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User's Guide for 10 CFR 61 Impact Analysis Codes

U.S. Nuclear Regulatory Commission

Office of Nuclear Material Safety and Safeguards

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ABSTRACT

This document explains how to use the Impact Analysis Codes used in the Draft Environmental Impact Statement (DEIS) (NUREG-0782, Vol. 1-4) supporting 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The mathematical development of the Impact Analysis Codes and other information necessary to understand the results of using the Codes is contained in the DEIS, and in a supporting document, "Data Base for Radioactive Waste Management" (NUREG/CR-1759, Vol. 1-3).

This document was prepared with the intention of accompanying a computer magnetic tape containing the Impact Analysis Codes. A form is included at the end of this document which can be used to obtain such a tape.

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INTRODUCTION

The tape accompanying this paper contains the five computer programs that performed the impact analysis for the Draft Environmental Impact Statement (DEIS) on 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste" (NUREG-0782, Volumes 1 through 4). Table 1 shows the arrangement of the files on the tape, which includes for each of the programs: the source program and a sample problem input.

The programs were developed for use as batch jobs on Control Data Corporation (CDC) equipment. An attempt has been made to use only ANSI standard FORTRAN IV statements in the programs. However, the rules of operation with CDC equipment were followed, resulting in certain statements and values which may have to be removed or changed for operation on other equipment. For example, the PROGRAM statement at the beginning of each program is unique to CDC, and the format for input/output of character fields using the A specification may not conform to other compiler's requirements.

This paper describes necessary information to execute the programs. Volume 2, Main Report, and Appendices D, G, H, and Q contained in Vols. 3 and 4 of the DEIS; and the supporting document, Data Base for Radioactive Waste Management, Vol. 3, Impacts Analyses Methodology Report (NUREG/CR-1759) are also needed for reference to execute the programs. Specific references to material in these volumes is contained in the following sections.

The listings of the five programs are included as Appendix 1 to this document.

Table 1 Contents of Tape

File name	Description
INTRUDE	INTRUDE source program
INTRUDEPROBLEMINPUT	INTRUDE sample problem input
GRWATER	GRWATER source program
GRWATERPROBLEMINPUT	GRWATER sample problem input
OPTIONS	OPTIONS source program
OPTIONSPROBLEMINPUT	OPTIONS sample problem input
INVERSI	INVERSI source program
INVERSIPROBLEMINPUT	INVERSI sample problem input
INVERSW	INVERSW source program
INVERSWPROBLEMINPUT	INVERSW sample problem input
DATA	Data file containing data associated with the 36 waste streams (the BAS matrix), the 23 radionuclides, and the specific regional sites. (See Table H.12 in the DEIS)
DATAD	Similar to DATA, for use with GRWATER.
NUCS	DATA file without BAS matrix (see page H-21 in the DEIS) for use with INVERSI and INVERSW.
SPECTRUMS	Data file containing ISPC data (waste spectrums described in Table H.5 in the DEIS).

1.0 SET-UP OF DATA FILES

The five impact analysis programs utilize the logical units 1 through 5 according to the assignments in Table 2. Note that logical units 4 and 5 are always used for output and input, respectively.

The contents of data files DATA, DATAD, and NUCS are explained in the text of Appendix H, and particularly in Table H.12 in the DEIS. SPECTRUMS is a data file consisting of the waste form behavior indices (ISPC) for Waste Spectrums 1 to 4 as described in Table H.5 in the DEIS. Appendix G of the DEIS describes the meaning of each of these behavior indices. Detailed explanations of Waste Spectrums 1 to 4 are contained in Appendix D of the DEIS.

Table 2 Assignments for Logical Units

Logical unit (CDC name) / Code name:	Logical unit 1 (TAPE1)	Logical unit 2 (TAPE2)	Logical unit 3 (TAPE3)	Logical unit 4 (TAPE4)	Logical unit 5 (TAPE5)
INTRUDE	DATA	SPECTRUMS	Detailed output from SUBROUTINE RCLAIM	OUTPUT	INPUT
GRWATER	DATAD	SPECTRUMS	Detailed output from SUBROUTINE GWATER	OUTPUT	INPUT
OPTIONS	DATA	SPECTRUMS	Not used	OUTPUT	INPUT
INVERSI	NUCS	Not used	Not used	OUTPUT	INPUT
INVERSW	NUCS	Not used	Not used	OUTPUT	INPUT

2.0 INPUT

Input for the five programs is read in in "sets". The first card for every run will be the number of "sets" of cards to follow, where each "set" will consist of the necessary input to execute the program one time.

Input for an execution of the INTRUDE, GRWATER, and OPTIONS codes generally consists of (1) a title for the execution, (2) an index which indicates which of Spectrums 1 to 4 is desired, (3) the values for the disposal technology indices (IRDC) described in Appendix G of the DEIS, and (4) other necessary indices.

The INVERSE codes do calculations for only one set of waste characteristics at a time. Therefore the information on the waste characteristics of the 36 waste streams in the SPECTRUMS file is not read in. Input for an execution of the INVERSI or INVERSW codes generally consists of (1) a title, (2) the IRDC values, and (3) the waste form behavior index (ISPC) values I4 through I9 for the desired waste characteristics .

3.0 INPUT INDICES

Table 3 shows the IRDC (disposal technology indices) parameters, optional values to choose from, and the explanation of each. These twelve indices are the major inputs for all five codes. Appendix G of the DEIS presents information explaining further what each index means.

Table 4 shows ISPC (waste form behavior indices) parameters I4 through I9, optional values to choose from, and the explanation of each. These six indices are inputs for the two inverse codes. Appendix G of the DEIS explains further the meanings of the index values. (In INTRUDE, GRWATER, and OPTIONS, the ISPC values are input from the SPECTRUMS data file.)

The other indices needed to execute the five impact analysis codes are explained below and summarized in Table 5. Each code does not need every index for execution. Therefore, with each explanation below, the code(s) that use(s) the index is(are) listed, and the table shows the codes that use each index.

The input formats in the next section will demonstrate where the index is in the input fields.

NSPC - this index identifies the desired waste spectrum (1, 2, 3, or 4). It is used in the INTRUDE, GRWATER, and OPTIONS codes.

NBEST - this index is used to take credit in certain calculations within the codes for improvements in the waste form for reducing impacts to inadvertent intruders. NBEST = 1 results in taking the credit, NBEST = 0 does not (refer to Vol. 2 of the DEIS, Section 4.3.4.1). NBEST is used in the INTRUDE, GRWATER, OPTIONS, and INVERSI codes.

NNDX - this index is the total number of waste streams to be removed from the regular impact analysis. It is used in the GRWATER and OPTIONS codes. In the OPTIONS code, streams removed can be excluded from the analysis totally, treated as stabilized, or placed in a high integrity container. NNDX is the total of all of the streams treated differently. In the GRWATER code, NNDX is just the total number excluded from the analysis.

NHIC - this index is used only in the GRWATER code and is the total number of streams to be placed in a high integrity container or stabilized by other means.

NTHIC - this index is used only in the GRWATER code and is the number of years of expected lifetime of the high integrity container.

NOPTW - this index is used only in the GRWATER code and indicates whether the boundary well (NOPTW = 1) or the intruder well (NOPTW = 0) is to be analyzed. The resultant output will show which well was chosen.

In the OPTIONS and GRWATER codes, two input indices (NNDX and NHIC) represent the total numbers of waste streams to be treated in a different manner than the regular analysis. In all the codes, each of the 36 waste streams is identified by the number corresponding to its position in the data file. Table 6 shows the identification number for the waste streams and the description of the streams.

For the special treatments of streams in OPTIONS and GRWATER, these numbers are utilized to identify the streams to be treated differently. An index value is assigned to each stream identifying the treatment it is to receive.

In the OPTIONS code, where only NNDX is used, an index value of "1" is automatically assigned to every stream to indicate regular analysis is to be done for every stream. Then if NNDX is greater than zero (0), the identification number for each stream to receive different treatment is input, and an index value other than "1" to identify the new treatment for the stream, according to the following:

"0" = remove stream from analysis
"2" = place in a high integrity container
"3" = treat as stabilized

In the GRWATER code, "1" is automatically assigned for every stream in the NNDX case to indicate regular treatment. Again if NNDX is greater than zero (0), the stream identification number is input, but the only possible special treatment index is a "0", to remove the stream from the analysis. The option to place a stream in a high integrity container or to stabilize by some other means is handled by the NHIC variable and the following procedure. The index value of "0" is automatically assigned to every stream in GRWATER to indicate that every stream is <u>not</u> in a high integrity container or stabilized. If NHIC is greater than zero (0), the appropriate stream identification number is input with the index value of "1" to identify that the stream <u>is</u> to be placed in a container or a value of "2" identifying that the stream is to be stabilized by some other means.

When NNDX is greater than zero (0) in OPTIONS or GRWATER, the identification number of the streams to receive special treatment is input by the index named IDIFF and the index value identifying the new treatment is input by NDXD (see Table 5).

When NHIC is greater than zero (0) in GRWATER, the identification number of the streams to be placed in a high integrity container, or stabilized, is input by the index named IDIF, and the index value is read in by NHCD (see Table 5).

Table 3 Disposal Technology Indices (IRDC)

Variable	Parameter	Optional values	Explanation
IR	REGION	1	Northeast regional site
		2	Southeast regional site
		3	Midwest regional site
		4	Southwest regional site
		5	Southeast site with clayey soil (slower ground water velocity)
		6	Southeast site with sandy soil (faster ground water velocity)
ID	DESIGN	1	Regular shallow land burial trenches
		2	"Concrete-walled" trenches
IC	COVER	1	Regular cover
		2	"Thick" cover
		3	"Intruder barrier" cover
IX	STABILIZATION	1	No special procedures
		2	Moderately extensive procedures
		3	Very extensive procedures
IE	EMPLACEMENT	1	Random
		2	Stacked
		3	Decontainerized
		4	Random with sand backfill
		5	Stacked with sand backfill
IS	SEGREGATION	0	No segregation
		1	Segregation of unstable waste and waste containing chemical agents
IL	LAYERING	0	No layering
		1	Layering of waste streams
IG	GROUTING	0	No grouting
		1	Grouting of interstices between disposed waste packages
IH	HOT WASTE FACILITY	0	No special disposal of high-activity waste
		1	Special disposal operations for high activity waste

Table 3 (continued)

Variable	Parameter	Optional values	Explanation
ICL*	CARE LEVEL	11	2 year modest closure with low care level
		12	2 year modest closure with moderate care level
		13	2 year modest closure with high care level
		21	4 year complete site restabilization with low care level
		22	4 year complete site restabilization with moderate care level
		23	4 year complete site restabilization with high care level
IPO	POSTOPERATIONAL PERIOD	2-99**	Number of years between cessation of disposal of waste and transfer of title to site owner
IIC	INSTITUTIONAL CONTROL PERIOD	0-999	Number of years between transfer of title to site owner and the assumed loss of institutional controls

*NOTE: The input disposal technology index ICL is a combination of the IQ and ICL indices listed in Table H.1 in the DEIS. The first digit of the two digit input ICL stands for the IQ (therefore, possible values of "1" or "2"), and the second digit for the ICL (therefore, possible values of "1", "2", or "3"). Appendix Q of the DEIS presents information on the meanings of the ICL values.

**IPO must be greater than 2 when care level chosen in the ICL index is for 2 year closure and must be greater than 4 when 4 year closure is chosen.

Table 4 Waste Form Behavior Indices (ISPC)

Variable	Parameter	Optional values	Explanation
I4	FLAMMABILITY	0	Non-flammable
		1	Low flammability
		2	Burns if heat supplied
		3	Flammable
I5	DISPERSIBILITY	0	Near zero
		1	Slight to moderate
		2	Moderate
		3	Severe
I6	LEACHABILITY	1	Unsolidified waste form
		2	Type A solidification
		3	Type B solidification
		4	Type C solidification
I7	CHEMICAL CONTENT	0	No chelating agents or organic chemicals
		1	Chelating agents or organic chemicals likely present
I8	STABILITY	0	Structurally unstable waste form
		1	Structurally stable waste form
I9	ACCESSIBILITY	1	Readily accessible
		2	Moderately accessible
		3	Accessible with difficulty

Table 5 Other Indices for Impacts Codes

Index	Optional values	Explanation	Codes where used
NSPC	1 2 3 4	Identification number of the desired waste spectrum	INTRUDE GRWATER OPTIONS
NBEST	0 1	No credit in waste form for reducing intruder impacts Take credit	INTRUDE GRWATER OPTIONS INVERSI
NNDX	0-36	Total number of waste streams to remove from regular analysis	GRWATER OPTIONS
NHIC	0-36	Total number of waste streams to place in a high integrity container or stabilize	GRWATER
NTHIC	0-1000	Lifetime (in years) of high integrity container	GRWATER
NOPTW	0 1	Intruder well case Boundary well case	GRWATER
		If NNDX > 0 :	
IDIFF	1-36	Identification number of waste streams to remove from regular analysis	GRWATER OPTIONS
NDXD	0 in GRWATER 0, 2, or 3 in OPTIONS	Index value identifying special treatment "0" = remove; "2" = place in high integrity container; "3" = stabilize;	GRWATER OPTIONS
		If NHIC > 0 :	
IDIF	1-36	Identification number of waste streams to place in a high integrity container or stabilize	GRWATER
NHCD	1 or 2	Index value identifying stream treatment "1" = place in a high integrity container "2" = stabilize by other means	GRWATER

Table 6 Waste Streams

Identification Number	Stream	Data file name
1	PWR Ion Exchange Resins	P-IXRESIN
2	PWR Concentrated Liquids	P-CONCLIQ
3	PWR Filter Sludges	P-FSLUDGE
4	PWR Filter Cartridges	P-FCARTRG
5	BWR Ion Exchange Resins	B-IXRESIN
6	BWR Concentrated Liquids	B-CONCLIQ
7	BWR Filter Sludges	B-FSLUDGE
8	PWR Compactible Trash	P-COTRASH
9	PWR Noncompactible Trash	P-NCTRASH
10	BWR Compactible Trash	B-COTRASH
11	BWR Noncompactible Trash	B-NCTRASH
12	Fuel Fabrication Compactible Trash	F-COTRASH
13	Fuel Fabrication Noncompactible Trash	F-NCTRASH
14	Institutional Trash (large facilities)	I-COTRASH
15	Institutional Trash (small facilities)	I+COTRASH
16	Industrial SS* Trash (large facilities)	N-SSTRASH
17	Industrial SS* Trash (small facilities)	N+SSTRASH
18	Industrial Low Trash (large facilities)	N-LOTRASH
19	Industrial Low Trash (small facilities)	N+LOTRASH
20	Fuel Fabrication Process Wastes	F-PROCESS
21	UF_6 Process Wastes	U-PROCESS
22	Institutional LSV** Waste (large facilities)	I-LIQSCVL
23	Institutional LSV** Waste (small facilities)	I+LIQSCVL
24	Institutional Liquid Waste (large facilities)	I-ABSLIQD
25	Institutional Liquid Waste (small facilities)	I+ABSLIQD
26	Institutional Biowaste (large facilities)	I-BIOWAST
27	Institutional Biowaste (small facilities)	I+BIOWAST
28	Industrial SS* Waste	N-SSWASTE
29	Industrial Low Activity Waste	N-LOWASTE
30	LWR Nonfuel Reactor Components	L-NFRCOMP
31	LWR Decontamination Resins	L-DECONRS
32	Waste from Isotope Production Facilities	N-ISOPROD
33	Tritium Production Waste	N-TRITIUM
34	Accelerator Targets	N-TARGETS
35	Sealed Sources	N-SOURCES
36	High Activity Waste	N-HIGHACT

* SS = Source and special nuclear material.

** LSV = Liquid scintillation vial.

4.0 INPUT FORMATS

4.1 INTRUDE

Input for the INTRUDE code begins with a single card indicating the number of executions of the code to be done for the run. This variable is named IREP. Then IREP data sets follow with two cards in each set. The formats are:

Card	Columns	Format	Index	Definition
1	1-2	I2	IREP	Number of executions in the run.

Data sets

Card	Columns	Format	Index	Definition
1	1-20	2A10	NOTE	Title of execution
2	1-2	I2	NSPC	Number of waste spectrum
	3-4	I2	IR	
	5-6	I2	ID	
	7-8	I2	IC	
	9-10	I2	IX	
	11-12	I2	IE	
	13-14	I2	IS	IRDC values
	15-16	I2	IL	
	17-18	I2	IG	
	19-20	I2	IH	
	21-23	I3	ICL	
	24-25	I2	IPO	
	26-29	I4	IIC	
	30-31	I2	NBEST	Credit for waste form to reduce intruder impacts

4.2 GRWATER

Input for the GRWATER code begins with a single card indicating the number of executions, read in as variable IREP. Then IREP data sets follow with a title card and a card that includes all the necessary indices. If NNDX is greater than zero, then NNDX cards follow with the stream identification number and index value indicating the stream is being removed from analysis. If NHIC is greater than zero, then NHIC cards follow with the stream identification number and the index value showing those streams are to be placed in a high integrity container (HIC) or stabilized. If both NNDX and NHIC are zero, then no cards are needed after the 2nd card of the Data set. The formats are:

Card	Columns	Format	Index	Definition
1	1-2	I2	IREP	Number of executions in the run

Data sets

Card	Columns	Format	Index	Definition
1	1-20	2A10	NOTE	Title of execution
2	1-2	I2	NSPC	Number of waste spectrum
	3-4	I2	IR	
	5-6	I2	ID	
	7-8	I2	IC	
	9-10	I2	IX	
	11-12	I2	IE	
	13-14	I2	IS	IRDC values
	15-16	I2	IL	
	17-18	I2	IG	
	19-20	I2	IH	
	21-23	I3	ICL	
	24-25	I2	IPO	
	26-29	I4	IIC	
	30-31	I2	NNDX	Number of streams being excluded
	32-33	I2	NHIC	Number of streams to go in HIC or stabilized
	34-37	I4	NTHIC	Lifetime of HIC (years)
	38-39	I2	NOPTW	Choice of well, boundary or intruder
	40-41	I2	NBEST	Credit for waste form to reduce intruder impacts

If NNDX > 0, then NNDX cards follow with the format:

Card	Columns	Format	Index	Definition
All	1-2	I2	IDIFF	Identification number of stream to be excluded from analysis
	3-4	I2	NDXD	(Always use a "0") where "0" = removal from analysis

If NHIC > 0, then NHIC cards follow with the format:

Card	Columns	Format	Index	Definition
All	1-2	I2	IDIF	Identification number of stream to go in an HIC, or to stabilize
	3-4	I2	NHCD	Index to identify treatment ("1" or "2")

4.3 OPTIONS

Input for the OPTIONS code begins with the card indicating IREP, the number of executions. Then IREP data sets follow with a title card and a card with all the indices needed to execute. If NNDX is greater than zero, NNDX cards follow with the waste stream identification number and the index value indicating the special treatment for that stream to receive. If NHIC is zero, then no cards are needed after the second card of the Data set. The formats are:

