
Poultry	2.5E-06	2.5E-06	2.5E-06	2.5E-06	2.5E-06	3.1E-06	3.2E-06	2.5E-06
Cow Milk	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.6E-05	1.7E-05	1.3E-05
Eggs	3.2E-06	3.2E-06	3.2E-06	3.2E-06	3.2E-06	3.9E-06	3.9E-06	3.2E-06
Soil Ing	2.5E-12	2.8E-12	2.8E-12	2.9E-12	3.1E-12	6.4E-12	3.9E-12	2.8E-12
Total	9.3E-05	9.3E-05	9.3E-05	9.3E-05	9.3E-05	1.1E-04	1.2E-04	9.3E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	9.5E-07	9.7E-07	9.5E-07	7.3E-09
Leaf Veg	1.9E-06	1.9E-06	1.9E-06	8.2E-11
Oth. Veg	1.4E-05	1.4E-05	1.4E-05	1.1E-10
Fruit	2.1E-05	2.1E-05	2.1E-05	1.2E-10
Cereals	2.3E-05	2.4E-05	2.3E-05	4.2E-11
Meat	1.4E-05	1.4E-05	1.4E-05	3.4E-13
Poultry	2.5E-06	2.6E-06	2.5E-06	2.4E-16
Cow Milk	1.3E-05	1.4E-05	1.3E-05	1.4E-14
Eggs	3.2E-06	3.2E-06	3.2E-06	2.0E-14
Soil Ing	2.6E-12	2.5E-12	2.5E-12	1.5E-13
Total	9.3E-05	9.5E-05	9.3E-05	7.6E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	7.5E-12
Sur Soil	5.4E-10
Total	5.5E-10

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.5E-07	9.5E-07	9.5E-07	9.5E-07	9.5E-07	1.2E-06	1.2E-06	9.5E-07
Leaf Veg	1.9E-06	1.9E-06	1.9E-06	1.9E-06	1.9E-06	2.3E-06	2.3E-06	1.9E-06
Oth. Veg	1.4E-05	1.4E-05	1.4E-05	1.4E-05	1.4E-05	1.7E-05	1.7E-05	1.4E-05
Fruit	2.1E-05	2.1E-05	2.1E-05	2.1E-05	2.1E-05	2.5E-05	2.6E-05	2.1E-05
Cereals	2.3E-05	2.3E-05	2.3E-05	2.3E-05	2.3E-05	2.8E-05	2.9E-05	2.3E-05
Meat	1.4E-05	1.4E-05	1.4E-05	1.4E-05	1.4E-05	1.7E-05	1.7E-05	1.4E-05
Poultry	2.5E-06	2.5E-06	2.5E-06	2.5E-06	2.5E-06	3.1E-06	3.2E-06	2.5E-06
Cow Milk	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.3E-05	1.6E-05	1.7E-05	1.3E-05
Eggs	3.2E-06	3.2E-06	3.2E-06	3.2E-06	3.2E-06	3.9E-06	3.9E-06	3.2E-06
Soil Ing	2.5E-12	2.8E-12	2.8E-12	2.9E-12	3.1E-12	6.4E-12	3.9E-12	2.8E-12
Total	9.3E-05	9.3E-05	9.3E-05	9.3E-05	9.3E-05	1.1E-04	1.2E-04	9.3E-05

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	9.5E-07	9.7E-07	9.5E-07	7.3E-09
Leaf Veg	1.9E-06	1.9E-06	1.9E-06	8.2E-11
Oth. Veg	1.4E-05	1.4E-05	1.4E-05	1.1E-10
Fruit	2.1E-05	2.1E-05	2.1E-05	1.2E-10
Cereals	2.3E-05	2.4E-05	2.3E-05	4.2E-11
Meat	1.4E-05	1.4E-05	1.4E-05	3.4E-13
Poultry	2.5E-06	2.6E-06	2.5E-06	2.4E-16
Cow Milk	1.3E-05	1.4E-05	1.3E-05	1.4E-14
Eggs	3.2E-06	3.2E-06	3.2E-06	2.0E-14
Soil Ing	2.6E-12	2.5E-12	2.5E-12	1.5E-13
Total	9.3E-05	9.5E-05	9.3E-05	7.6E-09

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	7.5E-12
Sur Soil	5.4E-10
Total	5.5E-10

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	9.3E-05	9.3E-05	9.3E-05	9.3E-05	9.3E-05	1.1E-04	1.2E-04	9.3E-05
SR 90	1.2E-11	1.6E-11	2.5E-11	1.5E-10	6.1E-10	1.5E-08	6.5E-09	8.2E-12
Y 90	2.9E-13	2.9E-11	6.9E-11	3.5E-10	8.5E-10	1.1E-14	1.1E-14	3.6E-16
TC 99	8.7E-13	2.0E-11	3.5E-13	1.2E-12	3.2E-12	2.2E-13	2.2E-13	1.8E-13
CS 137	2.3E-08	2.5E-08	2.5E-08	2.5E-08	2.5E-08	2.3E-08	2.3E-08	2.5E-08
AM 241	2.5E-10	1.6E-13	3.3E-13	1.7E-12	5.1E-12	3.9E-08	3.0E-09	5.9E-10
PU 239	5.7E-11	2.8E-14	6.6E-14	3.6E-13	1.1E-12	9.4E-09	7.3E-10	1.4E-10
Total	9.3E-05	9.3E-05	9.3E-05	9.3E-05	9.3E-05	1.1E-04	1.2E-04	9.3E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	9.3E-05	9.5E-05	9.3E-05	0.0E+00
SR 90	8.2E-12	8.2E-12	8.2E-12	0.0E+00
Y 90	4.2E-16	3.6E-16	3.6E-16	1.1E-14
TC 99	1.8E-13	1.8E-13	4.7E-12	2.5E-13
CS 137	2.3E-08	2.3E-08	2.3E-08	0.0E+00
AM 241	5.8E-10	4.3E-14	2.4E-14	6.2E-09
PU 239	1.4E-10	3.2E-15	3.2E-15	1.5E-09
Total	9.3E-05	9.5E-05	9.3E-05	7.6E-09

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	3.9E-15
Y 90	2.2E-13
TC 99	5.6E-18
CS 137	5.5E-10
AM 241	7.9E-16
PU 239	2.1E-18
Total	5.5E-10

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	9.3E-05	9.3E-05	9.3E-05	9.3E-05	9.3E-05	1.1E-04	1.2E-04	9.3E-05
SR 90	1.2E-11	1.6E-11	2.5E-11	1.5E-10	6.1E-10	1.5E-08	6.5E-09	8.2E-12
Y 90	2.9E-13	2.9E-11	6.9E-11	3.5E-10	8.5E-10	1.1E-14	1.1E-14	3.6E-16
TC 99	8.7E-13	2.0E-11	3.5E-13	1.2E-12	3.2E-12	2.2E-13	2.2E-13	1.8E-13
CS 137	2.3E-08	2.5E-08	2.5E-08	2.5E-08	2.5E-08	2.3E-08	2.3E-08	2.5E-08
AM 241	2.5E-10	1.6E-13	3.3E-13	1.7E-12	5.1E-12	3.9E-08	3.0E-09	5.9E-10
PU 239	5.7E-11	2.8E-14	6.6E-14	3.6E-13	1.1E-12	9.4E-09	7.3E-10	1.4E-10
Total	9.3E-05	9.3E-05	9.3E-05	9.3E-05	9.3E-05	1.1E-04	1.2E-04	9.3E-05