Card	Columns	Format	Index	Definition
1	1-2	I2	IREP	Number of executions in the run

Data sets

Card	Columns	Format	Index	Definition
1	1-20	2A10	NOTE	Title of execution
2	1-2	I2	NSPC	Number of waste spectrum
	3-4	I2	IR	
	5-6	I2	ID	
	7-8	I2	IC	
	9-10	I2	IX	
	11-12	I2	IE	
	13-14	I2	IS	IRDC values
	15-16	I2	IL	
	17-18	I2	IG	
	19-20	I2	IH	
	21-23	I3	ICL	
	24-25	I2	IPO	
	26-29	I4	IIC	
	30-31	I2	NNDX	Number of streams for special treatments
	32-33	I2	NBEST	Credit for waste form to reduce intruder impacts

If NNDX > 0, then NNDX cards follow with the format:

Card	Column	Format	Index	Definition
All	1-2	I2	IDIFF	Identification number of stream to be specially treated
	3-4	I2	NDXD	Index to identify special treatment ("0", "2", or "3")

4.4 INVERSI

Input for the INVERSI code begins with the card indicating the number of executions of the code to perform. Then IREP data sets follow, each set containing 3 cards. The formats are:

Card	Columns	Format	Index	Definition
1	1-2	I2	IREP	Number of executions in the run

Data Sets

Card	Columns	Format	Index	Definition
1	1-20	2A10	NOTE	Title of execution
2	1-2	I2	IR	
	3-4	I2	ID	
	5-6	I2	IC	
	7-8	I2	IX	
	9-10	I2	IE	
	11-12	I2	IS	
	13-14	I2	IL	IRDC values
	15-16	I2	IG	
	17-18	I2	IH	
	19-21	I3	ICL	
	22-23	I2	IPO	
	24-27	I4	IIC	
	28-29	I2	NBEST	Credit for waste form to reduce intruder impacts
3	1-2	I2	I4	
	3-4	I2	I5	
	5-6	I2	I6	
	7-8	I2	I7	ISPC values
	9-10	I2	I8	
	11-12	I2	I9	

4.5 INVERSW

Input for the INVERSW code begins with the card indicating the number of executions, followed by IREP data sets with 3 cards in each set. The formats are:

Card	Columns	Format	Index	Definition
1	1-2	I2	IREP	Number of executions in run

Data Sets

Card	Columns	Format	Index	Definition
1	1-20	2A10	NOTE	Title of execution
2	1-2	I2	IR	
	3-4	I2	ID	
	5-6	I2	IC	
	7-8	I2	IX	
	9-10	I2	IE	
	11-12	I2	IS	
	13-14	I2	IL	IRDC values
	15-16	I2	IG	
	17-18	I2	IH	
	19-21	I3	ICL	
	22-23	I2	IPO	
	24-27	I4	IIC	
3	1-2	I2	I4	
	3-4	I2	I5	
	5-6	I2	I6	
	7-8	I2	I7	ISPC values
	9-10	I2	I8	
	11-12	I2	I9	

5.0 EXAMPLE INPUT DECKS

Sections 5.1 to 5.5 presented here illustrate typical input decks for the five programs. See Sections 7.1 to 7.5 for example problems and input decks that can be used to actually run the programs.

5.1 INTRUDE

Figure 1 shows a typical input set-up for a run of the INTRUDE code. The run is for 2 executions of the code.

```
                  123456789 123456789 123456789 123456789 - (column numbers)

     card 1 -  2
data set 1 - example input 1
               1 2 1 1 1 1 0 0 0 0 21 2 100 0
data set 2 - example input 2
               3 2 1 0 1 1 0 0 1 0 22 2 100 1
```

Figure 1 - Sample Input Deck for INTRUDE

5.2 GRWATER

Figure 2 shows a typical input deck for a run of the GRWATER code. The run is for 2 executions of the code. In the second execution, NNDX is 1 and NHIC is 2. Therefore, 3 more lines follow, the first indicates that waste stream No. 36 (N-HIGHACT) is removed from the analysis, and the second and third show that streams Nos. 1 and 5 (P-IXRESIN and B-IXRESIN) are placed in a high integrity container.

```
                  123456789 123456789 123456789 123456789 12345 - (column numbers)

     card 1 -  2
data set 1 - example input 1
               1 4 1 1 1 1 0 0 0 0 13 2 100 0 0 000 1 1
data set 2 - example input 2
               1 1 2 1 1 1 1 0 1 0 22 2 100 1 2 100 0 0
              36 0
               1 1
               5 1
```

Figure 2 - Sample Input Deck for GRWATER

5.3 OPTIONS

Figure 3 shows a typical input set-up for a run of the OPTIONS code. The run is for 2 executions of the code. In the second execution, NNDX is 2, therefore 2 lines follow. In the first, stream 36 is designated to be removed from the analysis (index value = "0"), and stream 5 is to be placed in a high integrity container (index value = "2").

```
                    123456789 123456789 123456789 123456789 - (column numbers)

        card 1 -  2
data set 1 - example input 1
              1 2 1 1 1 1 0 0 0 0 13 2 100 0 0
data set 2 - example input 2
              2 2 1 1 1 1 0 0 0 0 13 2 100 2 1
             36 0
              5 2
```

Figure 3 - Sample Input Deck for OPTIONS

5.4 INVERSI

Figure 4 shows a typical input deck for a run of the INVERSI code for 2 executions of the code.

```
                    123456789 123456789 123456789 123456789 - (column numbers)

        card 1 -  2
data set 1 - example input 1
              2 1 1 1 1 0 0 0 0 13 2 100 0
              1 3 1 0 1 1
data set 2 - example input 2
              2 1 1 1 1 0 0 0 0 13 2 100 0
              1 2 1 0 0 1
```

Figure 4 - Sample Input Deck for INVERSI

5.5 INVERSW

Figure 5 shows a typical input set-up for a run of the INVERSW code for 2 executions.

```
                    123456789 123456789 123456789 123456789 - (column numbers)

        card 1 -  2
data set 1 - example input 1
              2 1 1 1 1 0 0 0 0 12 2 100
              3 2 1 0 0 1
data set 2 - example input 2
              2 1 1 1 1 0 0 0 0 12 2 100
              1 2 1 0 0 1
```

Figure 5 - Sample Input Deck for INVERSW

6.0 DATA STATEMENTS

Most of the data used in the impact analysis codes is read in from the data files DATA, DATAD, NUCS, and SPECTRUMS. However, some of the necessary information is input by the use of DATA statements within specific codes. DATA statements were used to read in the dose limitation criteria (DLC) in the GRWATER and OPTIONS codes and the waste stream groupings (IGRP) in the INTRUDE code. The information read in through these DATA statements was utilized for a large number of runs, and then was changed and the new numbers were manipulated many times. The alternate values for these variables are preserved in the codes as DATA statements with a "C" in the first column, making them comment lines.

In the case of the DLC's, the currently active values are the dose limitations defined by the NCRP for exposure to individuals. The alternate values presented are dose limitations defined by the EPA (40 CFR 190) and by the NRC for occupational exposure (10 CFR 20). If calculations are required with alternate dose limitations, "comment-out" the NCRP DATA statement, and activate the chosen DLC DATA line by removing the "C" from column 1.

In the case of the waste stream groupings, the output for analysis using the INTRUDE code for individual streams becomes voluminous. Therefore, stream groupings were made to aid in decreasing the size of the output so that many runs could be made. These groupings are discussed in Section 4.3.3.1 of the DEIS, and the IGRP DATA statements that are "commented-out" are the statements that contain the information necessary to group the streams as done in the DEIS. If this grouping is desired, "comment-out" the currently active DATA line, (the individual stream analysis), and activate the DATA statement with the desired grouping.

7.0 SAMPLE PROBLEMS

The following sections present sample problems to illustrate the use of each of the impacts codes. The problems are actual runs made for the preparation of the DEIS and further information may be found in the cited sections for each problem. Input for these problems is included on the supplied tape and output is shown in Appendix 2 to assist in obtaining proper operation of the codes.

7.1 INTRUDE

Problem Statement

In the description of the 4 waste spectra presented in Table H.5 in the DEIS it can be seen that in each of spectra 2 through 4, waste is treated by different methods, and waste form improvements are made. An analysis carried out for the DEIS compared potential exposures to the intruder for the 4 different spectra. Section 4.3.3.1 in the DEIS (Pg. 4-14) presents the results for such a comparison for the BWR-Ion Exchange Resins waste stream. A single run of INTRUDE can result in the necessary output to recreate these results.

Input

The problem is to compare the effects of the different spectra. Therefore only NSPC needs to be changed. Since we want to reproduce the results in the mentioned section and in the accompanying Table 4.4, we need to input the IRDC and index values used there. The values used were for the "base case" disposal technology with no credit taken in the waste forms for reduced intruder impacts. Therefore the IRDC and index values are:

IR = 2	ID = 1	IC = 1
IX = 1	IE = 1	IS = 0
IL = 0	IG = 0	IH = 0
ICL = 13	IPO = 2	IIC = 100
NBEST = 0		

There will be 4 executions of the code, where NSPC is varied from 1 to 4. The input set-up is:

```
                    123456789 123456789 123456789 123456789 - (column numbers)
        card 1 -    4
data set 1 -  intrude-spectrum 1
               1 2 1 1 1 1 0 0 0 0 13 2 100 0
data set 2 -  intrude-spectrum 2
               2 2 1 1 1 1 0 0 0 0 13 2 100 0
data set 3 -  intrude-spectrum 3
               3 2 1 1 1 1 0 0 0 0 13 2 100 0
data set 4 -  intrude-spectrum 4
               4 2 1 1 1 1 0 0 0 0 13 2 100 0
```

Figure 6 - Input Deck for Sample Problem of INTRUDE

This input set-up is under the file name INTRUDEPROBLEMINPUT on the accompanying tape.

The output for this run is rather large. The entire output, which can be used to check for proper operation of the code, is printed in Appendix 2 at the back of this document.

7.2 GRWATER

Problem Statement

Section 5.2.4.2 in the DEIS (pg. 5-23) presents cases 4A through 4E which were intended to show the effects of improved site stability and reduced percolation. Case 1A is cited as the reference case for cases 4A to 4E and the IRDC values for it are:

IR = 2	ID = 1	IC = 1
IX = 1	IE = 4	IS = 0
IL = 1	IG = 0	IH = 0
ICL = 13	IPO = 2	IIC = 100

In cases 4A through 4E, certain disposal technologies are analyzed by changing certain index values. In case 4A, certain waste streams are to be segregated, so IS becomes equal to "1". In case 4B, improved compaction methods are implemented in addition to the segregation, so IS = "1" and IX = "2". In case 4C, improved trench covers are to be used in addition to the improvements in Case 4B. Therefore, IC = "2". Case 4D is similar to Case 4C, but stacking is to be used in the trenches. So, IE is increased to "5". Since improvements to the operation are extensive, the ICL value is decreased to "12", because only moderate care is assumed necessary after cessation of these improved operations. Case 4E includes special treatment of "high activity wastes," so in addition to all the changes so far, IH is "1".

Ground-water impacts are discussed in Section 5.2.4.2 of the DEIS. The input necessary to reproduce the results discussed there can be set-up easily as a single run of the GRWATER code.

Input

Waste Spectrum 1 is the desired spectra, as given in Table 5.8. No waste streams are to be removed, or placed in a high integrity container or stabilized, and no credit is to be taken in the waste form for reduced intruder impacts. The code will be executed 5 times with only the changes developed above in the IRDC values. The input set-up is:

```
                    123456789 123456789 123456789 123456789 12345 - (column numbers)

        card 1 -  5
data set 1 - grwater-case 4a
                    1 2 1 1 1 4 1 1 0 0 13 2 100 0 0 000 1 0
data set 2 - grwater-case 4b
                    1 2 1 1 2 4 1 1 0 0 13 2 100 0 0 000 1 0
data set 3 - grwater-case 4c
                    1 2 1 2 2 4 1 1 0 0 13 2 100 0 0 000 1 0
data set 4 - grwater-case 4d
                    1 2 1 2 2 5 1 1 0 0 12 2 100 0 0 000 1 0
data set 5 - grwater-case 4e
                    1 2 1 2 2 5 1 1 0 1 12 2 100 0 0 000 1 0
```

Figure 7 - Input Deck for Sample Problem of GRWATER

This set-up is included on the tape as GRWATERPROBLEMINPUT.

The output for this run is also rather large. The entire output is printed in Appendix 2 at the back of this document.

7.3 OPTIONS

Problem Statement

Case 10C, presented in Section 5.2.4.8 of the DEIS (pg. 5-54), investigates disposing of certain waste streams associated with light water reactor processes and streams containing high amounts of H-3 in a high integrity container (HIC). These streams are P-IXRESIN, P-FSLUDGE, P-FCARTRG, B-IXRESIN, B-FSLUDGE, L-DECONRS, N-TRITIUM, and N-TARGETS. Additionally, five streams (P-NCTRASH, B-NCTRASH, L-NFRCOMP, N-ISOPROD, N-HIGHACT) are stabilized using the index value for special stabilizing treatment. Table 5.22 contains impacts associated with these described disposal techniques, and one run of OPTIONS will result in the output showing these results.

Input

Waste Spectrum 1 is the desired spectrum. The necessary IRDC values are:

IR = 2	ID = 1	IC = 2
IX = 2	IE = 4	IS = 1
IL = 1	IG = 0	IH = 0
ICL = 12	IPO = 2	IIC = 100

NBEST will equal 0, for no credit is to be taken in the waste form for reduced intruder impacts.

There are 13 waste streams receiving special treatment so NNDX is 13. The identification numbers for the 8 streams considered placed in an HIC are: 1, 3, 4, 5, 7, 31, 33, and 34. These are to have an index value (NDXD) equal to "2". The identification numbers of the streams to receive an index value of "3" for stabilization are: 9, 11, 30, 32, and 36. The input for the run appears on the tape as OPTIONSPROBLEMINPUT and is:

```
                  123456789 123456789 123456789 123456789 - (column numbers)
        card 1 -  1
   data set 1 - options-case 10c
                 1 2 1 2 2 4 1 1 0 0 12 2 10013 0
                 1 2
                 3 2
                 4 2
                 5 2
                 7 2
                 9 3
                11 3
                30 3
                31 2
                32 3
                33 2
                34 2
                36 3
```

Figure 8 - Input Deck for Sample Problem of OPTIONS

The resultant output showing results in Table 5.22 is in Appendix 2.

7.4 INVERSI

Problem Statement

A sample run of the INVERSI code will show concentration limits of the radionuclides for a given disposal technology, and a given set of waste characteristics. The "base case" disposal technology is used.

Input

The IRDC values employed are:

IR = 2	ID = 1	IC = 1
IX = 1	IE = 1	IS = 0
IL = 0	IG = 0	IH = 0
ICL = 13	IPO = 2	IIC = 100

NBEST is 0 for the no-credit case.

The ISPC values I4-I9 for the 4 waste spectrums are listed in Table 7. For this example, the P-COTRASH waste characteristic values from Spectrum 1 can be used. They are:

I4 = 3	I5 = 2	I6 = 1
I7 = 0	I8 = 0	I9 = 1

Note that the B-COTRASH, F-COTRASH, I-COTRASH, etc. values are the same in this spectrum. Such similarities can be found in all the spectrums where the source of the waste stream is very similar. Therefore, this example generates the same results as an execution for any of the compactable trash streams in Spectrum 1.

The input, named INVERSIPROBLEMINPUT on the tape, is:

```
                    123456789 123456789 123456789 123456789 - (column numbers)

          card 1 -  1
      data set 1 - inversi co-trash
                    2 1 1 1 1 0 0 0 0 13 2 100 0
                    3 2 1 0 0 1
```

Figure 9 - Input Deck for Sample Problem of INVERSI

The output is in Appendix 2.

7.5 INVERSW

Problem Statement

The same problem as in Section 7.4 above can be run to demonstrate the use of the INVERSW code.

Input

The INVERSW code does not consider the credit in waste form for reduced intruder impacts, therefore there is no NBEST index. Otherwise, the input set-up for this code is the same as for the INVERSI code.

The input on the tape is named INVERSWPROBLEMINPUT, and is:

```
                    123456789 123456789 123456789 123456789 - (column numbers)

          card 1 -   1
      data set 1 -  inversw co-trash
                    2 1 1 1 1 0 0 0 0 13 2 100
                    3 2 1 0 0 1
```

Figure 10 - Input Deck for Sample Problem of INVERSW

The output is included in Appendix 2.

Table 7 Waste Form Behavior Index (ISPC) Values I4-I9 for Waste Spectra 1-4

	SPECTRUM 1						SPECTRUM 2						SPECTRUM 3						SPECTRUM 4					
INDEX I	4	5	6	7	8	9*	4	5	6	7	8	9*	4	5	6	7	8	9*	4	5	6	7	8	9*
P-IXRESIN	2	1	1	0	0	1	1	1	3	0	1	1	2	0	4	0	1	1	1	0	4	0	1	1
P-CONCLIQ	1	1	2	0	1	1	1	1	3	0	1	1	2	0	4	0	1	1	1	0	4	0	1	1
P-FSLUDGE	1	3	1	0	0	1	1	1	3	0	1	1	2	0	4	0	1	1	1	0	4	0	1	1
P-FCARTRG	2	2	1	0	0	1	1	1	3	0	1	1	2	0	4	0	1	1	2	0	4	0	1	1
B-IXRESIN	2	1	1	0	0	1	1	1	3	0	1	1	2	0	4	0	1	1	1	0	4	0	1	1
B-CONCLIQ	1	1	2	0	1	1	1	1	3	0	1	1	2	0	4	0	1	1	1	0	4	0	1	1
B-FSLUDGE	1	3	1	0	0	1	1	1	3	0	1	1	2	0	4	0	1	1	1	0	4	0	1	1
P-COTRASH	3	2	1	0	0	1	3	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
P-NCTRASH	0	0	1	0	0	2	0	0	1	0	1	2	0	0	1	0	1	2	0	0	1	0	1	2
B-COTRASH	3	2	1	0	0	1	3	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
B-NCTRASH	0	0	1	0	0	2	0	0	1	0	1	2	0	0	1	0	1	2	0	0	1	0	1	2
F-COTRASH	3	2	1	0	0	1	3	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
F-NCTRASH	0	0	1	0	0	2	0	0	1	0	0	2	0	0	1	0	0	2	0	0	1	0	0	2
I-COTRASH	3	2	1	0	0	1	3	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
I+COTRASH	3	2	1	0	0	1	3	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
N-SSTRASH	2	2	1	0	0	1	2	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
N+SSTRASH	2	2	1	0	0	1	2	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
N-LOTRASH	3	2	1	0	0	1	3	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
N+LOTRASH	3	2	1	0	0	1	3	2	1	0	0	1	1	0	4	0	1	1	1	0	4	0	1	1
F-PROCESS	0	3	1	0	1	1	0	3	1	0	1	1	0	3	1	0	1	1	0	3	1	0	1	1
U-PROCESS	0	3	1	0	1	1	0	3	1	0	1	1	0	3	1	0	1	1	0	3	1	0	1	1
I-LQSCNVL	3	3	1	1	0	1	3	3	1	1	1	1	1	0	4	0	1	1	1	0	4	0	1	1
I+LQSCNVL	3	3	1	1	0	1	3	3	1	1	0	1	3	3	1	1	0	1	3	3	1	1	0	1
I-ABSLIQD	3	3	1	1	1	1	3	1	3	1	1	1	1	0	4	0	1	1	1	0	4	1	1	1
I+ABSLIQD	3	3	1	1	1	1	3	3	1	1	1	1	3	3	1	1	1	1	3	3	1	1	1	1
I-BIOWAST	2	3	1	1	0	1	2	3	1	1	0	1	1	0	4	0	1	1	1	0	4	0	1	1
I+BIOWAST	2	3	1	1	0	1	2	3	1	1	0	1	2	3	1	1	0	1	2	3	1	1	0	1
N-SSWASTE	0	3	1	0	1	1	0	3	1	0	1	1	0	3	1	0	1	1	0	3	1	0	1	1

Table 7 (continued)

	SPECTRUM 1						SPECTRUM 2						SPECTRUM 3						SPECTRUM 4					
INDEX 1	4	5	6	7	8	9*	4	5	6	7	8	9*	4	5	6	7	8	9*	4	5	6	7	8	9*
N-LOWASTE	3	3	1	1	0	1	3	3	1	1	0	1	3	3	1	1	0	1	3	3	1	1	0	1
L-NFRCOMP	0	0	1	0	0	2	0	0	1	0	1	2	0	0	1	0	1	2	0	0	1	0	1	2
L-DECONRS	2	0	4	1	1	1	2	0	4	1	1	1	1	0	4	0	1	1	1	0	4	0	1	1
N-ISOPROD	1	1	3	1	0	1	1	0	4	1	1	1	1	0	4	1	1	1	1	0	4	1	1	1
N-HIGHACT	0	0	1	0	0	3	0	0	1	0	1	3	0	0	1	0	1	3	0	0	1	0	1	3
N-TRITIUM	3	3	1	1	1	1	3	3	1	1	1	1	3	3	1	1	1	1	3	3	1	1	1	1
N-SOURCES	0	0	1	0	1	2	0	0	1	0	1	2	0	0	1	0	1	2	0	0	1	0	1	2
N-TARGETS	0	0	1	0	1	1	0	0	1	0	1	1	0	0	1	0	1	1	0	0	1	0	1	1

* I4 = Flammability index,
I5 = dispersability index,
I6 = leachability index,
I7 = Chemical content index,
I8 = stability index, and
I9 = accessability index.