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	9.3E-05	9.5E-05	9.3E-05	0.0E+00
SR 90	8.2E-12	8.2E-12	8.2E-12	0.0E+00
Y 90	4.2E-16	3.6E-16	3.6E-16	1.1E-14
TC 99	1.8E-13	1.8E-13	4.7E-12	2.5E-13
CS 137	2.3E-08	2.3E-08	2.3E-08	0.0E+00
AM 241	5.8E-10	4.3E-14	2.4E-14	6.2E-09
PU 239	1.4E-10	3.2E-15	3.2E-15	1.5E-09
Total	9.3E-05	9.5E-05	9.3E-05	7.6E-09

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	3.9E-15
Y 90	2.2E-13
TC 99	5.6E-18
CS 137	5.5E-10
AM 241	7.9E-16
PU 239	2.1E-18
Total	5.5E-10

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMIPI1.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

==========

Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	9.1E-07	0.0E+00	0.0E+00
C 14	1.1E+02	0.0E+00	0.0E+00
CS137	5.2E-03	0.0E+00	0.0E+00
PU239	2.2E-07	0.0E+00	0.0E+00
SR90	2.0E-04	0.0E+00	0.0E+00
TC99	2.8E-06	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

4.0E+02	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
4.6E+01	Stack height (m)
1.1E+01	Stack flow (m3/s)
5.0E-01	Stack radius (m)
6.6E+01	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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9.4E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) onsite MI - Elevated Release

Executed on: 10/25/95 at 16:59:25

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	5.9E-06	2.5E-01	1.5E-06
Breast	6.0E-06	1.5E-01	9.0E-07
R Marrow	7.4E-06	1.2E-01	8.9E-07
Lung	5.9E-06	1.2E-01	7.1E-07
Thyroid	5.9E-06	3.0E-02	1.8E-07
Bone Sur	7.6E-06	3.0E-02	2.3E-07
LL Int.	5.9E-06	6.0E-02	3.6E-07
S Int.	5.9E-06	6.0E-02	3.6E-07
UL Int.	5.9E-06	6.0E-02	3.6E-07
Stomach	5.9E-06	6.0E-02	3.6E-07
Liver	4.5E-08	6.0E-02	2.7E-09
Internal Effective Dose Equivalent			5.8E-06
External Dose			3.5E-09
Annual Effective Dose Equivalent			5.8E-06

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	C 14
Total Inhalation EDE:	5.8E-06
Total Ingestion EDE:	1.7E-11

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) onsite MI - Elevated Release

Executed on: 10/25/95 at 16:59:25

Release period:		1.0
Uptake/exposure period:		1.0
Dose commitment period:		70.0
Dose units:	Rem	

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	5.8E-06 +	1.4E-08 +	5.0E-10 +	...	=	5.8E-06	
	||	||	||				
Internal Annual Dose	5.8E-06 +	1.4E-08 +	5.0E-10 +	...	=	5.8E-06	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	3.5E-09	0.0E+00	0.0E+00	...		3.5E-09	
	||	||	||			||	
Annual Dose	5.8E-06 +	1.4E-08 +	5.0E-10 +	...	=	5.8E-06	Cumulative Dose
						5.8E-06	Maximum Annual Dose Occurred In Year 1

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	5.9E-06	5.9E-06	5.9E-06	5.9E-06	5.9E-06	7.3E-06	7.4E-06	5.9E-06
SR 90	2.8E-11	7.8E-12	8.3E-12	1.9E-11	5.9E-11	1.3E-08	5.5E-09	7.2E-12
Y 90	3.5E-14	5.0E-14	1.2E-13	6.0E-13	1.5E-12	7.6E-17	7.5E-17	2.5E-18
TC 99	4.5E-12	1.2E-12	1.9E-14	5.8E-14	1.5E-13	1.3E-14	1.3E-14	1.1E-14
CS 137	4.3E-09	4.2E-09	4.4E-09	4.3E-09	4.4E-09	3.9E-09	4.1E-09	4.3E-09
AM 241	1.5E-09	3.0E-13	3.8E-13	1.1E-12	2.7E-12	2.3E-07	1.8E-08	3.5E-09
PU 239	3.5E-10	3.1E-14	5.0E-14	2.0E-13	5.8E-13	5.6E-08	4.3E-09	8.5E-10
Total	5.9E-06	5.9E-06	5.9E-06	5.9E-06	5.9E-06	7.6E-06	7.4E-06	5.9E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	5.9E-06	6.0E-06	5.9E-06	0.0E+00
SR 90	7.2E-12	7.0E-12	7.2E-12	0.0E+00
Y 90	2.6E-18	2.5E-18	2.5E-18	7.5E-17
TC 99	1.1E-14	1.1E-14	2.9E-13	1.5E-14
CS 137	4.0E-09	3.8E-09	3.8E-09	0.0E+00
AM 241	3.5E-09	2.6E-13	1.4E-13	3.7E-08
PU 239	8.4E-10	1.9E-14	1.9E-14	8.7E-09
Total	5.9E-06	6.0E-06	5.9E-06	4.5E-08

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Radio-nuclide	Inhalation Effective Dose Equivalent	Ingestion Effective Dose Equivalent	External Dose	Internal Effective Dose Equivalent	Annual Effective Dose Equivalent
C 14	5.8E-06	0.0E+00	0.0E+00	5.8E-06	5.8E-06
SR 90	1.0E-09	1.5E-12	2.4E-14	1.0E-09	1.0E-09
Y 90	8.6E-15	1.3E-13	1.3E-12	1.4E-13	1.5E-12
TC 99	6.4E-13	2.7E-16	3.3E-17	6.4E-13	6.4E-13
CS 137	3.9E-09	1.5E-11	3.5E-09	3.9E-09	7.5E-09
AM 241	1.2E-08	2.5E-13	6.6E-15	1.2E-08	1.2E-08
PU 239	3.0E-09	6.1E-14	2.1E-17	3.0E-09	3.0E-09

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ROSMIPI2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	4.0E-04	0.0E+00	0.0E+00
C 14	1.2E+02	0.0E+00	0.0E+00
CS137	2.9E-01	0.0E+00	0.0E+00
PU239	4.4E-04	0.0E+00	0.0E+00
SR90	4.5E-01	0.0E+00	0.0E+00
TC99	2.8E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

4.0E+02	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
4.6E+01	Stack height (m)
1.1E+01	Stack flow (m3/s)
5.0E-01	Stack radius (m)
6.6E+01	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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9.4E-08 Individual chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) onsite MI - Elevated Release

Executed on: 10/25/95 at 17:12:10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	9.8E-06	2.5E-01	2.4E-06
Breast	6.7E-06	1.5E-01	1.0E-06
R Marrow	3.6E-05	1.2E-01	4.3E-06
Lung	8.0E-06	1.2E-01	9.6E-07
Thyroid	6.6E-06	3.0E-02	2.0E-07
Bone Sur	2.4E-04	3.0E-02	7.3E-06
Liver	3.3E-05	6.0E-02	2.0E-06
LL Int.	6.7E-06	6.0E-02	4.0E-07
UL Int.	6.6E-06	6.0E-02	4.0E-07
S Int.	6.6E-06	6.0E-02	4.0E-07
Stomach	6.6E-06	6.0E-02	4.0E-07
Internal Effective Dose Equivalent			2.0E-05
External Dose			1.9E-07
Annual Effective Dose Equivalent			2.0E-05

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	C 14
Total Inhalation EDE:	2.0E-05
Total Ingestion EDE:	4.8E-09

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) onsite MI - Elevated Release

Executed on: 10/25/95 at 17:12:10

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	7.1E-06 +	5.5E-07 +	4.7E-07 +	...	=	2.0E-05	
	||	||	||				
Internal Annual Dose	7.1E-06 +	5.5E-07 +	4.7E-07 +	...	=	2.0E-05	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	1.9E-07	0.0E+00	0.0E+00	...		1.9E-07	
	||	||	||			||	
Annual Dose	7.3E-06 +	5.5E-07 +	4.7E-07 +	...	=	2.0E-05	Cumulative Dose
						7.3E-06	Maximum Annual Dose Occurred In Year 1

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	6.3E-06	6.3E-06	6.3E-06	6.3E-06	6.3E-06	7.8E-06	7.9E-06	6.3E-06
SR 90	6.1E-08	1.7E-08	1.8E-08	4.1E-08	1.3E-07	2.7E-05	1.2E-05	1.5E-08
Y 90	7.9E-11	1.2E-10	2.8E-10	1.4E-09	3.4E-09	1.7E-13	1.7E-13	5.7E-15
TC 99	4.5E-11	1.2E-11	1.9E-13	5.8E-13	1.5E-12	1.3E-13	1.3E-13	1.1E-13
CS 137	2.4E-07	2.4E-07	2.5E-07	2.4E-07	2.5E-07	2.2E-07	2.3E-07	2.4E-07
AM 241	6.7E-07	1.3E-10	1.6E-10	4.8E-10	1.2E-09	1.0E-04	7.8E-06	1.5E-06
PU 239	6.9E-07	6.1E-11	9.8E-11	4.0E-10	1.1E-09	1.1E-04	8.5E-06	1.7E-06
Total	8.0E-06	6.6E-06	6.6E-06	6.6E-06	6.7E-06	2.4E-04	3.6E-05	9.8E-06

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	6.3E-06	6.4E-06	6.3E-06	0.0E+00
SR 90	1.5E-08	1.5E-08	1.5E-08	0.0E+00
Y 90	5.9E-15	5.6E-15	5.7E-15	1.7E-13
TC 99	1.1E-13	1.1E-13	2.9E-12	1.5E-13
CS 137	2.2E-07	2.2E-07	2.2E-07	0.0E+00
AM 241	1.5E-06	1.1E-10	6.3E-11	1.6E-05
PU 239	1.7E-06	3.8E-11	3.7E-11	1.7E-05
Total	9.7E-06	6.7E-06	6.6E-06	3.3E-05

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Radio-nuclide	Inhalation Effective Dose Equivalent	Ingestion Effective Dose Equivalent	External Dose	Internal Effective Dose Equivalent	Annual Effective Dose Equivalent
C 14	6.2E-06	0.0E+00	0.0E+00	6.2E-06	6.2E-06
SR 90	2.3E-06	3.4E-09	5.5E-11	2.3E-06	2.3E-06
Y 90	1.9E-11	3.0E-10	3.1E-09	3.2E-10	3.4E-09
TC 99	6.4E-12	2.7E-15	3.3E-16	6.4E-12	6.4E-12
CS 137	2.2E-07	8.6E-10	1.9E-07	2.2E-07	4.1E-07
AM 241	5.3E-06	1.1E-10	2.9E-12	5.3E-06	5.3E-06
PU 239	5.8E-06	1.2E-10	4.4E-14	5.8E-06	5.8E-06

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 1.090E+04

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\ ROSPOPI2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Onsite Population of the Hanford 200 Area for HWVP - TWRS EIS (Savino 1994)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	4.0E-04	0.0E+00	0.0E+00
C 14	1.2E+02	0.0E+00	0.0E+00
CS137	2.9E-01	0.0E+00	0.0E+00
PU239	4.4E-04	0.0E+00	0.0E+00
SR90	4.5E-01	0.0E+00	0.0E+00
TC99	2.8E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

4.6E+01	Stack height (m)
1.1E+01	Stack flow (m3/s)
5.0E-01	Stack radius (m)
6.6E+01	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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1.2E-04 Population-weighted chi/Q

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.2E-02	2.5E-01	3.0E-03
Breast	8.2E-03	1.5E-01	1.2E-03
R Marrow	4.5E-02	1.2E-01	5.4E-03
Lung	9.9E-03	1.2E-01	1.2E-03
Thyroid	8.1E-03	3.0E-02	2.4E-04
Bone Sur	3.0E-01	3.0E-02	9.1E-03
Liver	4.1E-02	6.0E-02	2.4E-03
LL Int.	8.3E-03	6.0E-02	5.0E-04
UL Int.	8.2E-03	6.0E-02	4.9E-04
S Int.	8.1E-03	6.0E-02	4.9E-04
Stomach	8.1E-03	6.0E-02	4.9E-04
Internal Effective Dose Equivalent			2.5E-02
External Dose			1.6E-04
Annual Effective Dose Equivalent			2.5E-02

Controlling Organ:	Bone Sur
Controlling Pathway:	Inh
Controlling Radionuclide:	C 14
Total Inhalation EDE:	2.5E-02
Total Ingestion EDE:	5.9E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

		Dose Commitment Year 1	2	3	...			
Internal Intake Year:	3			0.0E+00	...			
				+				
	2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
			+	+				
	1	8.8E-03 +	6.9E-04 +	5.9E-04 +	...	=	2.5E-02	
		||	||	||				
Internal Annual Dose		8.8E-03 +	6.9E-04 +	5.9E-04 +	...	=	2.5E-02	Cumulative Internal Dose
		+	+	+			+	
External Annual Dose		1.6E-04	0.0E+00	0.0E+00	...		1.6E-04	
		||	||	||			||	
Annual Dose		9.0E-03 +	6.9E-04 +	5.9E-04 +	...	=	2.5E-02	Cumulative Dose
							9.0E-03	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.9E-03	8.1E-03	8.1E-03	8.2E-03	8.3E-03	3.0E-01	4.5E-02	1.2E-02
Soil Ing	1.1E-06	1.4E-06	1.6E-06	3.4E-06	7.5E-06	5.5E-05	2.2E-05	1.3E-06
Total	9.9E-03	8.1E-03	8.1E-03	8.2E-03	8.3E-03	3.0E-01	4.5E-02	1.2E-02