APPENDIX 1

Listings of Codes

```
      PROGRAM INTRUDE(INPUT,OUTPUT,TAPE1,TAPE2,TAPE3,TAPE4=OUTPUT,
     *                TAPE5=INPUT)
C
C*****************************************************************
C     THIS IS THE INTRUDER IMPACTS CODE. IT FINDS THE DOSE TO    *
C     THE INADVERTENT INTRUDER FOR TWO SCENARIOS: CONSTRUCTION,  *
C     AND AGRICULTURE.                                           *
C     TAPE1 CONTAINS NSTR(NUMBER OF STREAMS), NNUC(NUMBER OF     *
C      NUCLIDES, FICRP(ICRP FACTORS), HAS AND DCF MATRICES,      *
C      AND DIS AND NUCS BLOCKS.                                  *
C     TAPE2 CONTAINS ISPC(SPECTRAL FILE).                        *
C     TAPE3 CONTAINS DETAILED OUTPUT FROM SUBROUTINE RCLAIM.     *
C     TAPE4 CONTAINS MAIN PROGRAM OUTPUT, THE INTRUDER IMPACTS.  *
C     TAPE5 IS USED TO INPUT TITLES, IHDC AND OTHER VALUES.      *
C*****************************************************************
C
      COMMON/HAST/BAS(36,32),ISPC(4,30,11),DCF(23,7,8),FICRP(7)
     *      /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *      /DINX/IHDC(12)
     *      /DIM3/FSC(6),FSA(6),PHC(6,2),QFC(6,5),TTM(6,3),TPC(6,5),
     *            RGF(6,3),PUP(6,3),DTTM(6),DTPC(6),TPU(6,2),NRET(6)
     *      /IMPS/DZD(7,2),DZ(7,2,9)
C
C     MOST OF THE MATRICES AND ARRAYS ABOVE ARE EXPLAINED IN TABLE H.12
C     DINX BLOCK CONTAINS THE DISPOSAL TECHNOLOGY INDICES (IHDC)
C     DZD(7,2) WILL CONTAIN THE RESULTS FROM SUBROUTINE RCLAIM
C     DZ(7,2,9) WILL CONTAIN THE IMPACTS FOR THE 2 SCENARIOS, 9
C      TIMESTEPS, AND 7 ORGANS.
C
      DIMENSION NOTE(2),TYM(9),DES(2),DEC(23,2),IGRP(36)
      DATA NTYM/9/,
     *     TYM/50.,100.,150.,200.,300.,400.,500.,1.E3,2.E3/
      DATA DES/10M INT-CONS ,10M INT-AGRI /
      DATA DEC/.9,.75,6*2.5E-3,2*1.E-2,13*2.5E-3,.9,.25,6*2.5E-5,
     *     2*1.E-4,13*2.5E-5/
      DATA NGNX/36/,
     *     IGRP/1,2,3,4,5,6,7,8,9,10,11,12,13,14,
     *          15,16,17,18,19,20,21,22,23,24,25,
     *          26,27,28,29,30,31,32,33,34,35,36/
C     DATA NGNX/4/,
C    *     IGRP/7*1,12*2,10*3,7*4/
C     DATA NGNX/5/,
C    *     IGRP/11*1,2,2,3,3,4*4,2,2,6*3,4,4,7*5/
C     DATA NGNX/1/,
C    *     IGRP/36*1/
C
C     THE ABOVE MATRICES AND ARRAYS ARE :
C     NOTE(2)      : HEADER LABEL FOR OUTPUT IDENTIFICATION.
C     TYM(9)       : NINE TIMESTEPS AT WHICH INTRUDER IMPACTS
C                    ARE CALCULATED.
C     DES(2)       : DESCRIPTION OF INTRUDER IMPACTS.
C     DEC(23,2)    : DECON FACTORS FOR INCINERATOR AND CALCINER.
C     IGRP(36)     : ARRAY USED TO DEFINE GROUPING OF WASTE STREAMS.
C
C     NGNX REPRESENTS THE NUMBER OF WASTE STREAM GROUPS.
C     NOTE THAT ONLY ONE SET OF GROUPS IS USED, THE OTHER
C     GROUPINGS ARE COMMENTED OUT.
C
      REWIND 1
      REWIND 2
```

```
C
      CALL READIN(NSTR,NNUC)
C
C       INPUT TITLES AND VALUES (IRDC) FOR EXECUTION
C
      READ(5,110) IREP
      DO 150 IRE=1,IREP
      READ(5,120) NOTE
      READ(5,130) NSPC,(IRDC(I),I=1,12),NBEST
  110 FORMAT(I2)
  120 FORMAT(2A10)
  130 FORMAT(10I2,I3,I2,I4,I2)
      DO 55 ISTR=1,NSTR
      A1=ISPC(NSPC,ISTR,2)
      A1=A1/ISPC(NSPC,ISTR,3)
      A2=BAS(ISTR,3)
      A3=A2/(A1*3.62)
      BAS(ISTR,3)=A3
      DO 50 I=5,27
   50 BAS(ISTR,I)=BAS(ISTR,I)*A1
      J=ISPC(NSPC,ISTR,10)
      IP=J/1000.
      IS=(J/100.)-IP*10.
      IL=(J/10.)-IP*100.-IS*10.
      IF(IL.EQ.0)GO TO 35
      IF(IP.LT.5)GO TO 35
      J=1
      IF(IP.GT.5)J=2
      BAS(ISTR,5)=(1.-DEC(1,J))*BAS(ISTR,5)
      BAS(ISTR,6)=(1.-DEC(2,J))*BAS(ISTR,6)
   55 CONTINUE
      WRITE(4,1001) NOTE,NSPC,(IRDC(I),I=1,12),NBEST
C
C       DO 70 LOOP INTERPRETS IGRP ARRAY
C       DO 50 LOOP IS THE MAIN LOOP IN CALCULATING INTRUDER IMPACTS.
C       DO 45 LOOP DISTINGUISHES BETWEEN THE TIMESTEPS.
C
      DO 70 IGNX=1,NGNX
      NX=0
      VDIS=0.0
C
      CALL ZERO(DZ,126)
C
      DO 50 ISTR=1,NSTR
      IF(IGNX.NE.IGRP(ISTR))GO TO 50
      DO 45 ITYM=1,NTYM
      IRDC(12)=TYM(ITYM)+0.1
C
      CALL RCLAIM(NSPC,ISTR,NNUC,NBEST)
C
      DO 40 I=1,7
      DO 40 J=1,2
   40 DZ(I,J,ITYM)=DZ(I,J,ITYM)+BAS(ISTR,3)*DZD(I,J)
   45 CONTINUE
      NX=1
      VDIS=VDIS+BAS(ISTR,3)
   50 CONTINUE
      IF(NX.EQ.0)GO TO 70
      DO 55 I=1,NTYM
      DO 55 J=1,7
```

```
      DO 55 K=1,2
   55 DZ(J,K,I)=DZ(J,K,I)/VOIS
      IF(NGNX.EQ.36)WRITE(6,1002) HAS(IGNX,1)
      IF(NGNX.NE.36)WRITE(6,1003) IGNX
      DO 65 I=1,NTYM
      WRITE(6,1004) TYM(I)
      DO 65 K=1,2
      A1=0.0
      DO 60 J=1,7
   60 A1=A1+DZ(J,K,I)*FICHP(J)
   65 WRITE(6,1005) LES(K),(DZ(J,K,I),J=1,7),A1
   70 CONTINUE
  150 CONTINUE
 1001 FORMAT(1H1/2X,2A10//2X*SPECTRUM *I2//2X,
     *                    *DISPOSAL TECHNOLOGY INDICES*/2X,
     *                    *IR =*I2*  ID =*I2*  IC =*I2*  IX =*I2/2X
     *                    *IE =*I2*  IS =*I2*  II =*I2*  IG =*I2//2X
     *                    *IH =*I2*  ICL=*I2*  IPO=*I2*  TIC=*I5//2X
     *                    *        WHEST=*I2)
 1002 FORMAT(///2X,A10)
 1003 FORMAT(///2X*GROUP NO =*I2)
 1004 FORMAT(/2X*YR =*F5.0*     BODY       BONE       LIVER*
     **     THYROID     KIDNEY     LUNG     G-I TRACT    TOTAL*)
 1005 FORMAT(1P,2X,A10,8E10.3)
      STOP
      END
C
C*****************************************************************************
C
      SUBROUTINE READIN(NSTR,NNUC)
C
C       SUBROUTINE READIN READS THE VALUES IN THE COMMON BLOCKS
C       OFF OF TAPES 1 AND 2.
C
      COMMON/BAST/BAS(36,32),ISPC(4,36,11),DCF(23,7,8),FICHP(7)
     *       /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *       /DTIS/FSC(6),FSA(6),PRC(6,2),QFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),POP(6,3),DTTM(6),DTPC(6),TPD(6,2),NRET(6)
      READ(1,101) NSTR,NNUC,FICHP
      DO 10 K=1,4
      DO 10 I=1,NSTR
   10 READ(2,105)(ISPC(K,I,J),J=1,10)
      DO 20 I=1,NSTR
   20 READ(1,102)(BAS(I,J),J=1,27)
      DO 40 I=1,NNUC
      READ(1,104)NUC(I),AL(I),FMF(I),RET(I,1),RET(I,4)
      DO 30 K=1,8
   30 READ(1,106)(DCF(I,J,K),J=1,7)
   40 CONTINUE
      DO 50 I=1,6
      READ(1,105)FSC(I),FSA(I),(PRC(I,J),J=1,2),(QFC(I,J),J=1,3),
     *           (TTM(I,J),J=1,3),(TPC(I,J),J=1,3),
     *           (RGF(I,J),J=1,3),(POP(I,J),J=1,3),NRET(I),
     *           DTTM(I),DTPC(I),(TPD(I,J),J=1,2)
   50 CONTINUE
  101 FORMAT(2I5,7F5.2)
  102 FORMAT(A10,2E10.3/10X,6E10.3/10X,6E10.3/10X,6E10.3/10X,6E10.3)
  103 FORMAT(10X,10I5)
  104 FORMAT(A10,4E10.3)
  105 FORMAT(10X,7E10.3/10X,6E10.3/10X,6E10.3,I5/10X,4E10.3)
```

```
 106 FORMAT(1HX,/E10.3)
     RETURN
     END
C
C*****************************************************************
C
     SUBROUTINE RCLAIM(NSPC,ISTR,NNUC,NREST)
C
C      SUBROUTINE RCLAIM CALCULATES THE DOSES
C
     COMMON/BAST/RAS(36,32),ISPC(4,36,11),DEF(23,7,6)
    *      /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
    *      /DINX/IR,ID,IC,IX,IE,IS,IL,IG,IM,ICL,IPO,IIC
    *      /DTIS/FSC(6),FSA(6)
    *      /IMPS/DZ(7,2)
     DIMENSION EMP(3),DMY(7,5)
     DATA EMP/.5,.75,.5/
C
C      EXPLANATION OF NEW ARRAYS :
C      EMP(3)      : VOLUME EMPLACEMENT EFFICIENCIES,
C      DMY(7,5)    : MATRIX TO HOLD 5 SUB-PATHWAYS WHICH WILL LATER
C                    BE ADDED TOGETHER TO DEFINE CONSTRUCTION AND
C                    AGRICULTURE PATHWAYS.
C
  10 IS=ISPC(NSPC,ISTR,5)
     IG=ISPC(NSPC,ISTR,6)
     IT=ISPC(NSPC,ISTR,7)
     IR=ISPC(NSPC,ISTR,8)
     IM=ISPC(NSPC,ISTR,9)
     FDES=EMP(IE)*(1.0-0.9*IG)
     A8=1.0
     IF(IG.EQ.2.OR.IG.EQ.3)A8=0.8
     IF(IS.EQ.0.OR.IT.EQ.1)IG=IG-1
C
C      GDEL DEFINES YEAR OF SCENARIO INITIATION.
C
     GDEL=IPO+IIC
     IF(IC.EQ.3)GDEL=IPO+500.
     IF(IM.EQ.3)A8=A8*10.
     A5=1.0
     IF(IS.LT.3)A5=10.**(IS-3)
     A6=1.0
     IF(IG.GT.1)A6=4.**(1-IG)
     A9=1.0
     IF(IM.GT.1)A9=10.**(1-IM)
     II2=1
     IF(IL.EQ.0.AND.IS.EQ.1.AND.IR.EQ.1) II2=2
     IF(IL.EQ.1.AND.IS.EQ.0) II2=3
     IF(IL.EQ.1.AND.IS.EQ.1.AND.IR.EQ.1) II2=4
     IF(IM.EQ.1.OR.ID.EQ.2) II2=5
     GO TO (11,12,13,14,15),II2
  11 A4C=1.0
     A4A=1.0
     A8C=A8
     A8A=A8
     GO TO 20
  12 A4C=0.012
     A4A=0.0
     A8C=0.012*A8
     A8A=0.0
```

```
      GO TO 20
   13 A4C=0.1
      A4A=0.0
      A8C=A8/12.0.
      A8A=0.0
      GO TO 20
   14 A4C=0.0012
      A4A=0.0
      A8C=0.0012*A8/12.0.
      A8A=0.0
      GO TO 20
   15 A8C=0.1*A8/1.44E+6
      IF(IG.EQ.0)A8C=A8C*0.1
      A4C=0.01
      A4A=0.0
      A8A=0.0
      GO TO 20
   20 CONTINUE
C
      CALL ZERO(DZ,14)
C
      WRITE(3,101) HAS(ISTR,1),HAS(ISTR,3),ISTR
  101 FORMAT(/2X,A10,E10.3,I5)
C
C      MAIN LOOP IN CALCULATING DOSES FROM ALL NUCLIDES FOR
C      SEVEN ORGANS.
C
      DO 40 INUC=1,NNUC
      A1=A9*ADES*EXM(AL(INUC)*GDEL)*BAS(ISTR,INUC+4)
      DO 30 I=1,7
      A2= DCF(INUC,I,5)
      DMY(I,1)=A1*0.057*A2*A8C
      DMY(I,3)=A1*0.27*A2*0.25*A8A
      IF(NREST.EQ.0) GO TO 21
      DMY(I,2)=A4C*A1*A5*FSC(IR)*DCF(INUC,I,2)
      DMY(I,4)=A4A*A1*A5*FSA(IR)*DCF(INUC,I,3)*0.25
      DMY(I,5)=A4A*A1*0.5*A8*FMF(INUC)*DCF(INUC,I,4)*0.25
      GO TO 22
   21 DMY(I,2)=A4C*A1*FSC(IR)*DCF(INUC,I,2)
      DMY(I,4)=A4A*A1*FSA(IR)*DCF(INUC,I,3)*0.25
      DMY(I,5)=A4A*A1*0.5*DCF(INUC,I,4)*0.25*FMF(INUC)
   22 DZ(I,1)=DZ(I,1)+DMY(I,1)+DMY(I,2)
      DZ(I,2)=DZ(I,2)+DMY(I,3)+DMY(I,4)+DMY(I,5)
   30 CONTINUE
      IF(ISTR.LT.30)GO TO 40
      WRITE(3,102) NUC(INUC),((DMY(I,J),I=1,7),J=1,5)
  102 FORMAT(2X,A10,7E9.2/(12X,7E9.2))
   40 CONTINUE
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE ZERO(A,N)
      DIMENSION A(N)
      DO 10 I=1,N
   10 A(I)=0.0
      RETURN
      END
C
```

```
C*************************************************************************
C
      FUNCTION EXM(A1)
      A2=0.0
      IF(A1.LT.230.)A2=EXP(-A1)
      EXM=A2
      RETURN
      END
```

```
      PROGRAM GRWATER(INPUT,OUTPUT,TAPE1,TAPE2,TAPE3,TAPE4=OUTPUT,
     *                TAPE5=INPUT)
C                                                                       GRWATER
C*****************************************************************
C     THIS IS THE GROUNDWATER IMPACTS CODE. IT FINDS THE DOSE FROM  *
C     GROUNDWATER MIGRATION OF NUCLIDES FOR THREE CASES : THE       *
C     INTRUDER WELL, THE OFF-SITE WELL, AND SURFACE EXPOSURE.       *
C     THE THREE CASES ARE: 1)BOUNDARY WELL; 2)OFF-SITE WELL;        *
C     AND 3)SURFACE EXPOSURE WHEN NOPTA = 1. SEE THE USER'S         *
C     GUIDE.                                                        *
C     TAPE1 CONTAINS NSTR(NUMBER OF STREAMS), NNUC(NUMBER OF        *
C      NUCLIDES), FICRP(ICRP FACTORS), RAS AND DCF MATRICES,        *
C      AND DTIS AND NUCS BLOCKS.                                    *
C     TAPE2 CONTAINS ISPC(SPECTRAL FILE).                           *
C     TAPE3 CONTAINS DETAILED OUTPUT FROM SUBROUTINE GWATER.        *
C     TAPE4 CONTAINS MAIN PROGRAM OUTPUT, THE GROUNDWATER IMPACTS.  *
C     TAPE5 IS USED TO INPUT IRDC, TITLES, AND OTHER VALUES.        *
C*****************************************************************
C
      COMMON/BAST/BAS(36,27),ISPC(4,36,11),DCF(23,7,8),FICRP(7)
     *      /NUCS/NUC(23),AI(23),FMF(23),HET(23,5)
     *      /DTMX/IRDC(12)
     *      /DTIS/FSC(6),FSA(6),PRC(6,2),QFC(6,3),TTM(6,3),TPC(6,3),
     *            RGF(6,3),POP(6,3),DTTM(6),DTPC(6),TPD(6,2),NRET(6)
     *      /IMPS/DZD(23,22,21)
     *      /DLCC/DLC(7)
C
C     MOST OF THE MATRICES AND ARRAYS ABOVE ARE EXPLAINED IN TABLE H.12
C     DTMX BLOCK CONTAINS THE DISPOSAL TECHNOLOGY INDICES (IRDC)
C     DZD(23,22,21) WILL CONTAIN RESULTS OF GWATER, DOSES FOR 23
C      NUCLIDES, 22 TIMESTEPS, 7 ORGANS, FOR 3 CASES.
C     DLCC BLOCK CONTAINS THE DOSE LIMITING CRITERIA
C
      DIMENSION NOTE(2),TYM(22),DES(3,2),DZ(7,3,22),NDX(36),IHIC(36),
     *          NNSPC(25)
      DATA NTYM/22/
      DATA TYM/40.,50.,60.,70.,80.,90.,100.,120.,200.,300.,400.,
     *         500.,600.,700.,800.,900.,1000.,2000.,4000.,6000.,
     *         8000.,10000./
      DATA DES/10H INT-WELL ,10H POP-WELL ,10H POP-SURF ,
     *         10H BOU-WELL ,10H POP-WELL ,10H POP-SURF /
      DATA DLC/2*500.,1500.,3000.,3*1500./
C     DATA DLC/3*25.,75.,3*25./
C     DATA DLC/2*5000.,15000.,30000.,3*15000./
C
C     THE ABOVE MATRICES AND ARRAYS ARE :
C       NOTE(2)     : HEADER LABEL FOR OUTPUT IDENTIFICATION
C       TYM(22)     : THE 22 TIMESTEPS
C       DES(3)      : DESCRIPTION OF THE 3 PATHWAYS (3 CASES)
C       DZ(7,3,22)  : DOSES SUMMED OVER ALL NUCLIDES
C       NDX(36)     : INDEX TO INCLUDE(NDX=1), OR EXCLUDE(NDX=0)
C                     PARTICULAR STREAMS IN ANALYSIS
C       IHIC(36)    : INDEX TO INTER (IHIC.NE.0) PARTICULAR
C                     STREAMS IN A HIGH INTEGRITY CONTAINER
C       NNSPC(25)   : INDEX TO CALL READIN AND COMBYN IF NSPC CHANGES
C
C     NOTE : THERE ARE 3 DIFFERENT LINES OF DATA FOR THE DLC
C            VALUES, THEY REFLECT PROGRESSIVELY, THE DOSE
C            LIMITING CRITERIA DEFINED BY THE NCRP, BY 40CFR190
C            (EPA), AND BY 10CFR20 (NRC). ONLY ONE IS ACTIVE,
```

```
C              COMMENT IT OUT, AND ACTIVATE ONE OF THE OTHER
C              TO PERFORM ANALYSIS WITH THOSE DLC VALUES
C              (DLC ARE USED IN SUBROUTINE RCLAIM)
C
C       THE NEXT SECTION READS INPUT FROM TAPES
C
      READ(5,101) IREP
      DO 15 IRE=1,IREP
      READ(5,102) TITE
      READ(5,103) NSPC,(IRDC(I),I=1,12),NNDX,NHIC,NTHIC,NOPTW,NREST
  101 FORMAT(I2)
  102 FORMAT(20A4)
  103 FORMAT(1012,I3,12,I4,212,I4,212)
C
C       THIS SECTION CALLS SUBROUTINE READIN AND COMBYN FOR THE
C       FIRST EXECUTION AND THEN FOR ANY EXECUTION WHEN THE WASTE
C       SPECTRUM NUMBER (NSPC) CHANGES.
C
      NNSPC(IRE)=NSPC
      IF(IRE.EQ.1) GO TO 5
      NNSP=NNSPC(IRE-1)
      IF(NNSPC(IRE).EQ.NNSP) GO TO 15
C
    5 REWIND 1
      REWIND 2
C
      CALL READIN(NSTR,NNUC)
      CALL COMBYN(NSTR,NNUC,NSPC)
C
C       LOOPS 20 AND 25 ASSIGN FLAGS TO WASTE STREAMS TO EITHER
C       INCLUDE OR EXCLUDE THE STREAM FROM THE ANALYSIS
C
   15 DO 20 I=1,36
      NDX(I)=1
   20 CONTINUE
      IF(NNDX.EQ.0) GO TO 30
      DO 25 I=1,NNDX
      READ(5,104)IDIFF,NDXD
  104 FORMAT(2I2)
      NDX(IDIFF)=NDXD
   25 CONTINUE
C
C       LOOPS 35 AND 40 ASSIGN FLAGS TO WASTE STREAMS TO EITHER
C       INCLUDE OR EXCLUDE THE STREAM IN A HIGH INTEGRITY CONTAINER
C
   30 DO 35 I=1,36
      IHIC(I)=0
   35 CONTINUE
      IF(NHIC.EQ.0) GO TO 45
      DO 40 I=1,NHIC
      READ(5,105)IDIF,NHCD
  105 FORMAT(2I2)
      IHIC(IDIF)=NHCD
   40 CONTINUE
C
   45 WRITE(4,1003) NOTE,NSPC,(IRDC(I),I=1,12),NOPTW,NREST
      WRITE(3,1003) NOTE,NSPC,(IRDC(I),I=1,12),NOPTW,NREST
      IF(NNDX.EQ.0) GO TO 55
      WRITE(4,1009)
      DO 50 ISTR=1,NSTR
```

```
      IF(NDX(ISTR),NE.1) WRITE(4,1010) HAS(ISTR,1)
   50 CONTINUE
   55 IF(NHIC.EQ.0) GO TO 60
      WRITE(4,1011)
C
   60 VNOT=0.0
      VREG=0.0
      VLAY=0.0
      VHOT=0.0
      IHIC=NTHIC
C
C      LOOP 70 CLASSIFIES WASTE STREAMS AND ACCUMULATES THEIR
C      VOLUME AS HOT ACCEPTABLE, REGULAR, LAYERED, OR HOT.
C
      DO 70 ISTR=1,NSTR
      IHC=IHIC(ISTR)
      IF(NHIC.EQ.0) GO TO 65
      IF(IHC.NE.0) WRITE(4,1010) HAS(ISTR,1)
   65 IF(IRDC(1).EQ.4) ISPC(NSPC,ISTR,5)=ISPC(NSPC,ISTR,5)+1
C
      CALL RCLAIM(ISTR,NNUC,IHC,NSPC,NREST)
C
      IF(NDX(ISTR).NE.1)ISPC(NSPC,ISTR,11)=0
      II=ISPC(NSPC,ISTR,11)+1
      GO TO (11,12,13,14),II
   11 VNOT=VNOT+HAS(ISTR,3)
      GO TO 70
   12 VREG=VREG+HAS(ISTR,3)
      GO TO 70
   13 VLAY=VLAY+HAS(ISTR,3)
      GO TO 70
   14 VHOT=VHOT+HAS(ISTR,3)
   70 CONTINUE
      IF(NHIC.EQ.0) GO TO 71
      WRITE(4,1012) NTHIC
   71 WRITE(4,1030) VREG,VLAY,VHOT,VNOT
C
      CALL GWATER(NSTR,NTYM,TYM,IHIC,THIC,NSPC,NOPTW)
C
      CALL ZERO(DZ,462)
C
C      LOOP 75 SUMS THE DOSES OVER ALL NUCLIDES
C
      DO 75 ITYM=1,NTYM
      DO 75 K=1,3
      KK=(K-1)*7
      DO 75 J=1,7
      DO 75 INUC=1,NNUC
   75 DZ(J,K,ITYM)=DZ(J,K,ITYM)+DZD(INUC,ITYM,KK+J)
C
C      LOOP 90 OUTPUTS GROUNDWATER DOSES FOR 7 ORGANS, 3 PATHWAYS,
C      AND 22 TIMESTEPS.
C
      N=NOPTW+1
      DO 90 ITYM=1,NTYM
      TYMD=TYM(ITYM)
      WRITE(4,1035) TYMD
      DO 85 K=1,3
      A1=0.0
      DO 80 J=1,7
```

```
   A6 A1=A1+DZ(J,K,ITYM)*FICRP(J)
   85 WRITE(4,1006) DES(K,N),(DZ(J,K,ITYM),J=1,7),A1
   90 CONTINUE
C
C     LOOP 95 OUTPUTS DOSES FOR EACH TIME CONSIDERED FOR EACH NUCLIDE
C
      DO 95 INUC=1,12
      WRITE(4,1007)  NUC(INUC)
      DO 95 ITYM=1,NTYM
      DO 95 K=1,3
      KK=(K-1)*7
   95 WRITE(4,1008) TYM(ITYM),DES(K,N),(DZD(INUC,ITYM,KK+J),J=1,7)
  150 CONTINUE
 1003 FORMAT(1H1//2X,2A10//2X*SPECTRUM *I2///2X,
     *                      *DISPOSAL TECHNOLOGY INDICES*//2X,
     *                      *IR =*I2*  ID =*I2*  IC =*I2*  IX =*I2//2X
     *                      *IE =*I2*  IS =*I2*  IL =*I2*  IG =*I2//2X
     *                      *IH =*I2*  ICL=*I2*  IPO=*I2*  IIC=*I2//2X
     *                      *      NDPT=*I2*        NRFST=*I2)
 1004 FORMAT(//1P,2X*VREG =*E9.2* VLAY =*E9.2* VHOT =*E9.2* VNOT =*E9.2)
 1005 FORMAT(//2X*YR =*F6.0*     BODY       BONE       LIVER*
     **     THYROID    KIDNEY      LUNG    G-I TRACT     ICRP*)
 1006 FORMAT(1P,2X,A10,RE10.3)
 1007 FORMAT(//2X,A10,10X*BODY       BONE       LIVER*
     **     THYROID    KIDNEY      LUNG    G-I TRACT*)
 1008 FORMAT(2X,F6.0,2X,A10,1P,7E10.3)
 1009 FORMAT(//2X**WASTE STREAMS NOT INCLUDED ARE :*)
 1010 FORMAT(2X,A10)
 1011 FORMAT(//2X*WASTE STREAMS USING H.I.C. ARE :*)
 1012 FORMAT(2X,*H.I.C. HAS A LIFE OF *I4* YEARS*)
      STOP
      END
C
C*****************************************************************************
C
      SUBROUTINE READIN(NSTR,NNUC)
C
C      SUBROUTINE READIN READS THE VALUES IN THE COMMON BLOCKS
C      OFF OF TAPES 1 AND 2.
C
      COMMON/WAST/BAS(36,27),ISPC(4,36,11),DCF(23,7,8),FICRP(7)
     *      /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *      /DTIS/FSC(6),FSA(6),PRC(6,2),QFC(6,3),TTM(6,3),TPC(6,3),
     *            RGF(6,3),POP(6,3),DTTM(6),DTPC(6),TPD(6,2),NRET(6)
      READ(1,101) NSTR,NNUC,FICRP
      DO 10 K=1,4
      DO 10 I=1,NSTR
   10 READ(2,103)(ISPC(K,I,J),J=1,10)
      DO 20 I=1,NSTR
   20 READ(1,102)(BAS(I,J),J=1,27)
      DO 40 I=1,NNUC
      READ(1,104)NUC(I),AL(I),FMF(I),RET(I,1),RET(I,4)
      DO 30 K=1,8
   30 READ(1,106)(DCF(I,J,K),J=1,7)
   40 CONTINUE
      DO 50 I=1,6
      READ(1,105)FSC(I),FSA(I),(PRC(I,J),J=1,2),(QFC(I,J),J=1,3),
     *           (TTM(I,J),J=1,3),(TPC(I,J),J=1,3),
     *           (RGF(I,J),J=1,3),(POP(I,J),J=1,3),NRET(I),
     *           DTTM(I),DTPC(I),(TPD(I,J),J=1,2)
```

```
   50 CONTINUE
  101 FORMAT(2I5,7F5.2)
  102 FORMAT(A10,2E10.3/10X,6E10.3/10X,6E10.3/10X,6E10.3/10X,6E10.3)
  103 FORMAT(10X,10I5)
  104 FORMAT(A10,4E10.3)
  105 FORMAT(10X,7E10.3/10X,6E10.3/10X,6E10.3,I5/10X,6E10.3)
  106 FORMAT(10X,7E10.3)
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE COMBYN(NSTR,NNUC,NSPC)
C
C       THIS SUBROUTINE PERFORMS SOME BASIC CALCULATIONS TO
C       INTEGRATE SOME OF THE INFORMATION
C
      COMMON/BAST/BAS(36,27),ISPC(4,36,11),DCF(23,7,8),FICRP(7)
     *       /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *       /OTTS/FSC(6),FSA(6),PHC(6,2),RFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),PUP(6,3),DTTM(6),DTPC(6),TPO(6,2),NRET(6)
C
      DIMENSION DEC(23,2)
      DATA DEC/.9,.75,6*2.5E-3,3*1.E-2,13*2.5E-3,.9,.25,6*2.5E-5,
     *         2*1.E-4,13*2.5E-3/
C
C       THE ABOVE ARRAY IS :
C           DEC(23,2)  : DECON FACTORS FOR INCINERATOR AND CALCINER
C
      DO 20 ISTR=1,NSTR
      A1=ISPC(NSPC,ISTR,2)
      A1=A1/ISPC(NSPC,ISTR,3)
      A2=BAS(ISTR,3)
      A3=A2/(A1+3.62)
      BAS(ISTR,3)=A3
      DO 10 I=5,27
   10 BAS(ISTR,I)=BAS(ISTR,I)*A1
      J=ISPC(NSPC,ISTR,10)
      IP=J/1000
      IS=(J/100)-IP*10
      IL=(J/10)-IP*100-IS*10
      IF(IL.EQ.0) GO TO 20
      IF(IP.LT.5)GO TO 20
      J=1
      IF(IP.GT.5)J=2
      BAS(ISTR,5)=(1.-DEC(1,J))*BAS(ISTR,5)
      BAS(ISTR,6)=(1.-DEC(2,J))*BAS(ISTR,6)
   20 CONTINUE
      DO 30 INUC=1,NNUC
      A2=RET(INUC,4)
      A1=(A2/RET(INUC,1))**0.334
      RET(INUC,5)=A2*A1
      RET(INUC,3)=A2/A1
   30 RET(INUC,2)=RET(INUC,1)*A1
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE RCLAIM(ISTR,NNUC,IHC,NSPC,NREST)
```

```
C
C       THIS SUBROUTINE IS USED TO CLASSIFY EACH WASTE STREAM AS:
C          (1) NOT ACCEPTABLE,     (2) REGULAR,
C          (3) LAYERED,  OR        (4) DEEP
C
      COMMON/MAST/BAS(36,27),ISPC(4,36,11),DCF(23,7,8)
     *       /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *       /OTHX/IH,TD,IC,IA,IF,IS,IL,IG,IM,TCL,IPD,TIC
     *       /OTIS/FSC(6),FSA(6)
     *       /INPS/DZ(7,2)
     *       /DLCC/DLC(7)
C
      DIMENSION EMP(5)
      DATA EMP/.5,.75,.5,.5,.75/
C
C       NEW ARRAYS ABOVE ARE :
C          DZ(7,2) : INTRUDER DOSES USED IN CLASSIFICATION TESTS
C          DLC(7)  : DOSE LIMITING CRITERIA FOR 7 ORGANS
C          EMP(5)  : VOLUME EMPLACEMENT EFFICIENCIES
C
      IS=ISPC(NSPC,ISTR,5)
      I6=ISPC(NSPC,ISTR,6)
      I7=ISPC(NSPC,ISTR,7)
      I8=ISPC(NSPC,ISTR,8)
      I9=ISPC(NSPC,ISTR,9)
      IF(IHC.GT.0)IH=1
      A7=1.0
      IF(I6.EQ.2.OR.I6.EQ.3) A7=0.80
      IF(I7.EQ.1.OR.I8.EQ.0) I6=I6-1
      FDES=EMP(IE)*(1.-.9*IG)
      IF(I9.EQ.3)A7=A7*10.
      A5=1.0
      IF(IS.LT.3) A5=10.**(IS-3)
      A6=1.0
      IF(I6.GT.1) A6=4.**(1-I6)
      A9=1.0
      IF(I9.GT.1) A9=10.**(1-I9)
      I3=1
      IF(IS.EQ.1.AND.I8.EQ.1)I3=2
C
C       TESTING ROUTINE FOR CLASSIFYING WASTE, BASED ON INTRUDER
C       CONSTRUCTION AND AGRICULTURE PATHWAYS.
C
      IF(I>.EQ.2.OR.I6.EQ.3) A7=0.80
   10 GDEL=IPD+TIC
      IF(TC.EQ.3) GDEL=IPD+500.
C
      CALL ZERO(DZ,14)
C
      GO TO (11,12,13,14,15,16,17,18),I3
   11 A4=1.0
      A4=1.0
      AB=A7
      AB=A7
      GO TO 20
   12 A4C=.012
      A4A=0.0
      ABC=.012*A7
      APA=0.0
      GO TO 20
```

```
   13 GDEL=IPU+500.
      AMC=1.0
      AMA=1.0
      AML=A7
      AMA=A7
      GO TO 20
   14 AMC=0.1
      AMA=0.0
      AML=A7/12.0.
      AMA=0.0
      GO TO 20
   15 AMC=0.0012
      AMA=1.0
      AML=0.0012*A7/12.0.
      AMA=0.0
      GO TO 20
   16 GDEL=IPU+500.
      AMC=1.0
      AMA=1.0
      AML=A7
      AMA=A7
      GO TO 20
   17 AML=0.1*A7/1.E+06
      IF(IG.EQ.0)AMC=AML*0.1
      AMC=0.01
      AMA=0.0
      AMA=0.0
      GO TO 20
   18 GDEL=IPU+1000.
      AML=A7
      IF(IG.EQ.0)AMC=0.1*A7
      AMC=1.0
      AMA=1.0
      AMA=AML
C
C     LOOP 40 IS THE MAIN LOOP FOR CALCULATING DOSES.
C
   20 DO 40 INUC=1,NNUC
      A1=AQ*FDES*EXM(AL(INUC)*GDEL)*HAS(ISIR,INUC+4)
      DO 35 I=1,7
      A2=DCF(INUC,I,5)
      R5=0.25*A1*AMA*A2*0.27
      R2=A1*AML*A2*0.057
      IF(NBEST.EQ.0) GO TO 25
      R1=A1*AMC*A5*FSC(IR)*DCF(INUC,I,2)
      R3=0.25*A1*A4A*A5*FSA(IR)*DCF(INUC,I,3)
      R4=0.25*0.5*A1*A4A*A6*FMF(INUC)*DCF(INUC,I,4)
      GO TO 30
   25 R1=A1*AMC*FSC(IR)*DCF(INUC,I,2)
      R3=0.25*A1*A4A*FSA(IR)*DCF(INUC,I,3)
      R4=0.5*0.25*A1*A4A*DCF(INUC,I,4)*FMF(INUC)
      GO TO 30
   30 DZ(I,1)=DZ(I,1)+R1+R2
   35 DZ(I,2)=DZ(I,2)+R3+R4+R5
   40 CONTINUE
C
C      LOOP 50 TESTS DOSES AGAINST THE DLC
C
      DO 50 IORG=1,7
      DO 50 IPT=1,2
```

```
      IF(DZ(IORG,IPTH).GT.DLC(IORG)) GO TO 50
   50 CONTINUE
      GO TO (51,52,51,54,53,50,55,56),I3
   51 ISPC(NSPC,ISTR,11)=1
      RETURN
   52 I3=3
      GO TO 10
   54 I3=6
      GO TO 10
   54 ISPC(NSPC,ISTR,11)=2
      RETURN
   55 I3=8
      GO TO 10
   56 ISPC(NSPC,ISTR,11)=4
      RETURN
   60 GO TO (61,62,63,63,63,63,70,701),I3
   61 IF(IL.EQ.0)GO TO 63
      I3=0
      GO TO 10
   62 IF(IL.EQ.0)GO TO 63
      I3=5
      GO TO 10
   63 IF(IH.EQ.0)GO TO 70
      I3=7
      GO TO 10
   70 ISPC(NSPC,ISTR,11)=1
      RETURN
      END
C
C*************************************************************************
C
      FUNCTION ERFS(A1,A2)
C
      A3=0.5*SQRT(A2/A1)
      A4=A3*(1.-A1)
      A5=A3*(1.+A1)
      IF(A4.GT.0)GO TO 10
      ERFS=2.-EXP(A4*A4)*(POLY(A5)-POLY(-A4))
      RETURN
   10 ERFS=EXP(A4*A4)*(POLY(A4)+POLY(A5))
      RETURN
      END
C
C*************************************************************************
C
      FUNCTION POLY(X1)
C
      DATA A1,A2,A3,A4,A5,P/.254829592,-.284496736,1.421413741,
     *                      -1.453152027,1.061405429,.3275911/
      T1=1./(1.+P*X1)
      POLY=T1*(A1+T1*(A2+T1*(A3+T1*(A4+T1*A5))))
      RETURN
      END
C
C*************************************************************************
C
      FUNCTION EXP(A1)
C
      A2=0.0
      IF(A1.LT.-230.)A2=EXP(-A1)
```

```
      EXMBA2
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE GWATER(NSTR,NTYM,TYMD,IHIC,THIC,NSPC,NOPTW)
C
C       SUBROUTINE GWATER CALCULATES THE GROUNDWATER IMPACTS
C
      COMMON/HART/HAS(36,27),ISPC(4,36,11),DCF(23,7,8),FICRP(7)
     *       /NUCS/NUC(23),AI(23),FMF(23),RET(23,5)
     *       /DIMX/IR,ID,IC,IX,IE,IS,IL,IG,IH,IGL,IPD,IIC
     *       /DTIS/FSC(6),FSA(6),PRC(6,2),QFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),PUP(6,3),DTTH(6),DTPC(6),TPD(6,2),NRET(6)
     *       /IMPS/DZ(23,22,21)
      DIMENSION EMP(5),EFF(2),SEFF(2),DMY(3,22),TYMD(22),RES(22,3),
     *          IHIC(36)
      DATA EMP/.5,.75,.5,.5,.75/
      DATA EFF/0.4,7.0/
      DATA SEFF/0.9,0.35/
      DATA NOPT/1/
C
C       THE ABOVE MATRICES AND ARRAYS ARE :
C          EMP(5)     : VOLUME EMPLACEMENT EFFICIENCIES
C          EFF(2)     : LAND USE VOLUME EFFICIENCIES
C          SEFF(2)    : LAND USE SURFACE AREA EFFICIENCIES
C          DMY(3,22)  : CONCENTRATIONS FOR 3 PATHS AND 22 TIMESTEPS
C          TYMD(22)   : THE 22 TIMESTEPS
C          RES(22,3)  : WILL CONTAIN RESULTS FROM SUBROUTINE RTTJ
C          IHIC(36)   : INDEX FOR INTERNMENT IN HIGH INTEGRITY CONT.
C
      TVOL=0.0
      GINS=IPD+IIC
      NSEC=10
C
      CALL ZERO(DZ,10626)
C
C       NEXT SECTION DETERMINES PERCOLATION VALUE AND LOWER
C       LIMIT FOR THE DILUTION FACTOR.
C
      PRC1=PRC(IR,1)
      PRC2=PRC(IR,2)
      IF(IG.EQ.1.OR.ID.EQ.2) GO TO 5
      IF(IE.EQ.4.OR.IE.EQ.5) PRC1=PRC(IR,1)/10.
      IF(IE.EQ.4.OR.IE.EQ.5) PRC2=PRC(IR,2)/10.
    5 CONTINUE
      IF(IC.EQ.1)PRCD=PRC1
      IF(IC.GT.1)PRCD=PRC2
      IF(IX.EQ.1)PRCD=4.0*PRC1
      IF(IC.EQ.1.AND.IX.EQ.2)PRCD=2.25*PRC1
      IF(IC.EQ.2.AND.IX.EQ.2)PRCD=4.00*PRC2
      TVOL=352000.*SQRT(PRC(IR,1)*27.8)
      IF(TVOL.LT.7700.)TVOL=7700.
C
C       LOOP 90 IS THE MAIN LOOP OF GROUNDWATER PATHWAY EQUATION
C
      DO 90 ISTR=1,NSTR
      III=ISPC(NSPC,ISTR,11)
      IF(III.EQ.0)GO TO 90
```

```
      WRITE(3,101) HAS(ISTR,1),HAS(ISTR,5),ISTR,I11
      I6=ISPC(NSPC,ISTR,6)
      VOR=0.9/(EMP(IF)*FFF(ID))
      I7=ISPC(NSPC,ISTR,7)
      IF(I11.EQ.5)VOR=0.19
      IA=ISPC(NSPC,ISTR,8)
      IF(IS.EQ.0.OR.I7.EQ.1)I6=I6-1
      IF(IHIC(ISTR).GT.0) IA=1
      I9=ISPC(NSPC,ISTR,9)
      GDEL=0.0
      IF(IHIC(ISTR).EQ.1)GDEL=THIC
      PERC=PRC0
      IF(I8.NE.1.OR.IS.NE.1)GO TO 10
      IF(IC.EQ.1)PERC=PRC1
      IF(IC.GT.1)PERC=PRC2
   10 IF(I11.EQ.5.OR.ID.EQ.2)PERC=PRC2/10.
      PERC=PERC*(1.0-0.9*IG)
      PER2=5.0*PERC+0.1*PRC1
      IF(ID.EQ.2)PER2=0.9*PERC+0.1*PRC2
      NX=0
      IF(PERC.LT.PRC1)NX=1
      A6=1.0
      IF(I6.GT.1)A6=4.**(1-I6)
      A9=1.0
      IF(I9.GT.1)A9=10.**(1-I9)
      I1=NRET(IR)
      IF(IS.EQ.0.OR.I7.EQ.1)I1=I1-1
      TDUM=1.0/(PERC*VOR*A6*A9)
      IF(I1.LE.0)I1=1
      DO 80 INUC=1,12
      IF(HAS(ISTR,INUC+6).LT.1.E-14)GO TO 80
      TDUR=TDUM/EMF(INUC)