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.2E-02	8.2E-03	8.1E-03	4.1E-02
Soil Ing	1.2E-06	1.1E-06	1.1E-06	8.5E-07
Total	1.2E-02	8.2E-03	8.1E-03	4.1E-02

External Dose by Exposure Pathway

Pathway	
Plume	4.4E-06
Sur Soil	1.6E-04
Total	1.6E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	9.9E-03	8.1E-03	8.1E-03	8.2E-03	8.3E-03	3.0E-01	4.5E-02	1.2E-02
Soil Ing	1.1E-06	1.4E-06	1.6E-06	3.4E-06	7.5E-06	5.5E-05	2.2E-05	1.3E-06
Total	9.9E-03	8.1E-03	8.1E-03	8.2E-03	8.3E-03	3.0E-01	4.5E-02	1.2E-02

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.2E-02	8.2E-03	8.1E-03	4.1E-02
Soil Ing	1.2E-06	1.1E-06	1.1E-06	8.5E-07
Total	1.2E-02	8.2E-03	8.1E-03	4.1E-02

External Dose by Exposure Pathway

Pathway	
Plume	4.4E-06
Sur Soil	1.6E-04
Total	1.6E-04

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	7.8E-03	7.8E-03	7.8E-03	7.8E-03	7.8E-03	9.6E-03	9.7E-03	7.8E-03
SR 90	7.8E-05	2.1E-05	2.3E-05	5.2E-05	1.6E-04	3.5E-02	1.5E-02	2.0E-05
Y 90	4.7E-06	3.5E-07	8.6E-07	4.2E-06	1.0E-05	7.7E-09	7.7E-09	2.6E-10
TC 99	5.5E-08	1.5E-08	2.3E-10	7.1E-10	1.9E-09	1.6E-10	1.6E-10	1.3E-10
CS 137	3.0E-04	2.9E-04	3.1E-04	3.0E-04	3.1E-04	2.7E-04	2.8E-04	3.0E-04
AM 241	8.1E-04	1.6E-07	2.0E-07	5.8E-07	1.4E-06	1.2E-01	9.4E-03	1.8E-03
PU 239	8.8E-04	7.8E-08	1.2E-07	5.0E-07	1.5E-06	1.4E-01	1.1E-02	2.1E-03
Total	9.9E-03	8.1E-03	8.1E-03	8.2E-03	8.3E-03	3.0E-01	4.5E-02	1.2E-02

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	7.8E-03	8.0E-03	7.8E-03	0.0E+00
SR 90	2.0E-05	1.9E-05	2.0E-05	0.0E+00
Y 90	2.6E-10	2.5E-10	2.6E-10	7.7E-09
TC 99	1.3E-10	1.3E-10	3.5E-09	1.8E-10
CS 137	2.8E-04	2.7E-04	2.7E-04	0.0E+00
AM 241	1.8E-03	1.3E-07	7.5E-08	1.9E-02
PU 239	2.1E-03	4.8E-08	4.7E-08	2.2E-02
Total	1.2E-02	8.2E-03	8.1E-03	4.1E-02

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	4.4E-08
Y 90	2.5E-06
TC 99	2.7E-13
CS 137	1.6E-04
AM 241	1.9E-09
PU 239	2.5E-11
Total	1.6E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	7.8E-03	7.8E-03	7.8E-03	7.8E-03	7.8E-03	9.6E-03	9.7E-03	7.8E-03
SR 90	7.8E-05	2.1E-05	2.3E-05	5.2E-05	1.6E-04	3.5E-02	1.5E-02	2.0E-05
Y 90	4.7E-06	3.5E-07	8.6E-07	4.2E-06	1.0E-05	7.7E-09	7.7E-09	2.6E-10
TC 99	5.5E-08	1.5E-08	2.3E-10	7.1E-10	1.9E-09	1.6E-10	1.6E-10	1.3E-10
CS 137	3.0E-04	2.9E-04	3.1E-04	3.0E-04	3.1E-04	2.7E-04	2.8E-04	3.0E-04
AM 241	8.1E-04	1.6E-07	2.0E-07	5.8E-07	1.4E-06	1.2E-01	9.4E-03	1.8E-03
PU 239	8.8E-04	7.8E-08	1.2E-07	5.0E-07	1.5E-06	1.4E-01	1.1E-02	2.1E-03
Total	9.9E-03	8.1E-03	8.1E-03	8.2E-03	8.3E-03	3.0E-01	4.5E-02	1.2E-02

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	7.8E-03	8.0E-03	7.8E-03	0.0E+00
SR 90	2.0E-05	1.9E-05	2.0E-05	0.0E+00
Y 90	2.6E-10	2.5E-10	2.6E-10	7.7E-09
TC 99	1.3E-10	1.3E-10	3.5E-09	1.8E-10
CS 137	2.8E-04	2.7E-04	2.7E-04	0.0E+00
AM 241	1.8E-03	1.3E-07	7.5E-08	1.9E-02
PU 239	2.1E-03	4.8E-08	4.7E-08	2.2E-02
Total	1.2E-02	8.2E-03	8.1E-03	4.1E-02

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	4.4E-08
Y 90	2.5E-06
TC 99	2.7E-13
CS 137	1.6E-04
AM 241	1.9E-09
PU 239	2.5E-11
Total	1.6E-04

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Individual dose

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSMIPI2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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Release Radio-nuclide	----Release Terms------ Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	4.0E-04	0.0E+00	0.0E+00
C 14	1.2E+02	0.0E+00	0.0E+00
CS137	2.9E-01	0.0E+00	0.0E+00
PU239	4.4E-04	0.0E+00	0.0E+00
SR90	4.5E-01	0.0E+00	0.0E+00
TC99	2.8E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========

Joint frequency data input.