C
      CALL ZERO(DMY,66)
C
      C1=TDUR
      IF(NX.EQ.0.OR.NOPT.EQ.0)GO TO 15
      IF(C1.LT.GINS)C1=GINS
C
   15 CALL RTIJ(TYMD,NTYM,INUC,IR,I1,C1,0,0,RES,GDEL,NOPTW)
C
C      RESULTS FROM SUBROUTINE RTIJ ARE RETURNED IN RES MATRIX
C
      H1=HAS(ISTR,3)*HAS(ISTR,INUC+6)/TDUR
      DO 30 IPTH=1,3
      H2=H1*RGF(IR,IPTH)/(QFC(IR,IPTH)*NSEC)
      IF(TVOL.GT.QFC(IR,IPTH))H2=H2*QFC(IR,IPTH)/TVOL
      I3=(IPTH-1)*7
      I2=0
      IF(IPTH.EQ.3)I2=7
      DO 25 ITYM=1,NTYM
      A3=EXM(AL(INUC)*TYMD(ITYM))
      DO 20 I=1,7
      A4=A3*RES(ITYM,IPTH)*H2*DCF(INUC,I,I2)
      DMY(IPTH,ITYM)=DMY(IPTH,ITYM)+A4*FICRP(I)
   20 DZ(INUC,ITYM,I3+I)=DZ(INUC,ITYM,I3+I)+A4
   25 CONTINUE
   30 CONTINUE
C
C      THE NEXT SECTION CONSIDERS (NOPT=0 CANCELS THIS CONSIDER-
```

```
C       ATION) THE SECOND SOURCE TERM OF THE 2-STEP ANALYSIS WITH
C       AN INCREASED SOURCE TERM (PER2) AFTER THE INSTITUTIONAL
C       CONTROL PERIOD.
C
        IF(NA.EQ.0.OR.NOPT.EQ.0)GO TO 60
        IF(TDUR.LE.GINS)GO TO 60
        I1=GINS
        T2=T1+PERC*(TDUR-T1)/PER2
C
        CALL RTIJ(ITYMD,NTYM,INUC,IR,I1,T2,T1,RES,GDEL,NOPTW)
C
        R1=R1*PER2/PERC
        DO 50 IPTH=1,3
        R2=R1*RGF(IR,IPTH)/(QFC(IR,IPTH)*NSEC)
        IF(TVOL.GT.QFC(IR,IPTH))R2=R2*QFC(IR,IPTH)/TVOL
        I3=(IPTH-1)*7
        I2=6
        IF(IPTH.EQ.3)I2=7
        DO 45 ITYM=1,NTYM
        A3=EXM(AL(INUC)*TYMD(ITYM))
        DO 46 I=1,7
        A4=A3*RES(ITYM,IPTH)*R2*DCF(INUC,I,I2)
        DMY(IPTH,ITYM)=DMY(IPTH,ITYM)+A4*FICRP(I)
   46   DZ(INUC,ITYM,I3+I1=DZ(INUC,ITYM,I3+I)+A4
   45 CONTINUE
   50 CONTINUE
   60 WRITE(3,102) NUC(INUC)
      WRITE(3,103) ((DMY(I,J),J=1,NTYM),I=1,3)
   80 CONTINUE
   90 CONTINUE
  101 FORMAT(1P,2X,A10,E10.3,2I5)
  102 FORMAT(2X,A7)
  103 FORMAT(1P,9X,9E9.2)
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE RTIJ(ITYMD,NTYM,INUC,IR,I1,TDUR,TMIN,RES,GDEL,NOPTW)
C
C       SUBROUTINE RTIJ CALCULATES THE MIGRATION REDUCTION FACTORS
C
      COMMON/NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *      /DTIS/FSC(6),FSA(6),PRC(6,2),QFC(6,3),TTM(6,3),TPC(6,3),
     *            RGF(6,3),POP(6,3),DTTM(6),DTPC(6),TPO(6,2),RRET(6)
      DIMENSION TYMD(NTYM),RES(22,3),RTTM(6),RTPC(6)
      DATA RTTM/350.,66.,175.,283.,56.,110./
      DATA RTPC/700.,1900.,700.,1600.,1900.,1900./
C
C       THE ABOVE ARRAYS ARE TTM AND TPC ARRAYS FOR
C       THE BOUNDARY CELL CASE (NOPTW=1)
C
      CALL ZERO(RES,66)
C
      DO 30 IPTH=1,3
      A1=RET(INUC,I1)*TTM(IR,IPTH)+GDEL
      IF(NOPTW.EQ.1.AND.IPTH.EQ.1)A1=RET(INUC,I1)*RTTM(IR)+GDEL
      DO 20 ITYM=1,NTYM
      TYM=TYMD(ITYM)-TMIN
      A2=TYMD(ITYM)-TDUR
```

```
      DO 10 ISEC=1,10
      B$=1.0/(A1+RET(TNUC,II)*(ISEC-1)*DTIM(IR))
      IF(TYM+1.1*B$.LT.1.0) GO TO 20
      H4=HPC(IH,IPTH)+(ISEC-1)*DTPC(IR)
      IF(NUPTH.EQ.1.AND.IPTH.EQ.1)H4=HTPC(IR)+(ISEC-1)*DTPC(IR)
      A$=0.5*ERFS(H$*TYM,H4)
      IF(A2.GT.0.0)A$=A$-0.5*ERFS(B$*A2,H4)
      IF(A$.LT.0.0)A$=0.0
   10 RFS(ITY1,IPTH1)=RFS(ITYM,IPTH)+A$
   20 CONTINUE
   30 CONTINUE
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE ZERO(A,N)
C
      DIMENSION A(4)
      DO 10 I=1,N
   10 A(I)=0.0
      RETURN
      END
```

```
      PROGRAM OPTIONS(INPUT,OUTPUT,TAPE1,TAPE2,TAPE4=OUTPUT,
     *                TAPE5=INPUT)
C
C*****************************************************************
C     THIS IS THE OPTIONS IMPACTS CODE. IT FINDS THE DISPOSAL    *
C     PRACTICES FOR PROPER INTERNMENT OF WASTE STREAMS, WASTE-   *
C     VOLUME-AVERAGED INTRUDER IMPACTS, EXPOSED WASTE IMPACTS,   *
C     ABNORMAL OPERATING CONDITION IMPACTS, AND COSTS, ENERGY    *
C     USE, LAND USE, OCCUPATIONAL EXPOSURES, AND POPULATION      *
C     EXPOSURES ASSOCIATED WITH DISPOSAL OPERATIONS.             *
C     TAPE1 CONTAINS NSTR(NUMBER OF STREAMS), NNUC(NUMBER OF     *
C      NUCLIDES), FICRP(ICRP FACTORS), HAS AND DCF MATRICES,     *
C      AND DTIS AND NUCS BLOCKS.                                 *
C     TAPE2 CONTAINS ISPC(SPECTRAL FILE).                        *
C     TAPE4 CONTAINS MAIN PROGRAM OUTPUT, THE DISPOSAL IMPACTS.  *
C     TAPE5 IS USED TO INPUT TITLES, TRUC AND OTHER VALUES.      *
C*****************************************************************
C
      COMMON/BAST/HAS(36,32),ISPC(4,36,11),DCF(23,7,8),FICRP(7)
     *       /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *       /DTNX/IWDC(12)
     *       /DTIS/FSC(6),FSA(6),PNC(6,2),WFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),POP(6,3),DTTM(6),DTPC(6),TPOP(6,2),NRET(6)
     *       /VOL/VREG,VLAY,VHOT
     *       /IMPS/DZ(8,7,2),DZG(4,7,2),DZA(7,7),DZS(36,7,2)
     *       /DLCC/DLC(7)
C
C      MOST OF THE MATRICES AND ARRAYS ABOVE ARE EXPLAINED IN TABLE H.12
C      DTNX BLOCK CONTAINS THE DISPOSAL TECHNOLOGY INDICES (IWDC)
C      VOL BLOCK CONTAINS TOTAL REGULAR, LAYERED, AND HOT WASTE VOLUMES
C      IMPS CONTAINS :
C       DZ(6,7,2)     : OUTPUT FROM SUBROUTINE RCLAIM, INTRUDER IMPACTS
C       DZG(4,7,2)    : USED TO VOLUME AVERAGE DOSES OBTAINED FROM
C                       SUBROUTINE RCLAIM.
C       DZA(7,7)      : OUTPUT FROM SUBROUTINE ACCEXP, ACCIDENT AND
C                       EXPOSURE DOSES
C       DZS(36,7,2)   : OUTPUT FROM SUBROUTINE ACCEXP FOR 36 STREAMS
C                       IN TWO ACCIDENT SCENARIOS.
C      DLCC BLOCK CONTAINS THE DOSE LIMITING CRITERIA
C
      DIMENSION NOTE(2),DES(9),IWR(36),IWL(36),IWH(36),TWN(36),
     *          TIMP(6),COST(8),G(4),D(4),UU(8),NDX(36)
      DATA DES/10H INT-CONS ,10H INT-AGRI ,10H INT-AIR  ,
     *         10H ERO-AIR  ,10H INT-WAT  ,10H ERO-WAT  ,
     *         10H ACC-SNGC ,10H ACC-FIRE ,10H ACC-AVG  /
      DATA HI,HJ/.1,.09/
      DATA DLC/2*500.,1500.,3000.,3*1500./
C     DATA DLC/3*25.,75.,3*25./
C     DATA DLC/2*5000.,15000.,30000.,5*15000./
C
C      THE ABOVE ARRAYS AND MATRICES ARE :
C       NOTE(2)      : HEADER LABEL FOR OUTPUT IDENTIFICATION
C       DES(9)       : DESCRIPTION OF 9 PATHWAYS CONSIDERED
C       IWR(36)      : INDICES OF STREAMS BELONGING TO EACH OF
C       IWL(36)        THE FOUR WASTE TYPES :
C       IWH(36)        REGULAR,   LAYERED
C       IWN(36)        HOT,  AND NOT ACCEPTABLE
C       TIMP(6)      : TRANSPORTATION IMPACTS FROM SUBROUTINE
C                      TRANSP PASSED TO MAIN PROGRAM
C       COST(8)      : DISPOSAL IMPACTS CALCULATED IN SUBROU-
```

```
C                       TIDE ECON AND PASSED TO MAIN PROGRAM
C       G(4),D(4)     # ACCUMULATED PROCESSING IMPACTS
C                       G(4) FOR PROCESSING AT GENERATOR SITE
C                       D(4) FOR PROCESSING AT DISPOSAL SITE
C       UN(8)         # UNIT COSTS ($/M$) FOR PROCESSING, TRANS-
C                       PORTATION, DISPOSAL DURING OPERATION,
C                       AND DURING POST-CLOSURE PERIOD.
C       NDX(36)       # INDEX TO EXCLUDE (NDX=0) ,  INCLUDE    (NDX=1)
C                       ANALIZE IN M.I.C.(NDX=2) ,  STABILIZE (NDX=3)
C
C       NOTE # THERE ARE 3 DIFFERENT LINES OF DATA FOR THE DLC
C       VALUES. THEY REPRESENT THE DOSE LIMITING CRITERIA DEFINED
C       BY, PROGRESSIVELY, THE NCRP, THE EPA, AND THE NRC. ONLY
C       ONE LINE OF DLC IS ACTIVE AT ANY ONE TIME. COMMENT OUT
C       THE CURRENTLY ACTIVE LINE, AND ACTIVATE ANY OF THE OTHERS
C       FOR SUBSEQUENT RUNS USING THOSE DLC VALUES.
C
C       RI AND RJ REPRESENT INTEREST AND INFLATION RATES
C
C       THE NEXT SECTION READS INPUT FROM TAPES
C
      READ(5,175) IREP
      DO 150 IRE=1,IREP
      READ(5,180) NOTE
      READ(5,185) NSPC,(IRDC(I),I=1,12),NNDX,NBEST
  175 FORMAT (I2)
  180 FORMAT (24A10)
  185 FORMAT (1OI2,I3,I2,I4,2I2)
C
      REWIND 1
      REWIND 2
C
      CALL READIN(NSTR,NNDC)
C
C       SUBROUTINE CUMRYN IS CALLED, PROCESSING IMPACTS ARE
C       RETURNED IN HAS(ISTR,29) THRU HAS(ISTR,32).
C
      CALL CUMRYN(NSTR,NNDC,NSPC,NDX)
C
   10 DO 20 I=1,36
      NDX(I)=1
      ISPC(NSPC,I,11)=1
   20 CONTINUE
      IF(NNDX.EQ.0) GO TO 40
      DO 30 I=1,NNDX
      READ(5,190) IDIFF,NDXD
  190 FORMAT(2I2)
      NDX(IDIFF)=NDXD
   30 CONTINUE
   40 WRITE(4,1003) NOTE,NSPC,(IRDC(I),I=1,12),NBEST
      IF(NNDX.EQ.0) GO TO 41
      WRITE(4,1006)
C
   41 CALL ZERO(DZ,721)
C
      VREG=0.0
      VLAY=0.0
      VOUT=0.0
      VNOT=0.0
      NREG=0
```

```
      NLAY=0
      NREG=0
      NVOT=0
C
C       NEXT SECTION CALCULATES THE INTRUDER IMPACTS AND DETERMINES
C       THE WASTE STREAM STATUS = ISPC(NSPC,ISTR,11)
C
      DO 50 ISTR=1,NSTR
      IF(NDX.EQ.0) GO TO 51
      IF(NDX(ISTR).NE.1) WRITE(4,1007) BAS(ISTR,1)
   51 IF(IMOD(1).EQ.4) ISPC(NSPC,ISTR,5)=ISPC(NSPC,ISTR,5)+1
      IF(NDA(ISTR).EQ.0) ISPC(NSPC,ISTR,11)=0
      IDX=NDX(ISTR)
      IMOD=1
C
      CALL NCLAIM(ISTR,NNUC,IMOD,IDX,NSPC,NREST)
C
      II=ISPC(NSPC,ISTR,11)+1
      GO TO (11,12,13,14),II
   11 NNUT=NNUT+1
      IQN(NNUT)=ISTR
      VNUT=VNUT+BAS(ISTR,3)
      GO TO 50
   12 NREG=NREG+1
      IQR(NREG)=ISTR
      DO 25 I=1,7
      DO 25 J=1,2
      DZQ(1,I,J)=DZQ(1,I,J)+BAS(ISTR,3)*DZ(IMOD,I,J)
      DZQ(2,I,J)=DZQ(2,I,J)+BAS(ISTR,3)*DZ(3,I,J)
   25 DZQ(3,I,J)=DZQ(3,I,J)+BAS(ISTR,3)*DZ(8,I,J)
      VREG=VREG+BAS(ISTR,3)
      GO TO 50
   13 NLAY=NLAY+1
      IQL(NLAY)=ISTR
      DO 35 I=1,7
      DO 35 J=1,2
      DZQ(4,I,J)=DZQ(4,I,J)+BAS(ISTR,3)*DZ(IMOD,I,J)
      DZQ(2,I,J)=DZQ(2,I,J)+BAS(ISTR,3)*DZ(5,I,J)
   35 DZQ(3,I,J)=DZQ(3,I,J)+BAS(ISTR,3)*DZ(8,I,J)
      VLAY=VLAY+BAS(ISTR,3)
      GO TO 50
   14 NVOT=NVOT+1
      IQH(NVOT)=ISTR
      DO 45 I=1,7
      DO 45 J=1,2
      DZQ(1,I,J)=DZQ(1,I,J)+BAS(ISTR,3)*DZ(IMOD,I,J)
   45 DZQ(3,I,J)=DZQ(3,I,J)+BAS(ISTR,3)*DZ(8,I,J)
      VVOT=VVOT+BAS(ISTR,3)
   50 CONTINUE
      DO 55 J=1,7
      DO 55 K=1,2
      DZQ(1,J,K)=DZQ(1,J,K)/(VREG+VVOT)
      IF(VLAY.GT.1.)DZQ(1,J,K)=DZQ(1,J,K)+DZQ(4,J,K)/VLAY
      DZQ(2,J,K)=DZQ(2,J,K)/(VREG+VLAY)
   55 DZQ(3,J,K)=DZQ(3,J,K)/(VREG+VLAY+VVOT)
C
C       THE MATRIX DZQ NOW CONTAINS THE VOLUME AVERAGED INTRUDER IMPACTS.
C
      IF(NREG.GT.0) CALL PRT(VREG,IQR,NREG,1,NDX,NSPC)
      IF(NLAY.GT.0) CALL PRT(VLAY,IQL,NLAY,2,NDX,NSPC)
```

```
      IF(NHOT.GT.0) CALL PRT(VHOT,IDH,NHOT,5,NDX,NSPC)
      IF(NNOT.GT.0) CALL PRT(VNOT,IDN,NNOT,4,NDX,NSPC)
C
      WRITE(4,1008)
      DO 70 I=1,5
      DO 65 K=1,2
      A1=0.0
      DO 60 J=1,7
   60 A1=A1+DZD(I,J,K)*FICRP(J)
   65 WRITE(4,1009) DES(K),(DZD(I,J,K),J=1,7),A1
   70 CONTINUE
C
C      THE NEXT SECTION CALCULATES THE DOSES FOR THE ACCIDENT
C      AND EXPOSURE SCENARIOS UTILIZING SUBROUTINE ACCEXP.
C
      CALL ACCEXP(NSTR,NNUC,NDX,NSPC,NREST)
C
      WRITE(4,1010)
      DO 100 K=1,7
      KK=K+2
      A1=0.0
      DO 95 J=1,7
   95 A1=A1+DZA(J,K)*FICRP(J)
  100 WRITE(4,1015)DES(KK),(DZA(J,K),J=1,7),A1
C
C      THE NEXT SECTION CALCULATES THE TRANSPORTATION IMPACTS AND
C      THE DISPOSAL IMPACTS THRU SUBROUTINE TRANSP AND ECON.
C
      CALL TRANSP(TIMP,NSTR,NSPC)
      CALL ZERO(G,4)
      CALL ZERO(D,4)
C
      DO 110 I=1,NSTR
      I1=ISPC(NSPC,I,10)
      I2=I1/100
      I3=(I1/10)-I2*10
      IF(I3.EQ.0) GO TO 110
C
C      SEPERATE GENERATOR AND DISPOSAL PROCESSING IMPACTS.
C
      IF(I3.EQ.2) GO TO 105
      G(1)=G(1)+BAS(I,29)
      G(2)=G(2)+BAS(I,30)
      G(3)=G(3)+BAS(I,31)
      G(4)=G(4)+BAS(I,32)
      GO TO 110
  105 D(1)=D(1)+BAS(I,29)
      D(2)=D(2)+BAS(I,30)
      D(3)=D(3)+BAS(I,31)
      D(4)=D(4)+BAS(I,32)
  110 CONTINUE
C
      CALL ECON(NSTR,RI,RJ,COST,NDX,NSPC)
C
C      PROCESSING, TRANSPORTATION, AND DISPOSAL IMPACTS ARE NOW
C      BROUGHT TOGETHER AND PRINTED OUT.
C
      VT=VREG+VLAY+VHOT
      UN(1)=G(1)/VT
      UN(2)=D(1)/VT
```

```
      UN(5)=TIMP(1)/VT
      UN(4)=COST(1)/VT
      UN(5)=COST(5)/VT
      UN(6)=COST(6)/VT
      UN(7)=COST(7)/VT
      UN(8)=COST(8)/VT
      COST(2)=COST(2)+TIMP(5)
      X=0.0
      TIMP(5)=TIMP(5)+TIMP(6)
      WRITE(4,1013)G(1),D(1),TIMP(1),COST(1),COST(5),
     *             COST(6),COST(7),COST(8),UN(1),UN(2),UN(3),
     *             UN(4),UN(5),UN(6),UN(7),UN(8),G(4),D(4),
     *             TIMP(4),X,G(3),D(3),TIMP(3),COST(2),X,X,X,
     *             COST(4),G(2),D(2),TIMP(2),COST(3),RI,RJ
C
      DO 120 K=1,2
      IF(K.EQ.1)WRITE(4,1016)
      IF(K.EQ.2)WRITE(4,1017)
      WRITE(4,1018)
      DO 120 I=1,36
      A1=0.0
      DO 115 J=1,7
  115 A1=A1+DZS(I,J,K)*FICRP(J)
      WRITE(4,1020)HAS(I,1),(DZS(I,J,K),J=1,7),A1
  120 CONTINUE
  150 CONTINUE
 1003 FORMAT(1H1/2X,2A10//2X*SPECTRUM *I2//2X,
     *                    *DISPOSAL TECHNOLOGY INDICES*/2X,
     *                    *IR =*I2*  ID =*I2*  IC =*I2*  IX =*I2/2X
     *                    *IE =*I2*  IS =*I2*  IL =*I2*  IG =*I2/2X
     *                    *IH =*I2*  ICL=*I2*  IPO=*I2*  IIC=*I5/2X
     *                    *         NHEST=*I2)
 1006 FORMAT(//2X**WASTE STREAMS TREATED SPECIALLY ARE :*)
 1007 FORMAT(2X,A10)
 1008 FORMAT(1H1/2X,*INTRUDER IMPACTS*,7X,*BODY       BONE      LIVER*
     **     THYROID    KIDNEY    LUNG    G=I TRACT   ICRP*)
C       IGN(36)          LAYERED
 1009 FORMAT(1P,12X,A10,8E10.3)
 1013 FORMAT(//2X,*OTHER IMPACTS       *ASTE PROCESSING*   TRANSP   *
     **DISPOSAL        POST OPERATIONAL COSTS*,
     */10X*      GENERAT  DISPOSAL*20X*  TOTAL      CLOSURE  *
     **OBSERVE     INSTITUT.*,
     */2X*COST ($)*4X,1P,8E10.2,
     */2X*UNIT COST ($/M3)*8E10.2,
     */2X*PUP DOSE (MREM) *4E10.2,
     */2X*UCC DOSE (MREM) *4E10.2,
     */2X*LAND USE (M2)   *4E10.2
     */2X*ENERGY USE (GAL)*4E10.2,
     */2X*INTEREST RATE   *0P,1F5.3,
     */2X*INFLATION RATE  *1F5.3)
 1014 FORMAT(//2X*EXPOSE/ACC IMPACTS*)
 1015 FORMAT(1P,12X,A10,8E10.3)
 1016 FORMAT(///2X*SINGLE CONTAINER ACCIDENT - ALL STREAMS*)
 1017 FORMAT(///2X*ACCIDENT BY FIRE - ALL STREAMS*)
 1018 FORMAT(14X,*STREAM*,5X,*BODY       BONE      LIVER     THYROID     *
     **KIDNEY    LUNG    G=I TRACT   ICRP*)
 1020 FORMAT(1P,12X,A10,8E10.3)
      STOP
      END
C
```

```
C*****************************************************************************
C
      SUBROUTINE READIN(NSTR,NNUC)
C
C       SUBROUTINE READIN READS THE VALUES IN THE COMMON BLOCKS
C       OFF OF TAPES 1 AND 2.
C
      COMMON/BAST/BAS(36,32),ISPC(4,36,11),DCF(23,7,8),FICRP(7)
     *       /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *       /DTIS/FSC(6),FSA(6),PRC(6,2),WFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),PUP(6,3),DTTM(6),DTPC(6),TPO(6,2),NRET(6)
      READ(1,101) NSTR,NNUC,FICRP
      DO 10 K=1,4
      DO 10 I=1,NSTR
   10 READ(2,103)(ISPC(K,I,J),J=1,10)
      DO 20 I=1,NSTR
   20 READ(1,102)(BAS(I,J),J=1,27)
      DO 40 I=1,NNUC
      READ(1,104)NUC(I),AL(I),FMF(I),RET(I,1),RET(I,4)
      DO 30 K=1,4
   30 READ(1,106)(DCF(I,J,K),J=1,7)
   40 CONTINUE
      DO 50 I=1,6
      READ(1,105)FSC(I),FSA(I),(PRC(I,J),J=1,2),(WFC(I,J),J=1,3),
     *           (TTM(I,J),J=1,3),(TPC(I,J),J=1,3),
     *           (RGF(I,J),J=1,3),(PUP(I,J),J=1,3),NRET(I),
     *           DTTM(I),DTPC(I),(TPO(I,J),J=1,2)
   50 CONTINUE
  101 FORMAT(2I5,7F5.2)
  102 FORMAT(A10,2E10.3/10X,6E10.3/10X,6E10.3/10X,6E10.3/10X,6E10.3)
  103 FORMAT(10X,10I5)
  104 FORMAT(A10,4E10.3)
  105 FORMAT(10X,7E10.3/10X,6E10.3/10X,6E10.3,I5/10X,4E10.3)
  106 FORMAT(10X,7E10.3)
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE COMBYN(NSTR,NNUC,NSPC,NDX)
C
C       SUBROUTINE COMBYN PERFORMS THE FOLLOWING BASIC
C       CALCULATIONS TO INTEGRATE SOME OF THE INFORMATION :
C        1)  MODIFIES VOLUMES AND CONCENTRATIONS ACCORDING TO
C            INFORMATION IN ISPC (SPECTRAL) FILE
C        2)  CALCULATES TRANSPORTED VOLUME, STORES IT IN BAS(ISTR,29)
C        3)  CALCULATES THE WASTE PROCESSING IMPACTS
C        4)  MODIFIES H=3 AND C=14 CONCENTRATION IF WASTE IS
C            INCINERATED
C        5)  CALCULATES THE RETARDATION MATRIX FROM GIVEN INFO.
C
      COMMON/BAST/BAS(36,32),ISPC(4,36,11),DCF(23,7,8),FICRP(7)
     *       /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *       /DTIS/FSC(6),FSA(6),PRC(6,2),WFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),PUP(6,3),DTTM(6),DTPC(6),TPO(6,2),NRET(6)
      DIMENSION AZN(36),UPNS(7,3),USOL(3,3),USAV(3),
     *          TPUP(2),DFC(23,2),NDX(36)
      DATA AZN/1.,1.,4.,3*1.,1.,4.,15*1.,4*3.,2*1.,92.,3*1.,2.,1.,3.,4*1./
      DATA UPNS/335.,503.,1006.,690.,2060.,1938.,1059.,3*0.0,
     *          56.3,116.,129.,72.,3*15.,4.42,8.,6.12.5.35/
```

```
      DATA USOL/1282.,1473.,2445.,3*40.,3*24./
      DATA USAV/210.,.4,4./
      DATA IPOP/1.56E-8,1.56E-10/
      DATA DEC/.9,.75,6*2.5E-3,2*1.E-2,15*2.5E-3,.9,.25,6*2.5E-5,
     *         2*1.E-4,15*2.5E-5/
C
C       THE ABOVE ARRAYS AND MATRICES ARE :
C        AZR(56)    : SPECTRUM 1 VIF/VRF RATIOS
C        UPRS(7,3)  : VOLUME REDUCTION UNIT IMPACTS
C        USOL(3,3)  : SOLIDIFICATION UNIT IMPACTS
C        USAV(3)    : UNIT SAVING RESULTING FROM VOLUME REDUCTION
C        IPOP(2)    : PERSON-YEAR/M3 ATMOSPHERIC DISPERSION FACTORS
C        DEC(25,2)  : DECON FACTORS FOR INCINERATION AND CALCINER
C
      DO 10 I=1,NSTR
      DO 10 J=28,32
      BAS(I,J)=0.0
   10 CONTINUE
      DO 50 ISTR=1,NSTR
      A1=ISPC(NSPC,ISTR,2)
      A1=A1/ISPC(NSPC,ISTR,3)
      A2=BAS(ISTR,3)/3.62
C
C       THE FACTOR 3.62 IS THE NORMALIZATION VALUE FOR ONE MILLION
C       CUBIC METERS.
C
      A3=A2/A1
      BAS(ISTR,3)=A3
C
C       THE NEXT SECTION UNSCRAMBLES THE PROCESSING INDEX AND GETS
C       THE VOLUME REDUCTION METHOD = IP,  SOLIDIFICATION = IS,
C       LOCATION = IL, AND THE ENVIRONMENT = IM. IF IL=0 THEN THERE
C       IS NO PROCESSING AND THE SECTION IS SKIPPED. IF IL=2, THEN
C       THE DISPOSAL AND TRANSPORTATION VOLUMES ARE DIFFERENT.
C
      DO 15 I=5,27
   15 BAS(ISTR,I)=BAS(ISTR,I)*A1
      BA3(ISTR,28)=BAS(ISTR,3)
      J=ISPC(NSPC,ISTR,10)
      BAS(ISTR,4)=BAS(ISTR,4)*A1
      IP=J/1000
      IS=(J/100)-IP*10
      IL=(J/10)-IP*100-IS*10
      IM=J-IP*1000-IS*100-IL*10
      IF(NDX(ISTR).EQ.2) GO TO 50
      IF(IL.EQ.0)GO TO 50
      IF(IL.NE.2) GO TO 20
      BAS(ISTR,28)=A2
      BAS(ISTR,4)=BAS(ISTR,4)/A1
   20 A5=0.5
      IF(ISTR.GT.11) A5=0.1
C
C       LOOP 25 CALCULATES WASTE PROCESSING IMPACTS.
C
      DO 25 J=1,3
      A4=-A3*(AZR(ISTR)*A1-1.)*USAV(J)
      IF(IP.GT.0)A4=A4+A2*UPRS(IP,J)
      IF(IS.GT.0)A4=A4+A3*USOL(IS,J)
      IF(J.EQ.3)A4=A4*A5
   25 BAS(ISTR,28+J)=A4
```

```
C
C       THE NEXT SECTION ACCOUNTS FOR WASTE STREAMS TO H.I.C.
C
   50 IF(NDX(ISTR),NE,2)GO TO 55
      AA=A2*450,
      BAS(ISTR,29)=AA
      IF(IL,EQ,0)GO TO 50
   55 CONTINUE
 3001 FORMAT(1P,5I4,6E10,3)
C
C       THE NEXT SECTION IS SKIPPED IF WASTE IS NOT INCINERATED,
C       OTHERWISE, LOCATION DEPENDENT POP, DOSES ARE CALCULATED,
C
      IF(IP,LT,5)GO TO 50
      A5=0,0
      J=2
      IF(IP,EQ,5) J=1
      IF(IH,NE,1,AND,IH,NE,2)IH=1
      DO 40 INUC=1,NNUC
      AA=BAS(ISTR,3)*BAS(ISTR,INUC+4)*DEC(INUC,J)*TPOP(IH)
      DO 40 I=1,7
   40 A5=A5+AA*FICRP(I)*DCF(INUC,I,8)
      BAS(ISTR,32)=A5
C
C       ONLY ICRP WEIGHTED POPULATION IMPACTS ARE CALCULATED
C       ABOVE, TWO STATEMENTS BELOW MODIFY H=3 AND C=14 CON-
C       CENTRATIONS TO ACCOUNT FOR LOSS UP THE STACK,
C
      BAS(ISTR,5)=(1,-DEL(1,J))*BAS(ISTR,5)
      BAS(ISTR,6)=(1,-DEC(2,J))*BAS(ISTR,6)
   50 CONTINUE
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE RCLAIM(ISTR,NNUC,IMOD,IDX,NSPC,NREST)
C
C       SUBROUTINE RCLAIM CALCULATES THE INTRUDER IMPACTS FOR
C       TWO PATHWAYS - CONSTRUCTION AND AGRICULTURE - AND DETERMINES
C       THE STATUS OF EACH WASTE STREAM (ISPC(ISTR,11)) AND DETERMINING
C       TEST CONDITION (IMOD),
C
      COMMON/WAST/BAS(30,32),ISPC(4,30,11),DCF(23,7,8)
     *      /NUCS/NUC(23),AL(23),EMF(23),HET(23,5)
     *      /DTNX/IR,ID,IC,IX,IE,IS,IL,IG,IH,ICL,IPU,IIC
     *      /DTIS/FSC(6),FSA(6)
     *      /IMPS/DZ(8,7,2)
     *      /DLCC/DLC(7)
      DIMENSION EMP(5)
      DATA EMP/,5,,75,,5,,5,,75/
C
C       NEWLY INTRODUCED ARRAY EMP ARE THE VOLUME EMPLACEMENT
C       EFFICIENCIES,
C
      I5=ISPC(NSPC,ISTR,5)
      I6=ISPC(NSPC,ISTR,6)
      I7=ISPC(NSPC,ISTR,7)
      I8=ISPC(NSPC,ISTR,8)
      I9=ISPC(NSPC,ISTR,9)
```

```
      IF(IDA,GT,1)IB=1
      A7=1,0
      IF(I6,EQ,2,OR,I6,EQ,3) A7=0,80
C
C
      CALL ZERO(DZ,112)
C
      IF(I7,EQ,1,OR,IS,EQ,0) IB=IB+1
C
      FDES=EMP(IE)*(1,-,9*IG)
      IF(I9,EQ,3) A7=A7*10,
      A5=1,0
      IF(I5,LT,3) A5=10,**(I5-3)
      A6=1,0
      IF(I6,GT,1) A6=4,**(1-I6)
      A9=1,0
      IF(I9,GT,1) A9=10,**(1-I9)
C
C      NEXT SECTION CALCULATES INTRUDER IMPACTS UNDER EIGHT CONDITIONS
C      (LOOP 35) AND SUBSEQUENTLY TESTS FOR STATUS ASSIGNMENT, ULTIMAT-
C      ELY WASTE STREAM WILL BE CLASSIFIED AS EITHER NOT ACCEPTABLE,
C      REGULAR, LAYERED, OR NOT,
C
      DO 35 I5=1,8
      GDEL=IPO+IIC
      IF(IC,EQ,3) GDEL=IPO+500,
      GO TO (11,12,13,14,15,16,17,18),I5
   11 A4C=1,0
      A4A=1,0
      A8C=A7
      A8A=A7
      GO TO 20
   12 A4C=0,012
      A4A=0,0
      A8C=0,012*A7
      A8A=0,0
      GO TO 20
   13 GDEL=IPO+500,
      A4C=1,0
      A4A=1,0
      A8C=A7
      A8A=A7
      GO TO 20
   14 A4C=0,1
      A4A=0,0
      A8C=A7/1200,
      A8A=0,0
      GO TO 20
   15 A4C=0,0012
      A4A=0,0
      A8C=0,0012*A7/1200,
      A8A=0,0
      GO TO 20
   16 GDEL=IPO+500,
      A4C=1,0
      A4A=1,0
      A8C=A7
      A8A=A7
      GO TO 20
   17 A8C=0,1*A7/1,04E6
```

```
      IF(IG.EQ.0) ABC=ABC*0.1
      AQC=0.0
      AQA=0.0
      ABA=0.0
      GO TO 20
   10 GDEL=IPD*1000.
      ABC=A7
      IF(IG.EQ.0) ABC=0.1*A7
      AQC=1.0
      AQA=1.0
      ABA=ABC
   20 DO 30 INUC=1,NNUC
      A1=A9*FDES*EXM(AL(INUC)*GDEL)*HAS(ISTR,INUC+4)
      DO 25 I=1,7
      A2=DCF(INUC,I,5)
      H5=0.25*A1*ABA*A2*0.27
      B2=A1*AMC*A2*0.057
      IF(NBEST.EQ.0) GO TO 21
      B1=A1*AQC*A5*FSC(IR)*DCF(INUC,I,2)
      B3=0.25*A1*AQA*A5*FSA(IR)*DCF(INUC,I,3)
      B4=0.5*0.25*A1*AQA*A6*FMF(INUC)*DCF(INUC,I,4)
      GO TO 22
   21 B3=0.25*A1*AQA*FSA(IR)*DCF(INUC,1,3)
      H4=0.5*0.25*A1*AQA*FMF(INUC)*DCF(INUC,I,4)
      B1=A1*AQC*FSC(IR)*DCF(INUC,I,2)
   22 DZ(I3,I,1)=DZ(I3,I,1)+B1+B2
   25 DZ(I3,I,2)=DZ(I3,I,2)+B3+H4+H5
   30 CONTINUE
   35 CONTINUE
C
C     ALL CONDITIONS TESTED - NOW DETERMINE WASTE STATUS.
C
      I3=1
      IF(IS.EQ.1.AND.IB.EQ.1) I3=2
      IF(ID.EQ.2) I3=2
      I30=I3
      IF(ISPC(NSPC,ISTR,11).EQ.0) GO TO 70
   40 DO 50 IORG=1,7
      DO 50 IPTH=1,2
      IF(DZ(I3,IORG,IPTH).GT.DLC(IORG)) GO TO 60
   50 CONTINUE
      GO TO (51,52,51,53,53,54,55,56),I3
   51 ISPC(NSPC,ISTR,11)=1
      IMOD=1
      IF(I30.EQ.2) IMOD=2
      RETURN
   52 I3=3
      GO TO 40
   53 I3=6
      GO TO 40
   54 ISPC(NSPC,ISTR,11)=2
      IMOD=4
      IF(I30.EQ.2) IMOD=5
      RETURN
   55 I3=6
      GO TO 40
   56 ISPC(NSPC,ISTR,11)=3
      IMOD=7
      RETURN
   60 GO TO (61,62,63,63,63,63,70,70),I3
```

```
   61 IF(IL.EQ.0)GO TO 65
      I5=4
      GO TO 40
   62 IF(IL.EQ.0)GO TO 65
      I5=5
      GO TO 40
   65 IF(IM.EQ.0)GO TO 70
      I5=7
      GO TO 40
   70 ISPC(NSPC,ISTR,11)=0
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE ACCEXP(NSTR,NNUC,NDX,NSPC,NREST)
C
C       SUBROUTINE ACCEXP CALCULATES THE EXPOSURE AND ACCIDENT IMPACTS
C       FOR 7 PATHWAYS (4 EXPOSURE AND  3 ACCIDENT) AND 7 ORGANS.
C
      COMMON/WAST/BAS(30,32),ISPC(4,30,11),UCF(23,7,8)
     *       /NUCS/NUC(23),AL(23),EMF(23),RET(23,5)
     *       /DTNX/IR,ID,IC,IX,IE,IS,IL,IG,IM,ICL,IPU,IIC
     *       /DTIS/FSC(6),FSA(6),PRC(6,2),WFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),PUP(6,3),DTT(6),DTPC(6),TPU(6,2),RET(6)
     *       /IMPS/DZDM(10M),DZA(7,7),DZS(30,7,2)
      DIMENSION EMP(5),EFF(2),SEFF(2),NDX(30)
      DATA EMP/.5,.75,.5,.5,.75/
      DATA EFF/0.4,7.0/
      DATA SEFF/0.9,0.35/
C
C       NEWLY INTRODUCED ARRAYS ABOVE ARE :
C        EFF(2)   : LAND USE VOLUME EFFICIENCIES
C        SEFF(2)  : LAND USE SURFACE AREA EFFICIENCIES
C
      VTUP=0.0
      VTUT=0.0
      VHUT=0.0
      GREC=IPU+IIC
C
C       EROSION TIME SCALE DEPEDENT ON COVER USED AT DISPOSAL SITE.
C
      GERO=IPU+2000.
      IF(IC.EQ.2) GERO=IPU+3000.
      IF(IC.EQ.3) GERO=IPU+10000.
      IF(ID.EQ.2) GERO=IPU+10000.
      DO 10 ISTR=1,NSTR
      I1=ISPC(NSPC,ISTR,11)
      IF(I1.EQ.1)VTUP=VTUP+BAS(ISTR,3)
      IF(I1.EQ.1.OR.I1.EQ.2)VTUT=VTUT+BAS(ISTR,3)
      IF(I1.EQ.3) VHUT=VHUT+BAS(ISTR,3)
   10 CONTINUE
C
C       VTUP IS JUST REGULAR WASTE
C       VTUT IS REGULAR + LAYERED WASTE
C
C       NEXT SECTION ESTABLISHES AREAL FACTORS FOR 4 EXPOSURE PATHWAYS
C
      FRA=5.72E-5*PUP(IR,1)*1.83E+3
      VOR=EMP(IE)*EFF(ID)*SEFF(ID)
```

```
      FEA=8.04E-6*POP(IR,2)*VTOT/VOR
      FRM=1.15E-4*POP(IR,3)*1.8E+3
      FEM=1.15E-3*POP(IR,3)*VTOT/VOR
C
C       LOOP 40 IS MAIN LOOP FOR EXPOSURE IMPACTS
C
      DO 40 ISTR=1,NSTR
      A1=0.25
      I11=ISPC(NSPC,ISTR,11)
      IF(I11.EQ.0) GO TO 40
      I5=ISPC(NSPC,ISTR,5)
      A5=1.0
      IF(I5.LT.3) A5=10.**(I5-3)
      I9=ISPC(NSPC,ISTR,9)
      A9=1.0
      IF(I9.GT.1) A9=10.**(1-I9)
      I8=ISPC(NSPC,ISTR,8)
      IF(NDX(ISTR).GT.1) I8=1
      IF(I8.EQ.1.AND.I5.EQ.1) A1=0.012/9.
      IF(I11.EQ.2.OR.ID.EQ.2) A1=A1*0.01
      IF(I11.EQ.3) A1=1.2E-5/9.
      A2=EMP(IE)*SEFF(ID)*HAS(ISTR,3)/VTOP
      A3=A2*VTOP/(VTOT+VHOT)
      IF(I11.GT.1) A2=0.0
      IF(ID.EQ.2.AND.I11.NE.2) A2=A3
      DO 30 INUC=1,NNUC
      A6=EXM(GREC*AL(INUC))
      A7=EXM(GERO*AL(INUC))
      A8=HAS(ISTR,INUC+4)
      IF(NBEST.EQ.0) GO TO 15
      B1=FRA*A1*A3*A6*A9*A5
      B2=FEA*A2*A7*A8
      GO TO 20
   15 B1=FRA*A1*A3*A6*A5
      B2=FEA*A2*A7*A8
   20 B3=FRM*A1*A3*A6*A8*A9
      B4=FEM*A2*A7*A8
      DO 25 IORG=1,7
      DZA(IORG,1)=DZA(IORG,1)+B1*DCF(INUC,IORG,8)
      DZA(IORG,2)=DZA(IORG,2)+B2*DCF(INUC,IORG,8)
      DZA(IORG,3)=DZA(IORG,3)+B3*DCF(INUC,IORG,7)
      DZA(IORG,4)=DZA(IORG,4)+B4*DCF(INUC,IORG,7)
   25 CONTINUE
   30 CONTINUE
   40 CONTINUE
C
      VSC=0.0
      VFR=0.0
C
C       LOOP 80 IS MAIN LOOP OF ACCIDENT IMPACTS
C
      DO 80 ISTR=1,NSTR
      I3=ISPC(NSPC,ISTR,11)
      IF(I3.EQ.0.OR.I3.EQ.3) GO TO 80
      I4=ISPC(NSPC,ISTR,4)
      I5=ISPC(NSPC,ISTR,5)
      I6=ISPC(NSPC,ISTR,6)
      I9=ISPC(NSPC,ISTR,9)
      A5=HAS(ISTR,3)
      IF(I9.GT.1) GO TO 80
```

```
      IF(AS.EQ.0.0) GO TO 80
      FAF=TMU(IM,1)*0.1
      FAS=TMU(IM,2)
      A0=1.0
      IF(IS.EQ.3) A0=1.0
      IF(IS.LT.3.AND.IO.EQ.1) A0=0.1
      IF(IO.EQ.2.OR.IO.EQ.3) A0=0.01
      IF(IO.EQ.4) A0=0.001
      FAS=FAS*A0
      IF(IA.LT.3) FAF=FAF*(20.**(IA-3))
      IF(IS.EQ.1.AND.IA.NE.3) FAF=0.0
C
C     DISTINGUISH BETWEEN SINGLE CONTAINER AND FIRE ACCIDENTS
C
      VFR=VFR+AS
      VSC=VSC+AS
      DO 70 INUC=1,NNUC
      AIS=FAS*BAS(ISTR,INUC+4)*AS
      AIF=FAF*BAS(ISTR,INUC+4)*AS
      DO 70 IORG=1,7
      DZS(ISTR,IORG,1)=DZS(ISTR,IORG,1)+AIS*DCF(INUC,IORG,1)/AS
      DZS(ISTR,IORG,2)=DZS(ISTR,IORG,2)+AIF*DCF(INUC,IORG,1)/AS
      DZA(IORG,5)=DZA(IORG,5)+AIS*DCF(INUC,IORG,1)
   70 DZA(IORG,6)=DZA(IORG,6)+AIF*DCF(INUC,IORG,1)
   80 CONTINUE
C
C     LOOP 90 CALCULATES AVERAGED ACCIDENT
C
      DO 90 IORG=1,7
      DZA(IORG,7)=(DZA(IORG,5)+DZA(IORG,6))/(VSC+VFR)
      IF(VSC.GT.0.) DZA(IORG,5)=DZA(IORG,5)/VSC
      IF(VFR.GT.0.) DZA(IORG,6)=DZA(IORG,6)/VFR
   90 CONTINUE
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE TRANSP(TIMP,NSTR,NSPC)
C
C     SUBROUTINE TRANSP DETERMINES THE TRANSPORTATION SCHEME FOR ALL