2.2E+04	Maximum individual distance from release point (m)
1.4E+01	Maximum individual sector index (Wind Toward ESE)
4.6E+01	Stack height (m)

1.1E+01	Stack flow (m3/s)
5.0E-01	Stack radius (m)
6.6E+01	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
4.4E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		1.0	3.0E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		5.0	2.2E+02
Fruit	90.0	0	0.0	0.0	2.0		5.0	3.3E+02
Cereals	90.0	0	0.0	0.0	0.8		180.0	8.0E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	8.0E+01	15.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	1.8E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.7E+02	1.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	3.0E+01	1.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

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Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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1.5E-08 Individual chi/Q

Release period:		1.0
Uptake/exposure period:		1.0
Dose commitment period:		70.0
Dose units:	Rem	

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	1.0E-04	2.5E-01	2.6E-05
Breast	1.1E-04	1.5E-01	1.6E-05
R Marrow	1.5E-04	1.2E-01	1.7E-05
Lung	1.0E-04	1.2E-01	1.2E-05
Thyroid	1.0E-04	3.0E-02	3.1E-06
Bone Sur	2.0E-04	3.0E-02	5.9E-06
LL Int.	1.1E-04	6.0E-02	6.4E-06
UL Int.	1.0E-04	6.0E-02	6.3E-06
S Int.	1.0E-04	6.0E-02	6.2E-06
Stomach	1.0E-04	6.0E-02	6.2E-06
Liver	5.6E-06	6.0E-02	3.4E-07
Internal Effective Dose Equivalent			1.1E-04
External Dose			3.1E-08
Annual Effective Dose Equivalent			1.1E-04

Controlling Organ:	Bone Sur
Controlling Pathway:	Ing
Controlling Radionuclide:	C 14
Total Inhalation EDE:	3.2E-06
Total Ingestion EDE:	1.0E-04

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	1.0E-04 +	6.7E-07 +	3.1E-07 +	...	=	1.1E-04	
	||	||	||				
Internal Annual Dose	1.0E-04 +	6.7E-07 +	3.1E-07 +	...	=	1.1E-04	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	3.1E-08	0.0E+00	0.0E+00	...		3.1E-08	
	||	||	||			||	
Annual Dose	1.0E-04 +	6.7E-07 +	3.1E-07 +	...	=	1.1E-04	Cumulative Dose
						1.0E-04	Maximum Annual Dose Occurred In Year 1

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) Offsite MI - Elevated Release

Executed on: 10/26/95 at 08:13:33

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.3E-06	1.1E-06	1.1E-06	1.1E-06	1.1E-06	4.0E-05	5.9E-06	1.6E-06
Leaf Veg	2.2E-06	2.2E-06	2.2E-06	2.3E-06	2.6E-06	6.7E-06	4.3E-06	2.2E-06
Oth. Veg	1.5E-05	1.5E-05	1.5E-05	1.6E-05	1.6E-05	2.9E-05	2.3E-05	1.5E-05
Fruit	2.3E-05	2.3E-05	2.3E-05	2.4E-05	2.5E-05	3.9E-05	3.3E-05	2.3E-05
Cereals	2.5E-05	2.5E-05	2.5E-05	2.5E-05	2.6E-05	3.3E-05	3.2E-05	2.5E-05
Meat	1.5E-05	1.5E-05	1.5E-05	1.5E-05	1.5E-05	1.9E-05	1.9E-05	1.5E-05
Poultry	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	3.4E-06	3.4E-06	2.8E-06
Cow Milk	1.5E-05	1.5E-05	1.5E-05	1.5E-05	1.5E-05	2.1E-05	1.9E-05	1.5E-05
Eggs	3.4E-06	3.4E-06	3.4E-06	3.4E-06	3.4E-06	4.2E-06	4.2E-06	3.4E-06
Soil Ing	1.5E-10	1.8E-10	2.1E-10	4.4E-10	9.9E-10	7.3E-09	3.0E-09	1.7E-10
Total	1.0E-04	1.0E-04	1.0E-04	1.0E-04	1.1E-04	2.0E-04	1.5E-04	1.0E-04

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.6E-06	1.1E-06	1.1E-06	5.3E-06
Leaf Veg	2.2E-06	2.2E-06	2.1E-06	6.0E-08
Oth. Veg	1.5E-05	1.6E-05	1.5E-05	8.5E-08
Fruit	2.3E-05	2.4E-05	2.3E-05	8.5E-08
Cereals	2.5E-05	2.6E-05	2.5E-05	3.0E-08
Meat	1.5E-05	1.5E-05	1.5E-05	1.6E-10
Poultry	2.8E-06	2.8E-06	2.8E-06	1.5E-13
Cow Milk	1.5E-05	1.5E-05	1.5E-05	6.9E-12
Eggs	3.4E-06	3.4E-06	3.4E-06	1.2E-11
Soil Ing	1.6E-10	1.4E-10	1.4E-10	1.1E-10
Total	1.0E-04	1.1E-04	1.0E-04	5.6E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	4.2E-10
Sur Soil	3.1E-08
Total	3.1E-08

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	1.3E-06	1.1E-06	1.1E-06	1.1E-06	1.1E-06	4.0E-05	5.9E-06	1.6E-06
Leaf Veg	2.2E-06	2.2E-06	2.2E-06	2.3E-06	2.6E-06	6.7E-06	4.3E-06	2.2E-06
Oth. Veg	1.5E-05	1.5E-05	1.5E-05	1.6E-05	1.6E-05	2.9E-05	2.3E-05	1.5E-05
Fruit	2.3E-05	2.3E-05	2.3E-05	2.4E-05	2.5E-05	3.9E-05	3.3E-05	2.3E-05
Cereals	2.5E-05	2.5E-05	2.5E-05	2.5E-05	2.6E-05	3.3E-05	3.2E-05	2.5E-05
Meat	1.5E-05	1.5E-05	1.5E-05	1.5E-05	1.5E-05	1.9E-05	1.9E-05	1.5E-05
Poultry	2.8E-06	2.8E-06	2.8E-06	2.8E-06	2.8E-06	3.4E-06	3.4E-06	2.8E-06
Cow Milk	1.5E-05	1.5E-05	1.5E-05	1.5E-05	1.5E-05	2.1E-05	1.9E-05	1.5E-05
Eggs	3.4E-06	3.4E-06	3.4E-06	3.4E-06	3.4E-06	4.2E-06	4.2E-06	3.4E-06
Soil Ing	1.5E-10	1.8E-10	2.1E-10	4.4E-10	9.9E-10	7.3E-09	3.0E-09	1.7E-10
Total	1.0E-04	1.0E-04	1.0E-04	1.0E-04	1.1E-04	2.0E-04	1.5E-04	1.0E-04

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	1.6E-06	1.1E-06	1.1E-06	5.3E-06
Leaf Veg	2.2E-06	2.2E-06	2.1E-06	6.0E-08
Oth. Veg	1.5E-05	1.6E-05	1.5E-05	8.5E-08
Fruit	2.3E-05	2.4E-05	2.3E-05	8.5E-08
Cereals	2.5E-05	2.6E-05	2.5E-05	3.0E-08
Meat	1.5E-05	1.5E-05	1.5E-05	1.6E-10
Poultry	2.8E-06	2.8E-06	2.8E-06	1.5E-13
Cow Milk	1.5E-05	1.5E-05	1.5E-05	6.9E-12
Eggs	3.4E-06	3.4E-06	3.4E-06	1.2E-11
Soil Ing	1.6E-10	1.4E-10	1.4E-10	1.1E-10
Total	1.0E-04	1.1E-04	1.0E-04	5.6E-06

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

External Dose by Exposure Pathway

Pathway	
Plume	4.2E-10
Sur Soil	3.1E-08
Total	3.1E-08

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	1.0E-04	1.0E-04	1.0E-04	1.0E-04	1.0E-04	1.3E-04	1.3E-04	1.0E-04
SR 90	2.6E-08	3.6E-08	5.4E-08	3.3E-07	1.4E-06	3.3E-05	1.4E-05	1.8E-08
Y 90	6.5E-10	6.6E-08	1.6E-07	7.8E-07	1.9E-06	2.5E-11	2.4E-11	8.1E-13
TC 99	8.7E-12	2.0E-10	3.5E-12	1.2E-11	3.2E-11	2.2E-12	2.2E-12	1.8E-12
CS 137	1.3E-06	1.4E-06	1.4E-06	1.4E-06	1.4E-06	1.3E-06	1.3E-06	1.4E-06
AM 241	1.1E-07	7.0E-11	1.4E-10	7.5E-10	2.2E-09	1.7E-05	1.3E-06	2.6E-07
PU 239	1.1E-07	5.6E-11	1.3E-10	7.2E-10	2.2E-09	1.9E-05	1.5E-06	2.9E-07
Total	1.0E-04	1.0E-04	1.0E-04	1.0E-04	1.1E-04	2.0E-04	1.5E-04	1.0E-04

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	1.0E-04	1.0E-04	1.0E-04	0.0E+00
SR 90	1.8E-08	1.8E-08	1.8E-08	0.0E+00
Y 90	9.3E-13	8.1E-13	8.1E-13	2.4E-11
TC 99	1.8E-12	1.8E-12	4.7E-11	2.5E-12
CS 137	1.3E-06	1.2E-06	1.2E-06	0.0E+00
AM 241	2.5E-07	1.9E-11	1.1E-11	2.7E-06
PU 239	2.8E-07	6.5E-12	6.3E-12	2.9E-06
Total	1.0E-04	1.1E-04	1.0E-04	5.6E-06

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	8.9E-12
Y 90	4.8E-10
TC 99	5.6E-17
CS 137	3.1E-08
AM 241	3.4E-13
PU 239	4.1E-15
Total	3.1E-08

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	1.0E-04	1.0E-04	1.0E-04	1.0E-04	1.0E-04	1.3E-04	1.3E-04	1.0E-04
SR 90	2.6E-08	3.6E-08	5.4E-08	3.3E-07	1.4E-06	3.3E-05	1.4E-05	1.8E-08
Y 90	6.5E-10	6.6E-08	1.6E-07	7.8E-07	1.9E-06	2.5E-11	2.4E-11	8.1E-13
TC 99	8.7E-12	2.0E-10	3.5E-12	1.2E-11	3.2E-11	2.2E-12	2.2E-12	1.8E-12
CS 137	1.3E-06	1.4E-06	1.4E-06	1.4E-06	1.4E-06	1.3E-06	1.3E-06	1.4E-06
AM 241	1.1E-07	7.0E-11	1.4E-10	7.5E-10	2.2E-09	1.7E-05	1.3E-06	2.6E-07
PU 239	1.1E-07	5.6E-11	1.3E-10	7.2E-10	2.2E-09	1.9E-05	1.5E-06	2.9E-07
Total	1.0E-04	1.0E-04	1.0E-04	1.0E-04	1.1E-04	2.0E-04	1.5E-04	1.0E-04

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	1.0E-04	1.0E-04	1.0E-04	0.0E+00
SR 90	1.8E-08	1.8E-08	1.8E-08	0.0E+00
Y 90	9.3E-13	8.1E-13	8.1E-13	2.4E-11
TC 99	1.8E-12	1.8E-12	4.7E-11	2.5E-12
CS 137	1.3E-06	1.2E-06	1.2E-06	0.0E+00
AM 241	2.5E-07	1.9E-11	1.1E-11	2.7E-06
PU 239	2.8E-07	6.5E-12	6.3E-12	2.9E-06
Total	1.0E-04	1.1E-04	1.0E-04	5.6E-06

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	8.9E-12
Y 90	4.8E-10
TC 99	5.6E-17
CS 137	3.1E-08
AM 241	3.4E-13
PU 239	4.1E-15
Total	3.1E-08

This is a far-field (wide-scale release, multiple site) scenario.
Release is chronic
Dose to exposed population of 3.759E+05

THE FOLLOWING TRANSPORT MODES ARE CONSIDERED
Air

THE FOLLOWING EXPOSURE PATHS ARE CONSIDERED:
Finite plume, external
Ground, external
Inhalation uptake
Terrestrial foods ingestion
Animal product ingestion
Inadvertent soil ingestion

THE FOLLOWING TIMES ARE USED:

Intake ends after (yr):	1.0
Dose calculations ends after (yr):	70.0
Release ends after (yr):	1.0

========== FILENAMES AND TITLES OF FILES/LIBRARIES USED ==========

Input file name: \GENII\RFSPOPI2.IN
GENII Default Parameter Values (28-Mar-90 RAP)
Radionuclide Library - Times<100 years (23-July-93 PDR)
PNL Food Transfer Factor Library (by Z, with Fr&Os 7/19/93 PDR)
External Dose Factors for GENII in person Sv/yr per Bq/n (8-May-90 R
Worst-Case Solubilities, Yearly Dose Increments (23-Jul-93 PDR)
EXTGAM - Gamma Energies by Group for Finite Plume (13-May-90 RAP)
Population within 80 km of the Hanford 200 Area, 1990 Census (Beck, et al 1991
200 AREA (HMS) - 61 M - Pasquill A - G (1983 - 1991 Average)

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	----Release Terms------		
Release Radio-nuclide	Air Ci/yr	Surface Water Ci/yr	Buried Source Ci/m3
AM241	4.0E-04	0.0E+00	0.0E+00
C 14	1.2E+02	0.0E+00	0.0E+00
CS137	2.9E-01	0.0E+00	0.0E+00
PU239	4.4E-04	0.0E+00	0.0E+00
SR90	4.5E-01	0.0E+00	0.0E+00
TC99	2.8E-05	0.0E+00	0.0E+00

========== AIR TRANSPORT ==========
Joint frequency data input.
4.6E+01 Stack height (m)
1.1E+01 Stack flow (m3/s)

5.0E-01	Stack radius (m)
6.6E+01	Effluent temperaure (degrees C)

========== EXTERNAL EXPOSURE ==========

8.8E+03	Hours of exposure to plume
2.9E+03	Hours of exposure to ground contamination

========== INHALATION ==========

8.8E+03	Hours of inhalation exposure per year
1	Resuspension model: 1-Mass Loading, 2-Anspaugh
1.0E-04	Mass loading factor (g/m3)

========== INGESTION POPULATION ==========

1	Atmospheric production definition: 1 - Use population-weighted chi/Q Food production in region assumed to equal consumption.

========== TERRESTRIAL FOOD INGESTION ==========

FOOD TYPE	GROW TIME d	--IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m2	PROD-UCTION kg/yr	--CONSUMPTION-- HOLDUP d	RATE kg/yr
Leaf Veg	90.0	0	0.0	0.0	1.5		14.0	1.5E+01
Oth. Veg	90.0	0	0.0	0.0	4.0		14.0	1.4E+02
Fruit	90.0	0	0.0	0.0	2.0		14.0	6.4E+01
Cereals	90.0	0	0.0	0.0	0.8		180.0	7.2E+01

========== ANIMAL FOOD INGESTION ==========

FOOD TYPE	---HUMAN---- CONSUMPTION RATE kg/yr	HOLDUP d	TOTAL PROD-UCTION kg/yr	DRINK WATER CONTAM FRACT.	----------STORED FEED---------- DIET FRAC-TION	GROW TIME d	-IRRIGATION-- S *	RATE in/yr	TIME mo/yr	YIELD kg/m3	STOR-AGE d
Meat	7.0E+01	34.0		0.00	0.3	90.00	0	0.0	0.0	0.80	180.0
Poultry	8.5E+00	34.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
Cow Milk	2.3E+02	4.0		0.00	0.3	45.00	0	0.0	0.0	2.00	100.0
Eggs	2.0E+01	18.0		0.00	1.0	90.00	0	0.0	0.0	0.80	180.0
					----------FRESH FORAGE----------						
Meat					0.75	45.0	0	0.0	0.0	2.00	100.0
Cow Milk					0.75	30.0	0	0.0	0.0	1.50	0.0

==========

Input prepared by: _____ Date: _____

Input checked by: _____ Date: _____

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8.0E-04 Population-weighted chi/Q

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) Offsite Population - Elevated Stack

Executed on: 10/26/95 at 08:18:34

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Organ	Committed Dose Equivalent	Weighting Factors	Weighted Dose Equivalent
Gonads	3.6E+00	2.5E-01	9.0E-01
Breast	3.6E+00	1.5E-01	5.5E-01
R Marrow	5.0E+00	1.2E-01	6.0E-01
Lung	3.6E+00	1.2E-01	4.3E-01
Thyroid	3.6E+00	3.0E-02	1.1E-01
Bone Sur	7.3E+00	3.0E-02	2.2E-01
LL Int.	3.7E+00	6.0E-02	2.2E-01
UL Int.	3.6E+00	6.0E-02	2.2E-01
S Int.	3.6E+00	6.0E-02	2.2E-01
Stomach	3.6E+00	6.0E-02	2.2E-01
Liver	2.9E-01	6.0E-02	1.8E-02
Internal Effective Dose Equivalent			3.7E+00
External Dose			1.1E-03
Annual Effective Dose Equivalent			3.7E+00

Controlling Organ:	Bone Sur
Controlling Pathway:	Ing
Controlling Radionuclide:	C 14
Total Inhalation EDE:	1.7E-01
Total Ingestion EDE:	3.5E+00

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

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Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

	Dose Commitment Year 1	2	3	...			
Internal Intake Year: 3			0.0E+00	...			
			+				
2		0.0E+00	0.0E+00	...			Internal Effective Dose Equivalent
		+	+				
1	3.5E+00 +	2.3E-02 +	1.1E-02 +	...	=	3.7E+00	
	||	||	||				
Internal Annual Dose	3.5E+00 +	2.3E-02 +	1.1E-02 +	...	=	3.7E+00	Cumulative Internal Dose
	+	+	+			+	
External Annual Dose	1.1E-03	0.0E+00	0.0E+00	...		1.1E-03	
	||	||	||			||	
Annual Dose	3.5E+00 +	2.3E-02 +	1.1E-02 +	...	=	3.7E+00	Cumulative Dose
						3.5E+00	Maximum Annual Dose Occurred In Year 1

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	7.0E-02	5.7E-02	5.7E-02	5.7E-02	5.8E-02	2.1E+00	3.2E-01	8.5E-02
Leaf Veg	5.7E-02	5.8E-02	5.8E-02	6.2E-02	7.0E-02	1.8E-01	1.1E-01	5.7E-02
Oth. Veg	5.1E-01	5.1E-01	5.1E-01	5.3E-01	5.5E-01	9.7E-01	7.8E-01	5.1E-01
Fruit	2.3E-01	2.3E-01	2.3E-01	2.4E-01	2.5E-01	4.0E-01	3.4E-01	2.3E-01
Cereals	1.2E+00	1.2E+00	1.2E+00	1.2E+00	1.2E+00	1.5E+00	1.5E+00	1.2E+00
Meat	7.0E-01	7.1E-01	7.1E-01	7.1E-01	7.1E-01	8.9E-01	8.9E-01	7.1E-01
Poultry	7.0E-02	7.0E-02	7.0E-02	7.0E-02	7.0E-02	8.6E-02	8.7E-02	7.0E-02
Cow Milk	6.7E-01	6.7E-01	6.7E-01	6.7E-01	6.8E-01	9.4E-01	8.8E-01	6.7E-01
Eggs	1.2E-01	1.2E-01	1.2E-01	1.2E-01	1.2E-01	1.5E-01	1.5E-01	1.2E-01
Soil Ing	7.5E-06	9.3E-06	1.1E-05	2.3E-05	5.2E-05	3.9E-04	1.6E-04	8.7E-06
Total	3.6E+00	3.6E+00	3.6E+00	3.6E+00	3.7E+00	7.3E+00	5.0E+00	3.6E+00

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	8.4E-02	5.8E-02	5.7E-02	2.9E-01
Leaf Veg	5.7E-02	5.8E-02	5.7E-02	1.6E-03
Oth. Veg	5.1E-01	5.2E-01	5.1E-01	2.7E-03
Fruit	2.3E-01	2.4E-01	2.3E-01	8.7E-04
Cereals	1.2E+00	1.2E+00	1.2E+00	1.5E-03
Meat	7.0E-01	7.1E-01	7.0E-01	7.7E-06
Poultry	7.0E-02	7.1E-02	7.0E-02	3.7E-09
Cow Milk	6.7E-01	6.8E-01	6.7E-01	3.6E-07
Eggs	1.2E-01	1.2E-01	1.2E-01	4.2E-07
Soil Ing	8.1E-06	7.4E-06	7.4E-06	5.9E-06
Total	3.6E+00	3.6E+00	3.6E+00	2.9E-01

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	2.3E-05
Sur Soil	1.1E-03
Total	1.1E-03

GENII Dose Calculation Program
(Version 1.485 3-Dec-90)

Case title: Chronic (Phased Imp) Offsite Population - Elevated Stack

Executed on: 10/26/95 at 08:18:34

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Cumulative Internal Dose to Organs by Exposure Pathway

Pathway	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
Inhale	7.0E-02	5.7E-02	5.7E-02	5.7E-02	5.8E-02	2.1E+00	3.2E-01	8.5E-02
Leaf Veg	5.7E-02	5.8E-02	5.8E-02	6.2E-02	7.0E-02	1.8E-01	1.1E-01	5.7E-02
Oth. Veg	5.1E-01	5.1E-01	5.1E-01	5.3E-01	5.5E-01	9.7E-01	7.8E-01	5.1E-01
Fruit	2.3E-01	2.3E-01	2.3E-01	2.4E-01	2.5E-01	4.0E-01	3.4E-01	2.3E-01
Cereals	1.2E+00	1.2E+00	1.2E+00	1.2E+00	1.2E+00	1.5E+00	1.5E+00	1.2E+00
Meat	7.0E-01	7.1E-01	7.1E-01	7.1E-01	7.1E-01	8.9E-01	8.9E-01	7.1E-01
Poultry	7.0E-02	7.0E-02	7.0E-02	7.0E-02	7.0E-02	8.6E-02	8.7E-02	7.0E-02
Cow Milk	6.7E-01	6.7E-01	6.7E-01	6.7E-01	6.8E-01	9.4E-01	8.8E-01	6.7E-01
Eggs	1.2E-01	1.2E-01	1.2E-01	1.2E-01	1.2E-01	1.5E-01	1.5E-01	1.2E-01
Soil Ing	7.5E-06	9.3E-06	1.1E-05	2.3E-05	5.2E-05	3.9E-04	1.6E-04	8.7E-06
Total	3.6E+00	3.6E+00	3.6E+00	3.6E+00	3.7E+00	7.3E+00	5.0E+00	3.6E+00

Pathway	Ovaries	Muscle	Thyroid	Liver
Inhale	8.4E-02	5.8E-02	5.7E-02	2.9E-01
Leaf Veg	5.7E-02	5.8E-02	5.7E-02	1.6E-03
Oth. Veg	5.1E-01	5.2E-01	5.1E-01	2.7E-03
Fruit	2.3E-01	2.4E-01	2.3E-01	8.7E-04
Cereals	1.2E+00	1.2E+00	1.2E+00	1.5E-03
Meat	7.0E-01	7.1E-01	7.0E-01	7.7E-06
Poultry	7.0E-02	7.1E-02	7.0E-02	3.7E-09
Cow Milk	6.7E-01	6.8E-01	6.7E-01	3.6E-07
Eggs	1.2E-01	1.2E-01	1.2E-01	4.2E-07
Soil Ing	8.1E-06	7.4E-06	7.4E-06	5.9E-06
Total	3.6E+00	3.6E+00	3.6E+00	2.9E-01

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

External Dose by Exposure Pathway

Pathway	
Plume	2.3E-05
Sur Soil	1.1E-03
Total	1.1E-03

Release period:	1.0
Uptake/exposure period:	1.0
Dose commitment period:	70.0
Dose units:	Person rem

Committed Dose Equivalent by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	3.5E+00	3.5E+00	3.5E+00	3.5E+00	3.5E+00	4.3E+00	4.4E+00	3.5E+00
SR 90	9.7E-04	1.0E-03	1.6E-03	9.1E-03	3.8E-02	1.0E+00	4.4E-01	5.6E-04
Y 90	1.4E-04	2.1E-03	4.9E-03	2.4E-02	6.0E-02	9.9E-07	9.7E-07	3.2E-08
TC 99	4.3E-07	5.0E-06	8.8E-08	3.0E-07	8.0E-07	5.4E-08	5.4E-08	4.6E-08
CS 137	5.2E-02	5.6E-02	5.6E-02	5.6E-02	5.6E-02	5.1E-02	5.2E-02	5.6E-02
AM 241	5.8E-03	2.4E-06	4.4E-06	2.1E-05	6.3E-05	8.9E-01	6.9E-02	1.4E-02
PU 239	6.0E-03	1.7E-06	3.8E-06	2.0E-05	6.3E-05	9.7E-01	7.5E-02	1.5E-02
Total	3.6E+00	3.6E+00	3.6E+00	3.6E+00	3.7E+00	7.3E+00	5.0E+00	3.6E+00

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	3.5E+00	3.6E+00	3.5E+00	0.0E+00
SR 90	5.6E-04	5.6E-04	5.6E-04	0.0E+00
Y 90	3.6E-08	3.2E-08	3.2E-08	9.5E-07
TC 99	4.6E-08	4.6E-08	1.2E-06	6.3E-08
CS 137	5.1E-02	5.1E-02	5.1E-02	0.0E+00
AM 241	1.3E-02	9.9E-07	5.6E-07	1.4E-01
PU 239	1.5E-02	3.3E-07	3.3E-07	1.5E-01
Total	3.6E+00	3.6E+00	3.6E+00	2.9E-01

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	3.1E-07
Y 90	1.8E-05
TC 99	1.9E-12
CS 137	1.1E-03
AM 241	1.3E-08
PU 239	1.6E-10
Total	1.1E-03

Release period: 1.0
Uptake/exposure period: 1.0
Dose commitment period: 70.0
Dose units: Person rem

Cumulative Internal Dose to Organs by Radionuclide

Radionuclide	Lung	Stomach	S Int.	UL Int.	LL Int.	Bone Su	R Marro	Testes
C 14	3.5E+00	3.5E+00	3.5E+00	3.5E+00	3.5E+00	4.3E+00	4.4E+00	3.5E+00
SR 90	9.7E-04	1.0E-03	1.6E-03	9.1E-03	3.8E-02	1.0E+00	4.4E-01	5.6E-04
Y 90	1.4E-04	2.1E-03	4.9E-03	2.4E-02	6.0E-02	9.9E-07	9.7E-07	3.2E-08
TC 99	4.3E-07	5.0E-06	8.8E-08	3.0E-07	8.0E-07	5.4E-08	5.4E-08	4.6E-08
CS 137	5.2E-02	5.6E-02	5.6E-02	5.6E-02	5.6E-02	5.1E-02	5.2E-02	5.6E-02
AM 241	5.8E-03	2.4E-06	4.4E-06	2.1E-05	6.3E-05	8.9E-01	6.9E-02	1.4E-02
PU 239	6.0E-03	1.7E-06	3.8E-06	2.0E-05	6.3E-05	9.7E-01	7.5E-02	1.5E-02
Total	3.6E+00	3.6E+00	3.6E+00	3.6E+00	3.7E+00	7.3E+00	5.0E+00	3.6E+00

Radionuclide	Ovaries	Muscle	Thyroid	Liver
C 14	3.5E+00	3.6E+00	3.5E+00	0.0E+00
SR 90	5.6E-04	5.6E-04	5.6E-04	0.0E+00
Y 90	3.6E-08	3.2E-08	3.2E-08	9.5E-07
TC 99	4.6E-08	4.6E-08	1.2E-06	6.3E-08
CS 137	5.1E-02	5.1E-02	5.1E-02	0.0E+00
AM 241	1.3E-02	9.9E-07	5.6E-07	1.4E-01
PU 239	1.5E-02	3.3E-07	3.3E-07	1.5E-01
Total	3.6E+00	3.6E+00	3.6E+00	2.9E-01

External Dose by Radionuclide

Radionuclide	
C 14	0.0E+00
SR 90	3.1E-07
Y 90	1.8E-05
TC 99	1.9E-12
CS 137	1.1E-03
AM 241	1.3E-08
PU 239	1.6E-10
Total	1.1E-03