C     WASTE STREAMS BASED ON THE PACKAGING INDEX OF THE SPECTRUM FILES
C     AND THE CONCENTRATIONS OF THE INDIVIDUAL STREAMS. ULTIMATE RESULT
C     IS THE TRANSPORTAION IMPACTS (TIMP)
C
      COMMON/WAST/BAS(36,32),ISPC(8,36,11)
     *      /DINX/IR,ID,IC,IX,IE
C
      DIMENSION PCAR(6,3),PPAK(8,6),KON(18),TYM(2,18),TCST(2,3),
     *          RDZ(2,3),TDZ(2,2),PKV(5),KNT(18),DIST(6),STPS(6),
     *          CASK(6),DUM1(3),DUM2(3),DUM3(3,3),TIMP(6),TVOL(5,3)
      DATA PCAR/1.,.8,.4,.2,.1,0.,0.,.2,.5,.6,.5,.2,0.,0.,.1,.2,.4,.8/
      DATA PPAK/0.,.23,5*0.,.1,.0,.08,.025,5*0.,.69,.69,.975,.2,1.,
     *          3*0.,.15,0.,0.,.8,0.,.5,2*0.,.16,4*0.,.5,1.,0.,
     *          3.,1.,.2,.4*3.,1./
      DATA KON/1103024,1104076,1236100,1370100,1411100,-1501100,
     *         2103100,2236096,-2206004,2370048,-2314051,-2306001,
     *         -2402100,-2501100,-3306051,-3301049,-3402100,-3501100/
      DATA TYM/200.,240.,74.,120.,10.,24.,6.,24.,136.,165.,1200.,1440.,
     *         300.,360.,26.,39.,250.,300.,10.,24.,46.,175.,200.,312.,
```

```
*          600.,720.,1200.,1440.,200.,312.,600.,720.,600.,720.,
*          1500.,1800./
      DATA ICST/1.69,1.25,1.47,1.14,1.17,1.08/
      DATA HDZ/500.,750.,1200.,1800.,2200.,2200./
      DATA IDZ/1.8E-2,2.0E-2,2.,2./
      DATA PRV/3.625,.453,.208,1.416,4.814/
      DATA KNI/16*0,2*1/
      DATA DIST/300.,900.,600.,1000.,2*400./
      DATA STPS/2*1.,2.,3.,2*1./
      DATA CASK/2.,3.,5.,8.,2*3./
C
C      THE ABOVE ARRAYS AND MATRICES ARE :
C        PCAK(6,3)    : CONTAINS 6 DISTRIBUTIONS OF 3 CARE TYPES
C        PPAK(8,6)    : CONTAINS 8 DISTRIBUTIONS OF 5 PACKING
C                       CONTAINERS, AND A POSITIONING INDEX
C        KON(18)      : MULTIPLE INDEX WHICH DESCRIBES THE
C                       PACKING CAPABILITIES FOR 3 CARE TYPES
C                       AND 5 CONTAINERS
C        TYM(2,18)    : TIME IN MINUTES FOR UNLOADING OF WASTE
C                       CORRESPONDING TO 18 VALUES OF KON
C        TCST(2,5)    : TRANSPORTATION COST ($) PER MILE
C        HDZ(2,5)     : DOSE PER HOUR OF CONTACT TIME WITH WASTE
C        IDZ(2,2)     : DOSE PER MILE FROM TRANSPORTATION AND LOOP
C                       SUM PARAMETERS
C        PRV(5)       : VOLUME CAPACITY FOR 5 CONTAINERS
C        KNI(18)      : INDEX TO RELATE TRANSPORT VEHICLE OVER-
C                       WEIGHT STATUS TO EACH OF KON INDICES
C        DIST(6)      : TRAVEL DISTANCE TO DISPOSAL SITE IN
C                       VARIOUS REGIONS
C        STPS(6)      : STATE INSPECTION STOPS TO BE EXPECTED IN
C                       THE VARIOUS REGIONS
C        CASK(6)      : NUMBER OF DAYS A CASK WOULD BE REQUIRED IN
C                       THE REGIONS
C
      CALL ZERO(TIMP,6)
      CALL ZERO(TVOL,15)
C
C      LOOP 160 DISTRIBUTES THE WASTE INTO THREE CARE TYPES AND AMONG
C      FIVE PACKING CONTAINERS .
C
      DO 160 IPAK=1,8
      NXBO
C
      CALL ZERO(DUM1,3)
C
C      LOOP 70 DISTRIBUTES WASTE AMONG CARE TYPES
C
      DO 70 ISTR=1,NSTR
      IF(ISPC(NSPC,ISTR,11),EQ,0) GO TO 70
      I2=IABS(ISPC(NSPC,ISTR,1))
      I1=I2/10
      IF(I1,NE,IPAK) GO TO 70
      I3=I2-I1*10
      A1=BAS(ISTR,28)
C
C      I1 = PACKAGING INDEX     I3 = CARE TYPE INDEX
C
C      THE FOLLOWING SECTION DETERMINES I4 = INDEX FOR CARE TYPE
C      DISTRIBUTION = BASED ON UNDECAYED TOTAL ACTIVITY OF STREAM.
C
```

```
      A2=ABS(ISTR,4)*100.
      IF(I3.EQ.2) A2=ABS(ISTR,4)*10.
      NX=1
      IF(I3.GT.2) GO TO 40
      I5=ALOG10(A2)
      IF(I3.EQ.2) GO TO 30
      IF(A2.LT.1.) I4=1
      IF(A2.GE.1.) I4=I5+2
      IF(I4.GT.6) I4=6
      GO TO 50
   30 IF(A2.LT.1.) I4=1
      IF(A2.GE.1.) I4=I5+2
      IF(I4.GT.4) I4=4
      GO TO 50
   40 I4=I3+2
   50 DO 60 I=1,3
   60 DUM1(I)=DUM1(I)+PCAR(I4,I)*A1
   70 CONTINUE
C
C      DUM1 CONTAINS WASTE VOLUME IN EACH OF 3 CASE TYPES
C
      IF(NX.EQ.0) GO TO 160
      A1=DUM1(1)+DUM1(2)+DUM1(3)
      I2=PPAK(IPAK,6)+0.1
C
C      LOOP 80 DISTRIBUTES WASTE AMONG CONTAINERS
C
      DO 80 I=1,3
      II=I-1
   80 DUM2(I)=PPAK(IPAK,I2+II)*A1
C
C      DUM2 CONTAINS WASTE VOLUME IN EACH OF THE 3 CONTAINERS
C      CONSIDERED IN THE FOLLOWING LOOPS.
C
      CALL ZERO(DUM3,9)
C
C      LOOP 150 DETERMINES PACKAGING STRATEGY FOR 3 CASE TYPES AND
C      3 CONTAINERS CONSIDERED FOR THIS LOOP OF IPAK. RESULTS ARE
C      PLACED IN DUM3.
C
      DO 130 J=1,3
      DO 120 I=1,3
      IF(DUM1(J).LE.0.0) GO TO 130
      IF(DUM2(I).LE.0.0) GO TO 120
      IF(DUM1(J)-DUM2(I))90,100,110
   90 DUM3(I,J)=DUM1(J)
      DUM2(I)=DUM2(I)-DUM1(J)
      DUM1(J)=-1.0
      GO TO 150
  100 DUM3(I,J)=DUM1(J)
      DUM2(I)=-1.0
      DUM1(J)=-1.0
      GO TO 150
  110 DUM3(I,J)=DUM2(I)
      DUM1(J)=DUM1(J)-DUM2(I)
      DUM2(I)=-1.0
  120 CONTINUE
  130 CONTINUE
      DO 150 I=1,3
      II=I-1
```

```
      DO 150 J=1,3
  150 TVOL(I2+I1,J)=TVOL(I2+I1,J)+DUMS(I,J)
  160 CONTINUE
C
C       TVOL CONTAINS TOTAL WASTE VOLUME DISTRIBUTED FOR 3 CASK TYPES
C       AND 5 CONTAINERS FOR ALL WASTE STREAMS
C
C       LOOP 240 CALCULATES THE TRANSPORTATION IMPACTS FROM THE
C       TVOL DISTRIBUTION.
C       RESULTS ARE PLACED IN TIMP ARRAY, WHERE I
C         TIMP(1) = DOLLARS
C         TIMP(2) = ENERGY USE
C         TIMP(3) = TRANSPORTATION OCCUPATIONAL DOSE
C         TIMP(4) = TRANSPORTAION POPULATION DOSE
C         TIMP(5) = DISPOSAL SITE OCCUPATIONAL DOSE (UNLOADING)
C         TIMP(6) = TRANSPORTATION OCCUPATIONAL DOSE (LOADING)
C
      DO 240 IKON=1,18
      II=KON(IKON)
      NX=1
      FRC=1.0
C
C       IF KON INDEX IS NEGATIVE THEN RETURN TRIP IS NECESSARY.
C
      IF(II.GT.0) GO TO 210
      II=-II
      NX=2
  210 I3=II/100000
      I2=I3/10
      I1=I3-I2*10
      I5=II-I3*100000
      I3=I5/1000
      I4=I5-I3*1000
C
C       IN SECTION ABOVE, KON IS BROKEN UP INTO
C       I1 = PACKAGE TYPE          I3 = NO. OF PACKAGES THIS SHIPMENT
C       I2 = CASK TYPE             I4 = PCT. OF WASTE SENT THIS SHIPMENT
C
      IF((I2.EQ.1).OR.(I2.EQ.2.AND.NX.EQ.2)) FRC=0.1
      FRS=I4/100.
      A1=TVOL(I1,I2)*FRS
      IF(A1.LT.1.E-06) GO TO 240
      KSHP=A1/(I3*PKV(I1))+1.0
      A2=KSHP*DIST(IR)
      A3=A2*NX
      TIMP(2)=TIMP(2)+A3/6.
C
C       IN ABOVE EQUATION 6 REPRESENTS MPG FUEL CONSUMPTION.
C
      TIMP(4)=TIMP(4)+(A2*TDZ(1,1)+KSHP*TDZ(1,2)*STPS(IR))*FRC
      TIMP(3)=TIMP(3)+(A2*TDZ(2,1)+KSHP*TDZ(2,2)*STPS(IR))*FRC
      NC=3
      IF(DIST(IR).GT.400..AND.DIST(IR).LT.1000.) NC=2
      IF(DIST(IR).LE.400.) NC=1
      TIMP(1)=TIMP(1)+A3*TCST(NX,NC)*1.15
C
C       IN NEXT SECTION CASK RENTAL FEE AND OVERWEIGHT FEE ADDED, IF
C       APPLICABLE.
C
      IF(NX.EQ.1) GO TO 220
```

```
      TIMP(1)=TIMP(1)+XSHP*CASK(IH)*250.
      IF(XWT(IKON).GT.0)TIMP(1)=TIMP(1)+A2*0.70+00.*STPS(IH)
  220 XPAK=PAK/PRV(I1)+1.0
      NX=2
      IF(IE.EQ.1.OR.IE.EQ.4) NX=1
      FRC=1.0
      IF(IE.EQ.3) FRC=2.0
      A2=XPAK*1.E-3/60.
      TIMP(5)=TIMP(5)+A2*TYM(NX,IKON)*RND2(NX,I2)*FRC
      TIMP(6)=TIMP(6)+A2*TYM(2,IKON)*RND2(2,I2)
  240 CONTINUE
 3002 FORMAT(1P,*TVOL   *3E10.2)
 3003 FORMAT(1P,*TIMPS      *6E10.2)
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE ECON(NSTR,RI,RJ,COST,NDX,NSPC)
C
C       SUBROUTINE ECON CALCULATES THE DISPOSAL IMPACTS BASED LARGELY
C       ON THE INPUTED VALUES FOR THE DISPOSAL TECHNOLOGY INDICES.
C       THE RESULTS OF THIS ROUTINE ARE PLACED IN ARRAY COST, WHERE :
C           COST(1) = PRE-OP AND OPERATIONAL COST
C           COST(2) = OCCUPATIONAL DOSE
C           COST(3) = ENERGY USE
C           COST(4) = LAND USE
C           COST(5) = TOTAL POST OPERATIONAL COST
C           COST(6) = COST FOR CLOSURE PERIOD
C           COST(7) = COST FOR OBSERVATIONAL PERIOD
C           COST(8) = COST FOR INSTITUTIONAL CONTROL
C
      COMMON/BAST/BAS(36,32),ISPC(4,36,11)
     *       /DTNX/IR,IO,IC,IX,IE,IS,IL,IG,IM,ICL,IPO,TIC
     *       /VOL/VREG,VLAY,VHOT
      DIMENSION EMP(5),EFF(2),SEFF(2),AMULT(2),CONT(6),ICONX(36),
     *          IMA(2),COST(8),NDX(36)
      DATA EMP/.5,.75,.5,.5,.75/
      DATA EFF/0.4,7.0/
      DATA SEFF/0.9,0.35/
      DATA AMULT/10.38,1.56/
      DATA CONT/1007.,367.,367.,0.,36M.,1007./
      DATA ICONX/7*0,1,0,1,0,18*1, *0/
      DATA IMA/2,4/
      DATA ITO/20/
      DATA F/.015/
C
C       ARRAYS NEWLY INTRODUCED ABOVE ARE :
C         AMULT(2)  : CAPITAL AND OPERATIONS COST ($) MULTIPLIERS
C         CONT(6)   : CONTIGENCY COSTS FOR SOIL PERMEABILITY
C                     CONDITIONS
C         COST(8)   : CONTAINS RESULTANT IMPACTS OF LAND USE,
C                     ENERGY USE, DOSES, AND DOLLARS
C
      CALL ZERO( UST,8)
C
      VSTA=0.0
      VUNS=0.0
      DCUN=0.0
      DO 5 ISTR=1,NSTR
```

```
      I11=ISPC(NSPC,ISTR,1)
      I2=ISPC(NSPC,ISTR,2)
      IZ=ICONX(ISTR)
      IW=NDX(ISTR)
      IF(IW.GT.1) I2=1
      IF(I11.EQ.0.OR.I11.EQ.3) GO TO 5
      IF(IE.NE.3) GO TO 4
      IF(I2.EQ.1.OR.IZ.EQ.0) GO TO 4
      DCON=DCON+HAS(ISTR,3)
    4 CONTINUE
      IF(I2.EQ.0) VSTAB=VSTAB+HAS(ISTR,3)
      IF(I2.EQ.1) VUNS=VUNS+HAS(ISTR,3)
    5 CONTINUE
      IF(IE.EQ.3)IS=1
C
C       VSTA  3 ) VUNS CONTAIN STABLE AND UNSTABLE WASTE VOLUMES,
C       RESPEC..VELY,
C
      DLAY=VLAY*1.00E-06
      DREG=(VREG+VLAY)*1.0E-6
      DHOT=VHOT*1.0E-6
      SV=DREG*((1.1567/EMP(IE))-1.)
      DCON=DCON*1.0E-06
      DVOL=DREG/EMP(IE)
      DAREA=DVOL/(EFF(ID)*SEFF(ID))
      GV=(1.-EMP(IE))*DVOL
C
C       VOLUME AND AREA VALUES ARE EXPRESSED IN UNITS OF MILLION M$ OR M2
C       FOR USE IN COST EVALUATIONS, GV IS GHOUT VOLUME, SV IS SAND
C       VOLUME,
C
      COST(4)=DAREA*1.0E+06+(DHOT/1.88)*1.0E+06
      S1=(VSTAB/VREG)*DAREA
      S2=(VUNS/VREG)*DAREA
C
C       IN FOLLOWING SECTION, C1,C2,AND C3 WILL ACCUMULATE THE DOLLAR,
C       DOSE, AND ENERGY COSTS THROUGH THE VARIOUS PHASES OF THE STTE
C       ..ES.
C
C       PRE-OPERATIONAL (CAPITAL) COSTS
C
C       ******* REFERENCE BASE CASE ********
      C1=7452.
      COST(3)=212.
C       ******* ADDITIVE ALTERNATIVES ******
      IF(ID.EQ.2) C1=C1+593.5
      IF(IE.EQ.2.OR.IE.EQ.5) C1=C1+225.5
      IF(IS.EQ.1) C1=C1+0.99
      IF(IL.EQ.1) C1=C1+132.
      IF(IE.EQ.3) C1=C1+924.3
      IF(IH.EQ.1) C1=C1+259.5
      IF(IG.EQ.1) C1=C1+5..
      IF(IC.EQ.3) C1=C1+280.5
      IF(IX.EQ.3) C1=C1+9.9
      CAP=C1*AMULT(1)
C
C       OPERATIONAL COSTS
C
C       ******* REFERENCE BASE CASE *******
      C1=2341.*DVOL
```

```
      C2=500.*DVOL
      C3=200.*DVOL
      C1=C1+1420.*DAREA
      C2=C2+2400.*DAREA
      C3=C3+100.*DAREA
      C1=C1+63690.
      C2=C2+1000.
      C3=C3+200.
C
C       ******* ADDITIVE ALTERNATIVES *****
      IF(ID.NE.2) GO TO 20
      C1=C1+74438.*DVOL
      C2=C2+700.*DVOL
      C3=C3+500.*DVOL
   20 IF(IE.NE.2) GO TO 24
      C1=C1+12758.*DREG
      C2=C2+100.*DREG
      C3=C3+100.*DREG
   24 IF(IE.NE.5) GO TO 25
      C1=C1+12758.*DREG
      C2=C2+100.*DREG
      C3=C3+100.*DREG
   25 IF(IS.NE.1) GO TO 30
      C1=C1+3888.*DREG
      C2=C2+100.*DREG
      C3=C3+30.*DREG
   30 IF(IL.NE.1) GO TO 35
      C1=C1+15400.*DLAY
      C2=C2+(-100.)*DLAY
      C3=C3+30.*DLAY
   35 IF(IE.NE.3) GO TO 40
      C1=C1+48975.*DCON
      C2=C2+400.*DCON
      C3=C3+100.*DCON
   40 IF(IH.NE.1) GO TO 45
      C1=C1+176979.*DHOT
      C2=C2+(-200.)*DHOT
      C3=C3+450.*DHOT
   45 IF(IG.NE.1) GO TO 46
      C1=C1+72400.*GV
      C2=C2+2250.*GV
      C3=C3+800.*GV
   46 IF(IE.LT.4) GO TO 50
      C1=C1+3720.*SV
      C3=C3+185.*SV
   50 IF(IC.NE.2) GO TO 55
      C1=C1+1[illegible]24.*DAREA
      C2=C2+2400.*DAREA
      C3=C3+150.*DAREA
   55 IF(IC.NE.3) GO TO 60
      C1=C1+103854.*DAREA
      C2=C2+2400.*DAREA
      C3=C3+300.*DAREA
   60 IF(IX.EQ.1) GO TO 75
      S3=S2
      IF(IS.EQ.0) S3=S1+S2
      IF(ID.EQ.2)S3=0
      IXX=IX+1
      GO TO (65,70),IXX
   65 C1=C1+5465.*S3
```

```
      C2=C2+4800.*S3
      C3=C3+3[illegible].*S3
      GO TO 75
   70 C1=C1+33345.*S3
      C2=C2+4800.*S3
      C3=C3+6[illegible].*S3
   75 UPS=C1*AMULT(2)
      COST(2)=COST(2)+C2
      COST(3)=COST(3)+C3
C
C       POST-OPERATIONAL COSTS
C
C       ICL IS BROKEN INTO TWO PARTS TO INDICATE THE LEVEL OF
C       CLOSURE AND INSTITUTIONAL CARE
C
C       ******* CLOSURE PERIOD *******
      ICL1=ICL/10
      ICL2=ICL-ICL1*10
      C1=1010.
      C2=500.
      C3=15.
      IF(ICL1.NE.2) GO TO 76
      C1=3025.
      C2=1000.
      C3=60.
C
C       ******* INSTITUTIONAL PERIOD ******
C
C       DOLLAR COST SECTION
C
   76 CA=150.
      CH=63.
      CC=51.
      COM=90.54
      IF(ICL2.NE.2) GO TO 77
      CA=303.
      CH=150.
      CC=63.
      COM=186.9
   77 IF(ICL2.NE.3) GO TO 78
      CA=440.+CONT(IR)
      CH=303.
      CC=150.
      COM=203.35
   78 S1=0.0
      S2=0.0
      S3=0.0
      DO 80 N=1,10
      E=N
      D1=(1.+RJ)**E
      D2=(1.+RI)**E
   80 S1=S1+D1/D2
      DO 85 N=11,25
      E=N
      D1=(1.+RJ)**E
      D2=(1.+RI)**E
   85 S2=S2+D1/D2
      DO 90 N=26,IIC
      E=N
      D1=(1.+RJ)**E
```

```
      D2=(1.+RI)**E
   90 S3=S3+D1/D2
      IM1=IMA(ICL1)
      IM=IPU-IM1
      S4=0.0
      IF(IM.LT.1) GO TO 95
      DO 93 N=1,IM
      E=N
      D1=(1.+RJ)**E
      D2=(1.+RI)**E
   93 S4=S4+D1/D2
   95 CONTINUE
      PVB0=CA*S1+CB*S2+CC*S3
      M=IPU+ITU
      M1=ITU+IM1
      EM=M
      EITU=ITU
      EIPU=IPU
      EM1=M1
      D1=(1.+RJ)**EITU
      D2=(1.+RJ)**EM
      D3=(1.+RI)**EITU
      D4=(1.+RJ)**EIPU
      D5=(1.+RJ)**EM1
      D6=(((1.+RI)**EM1)-1.)
      COST(8)=(EITU*PVB0*D2*RI)/((D3-1.)*D4)
      COST(7)=EITU*CUM*D5*S4*RI/D6
      COST(6)=EITU*D1*C1*(F+(RI/(D3-1.)))
      COST(1)=CAP+UPS
      COST(5)=COST(6)+COST(7)+COST(8)
C
C       ENERGY USE SECTION
C
      IICC=(IIC-26)+1
      GO TO (100,110,120),ICL2
  100 C3=C3+10*5.+15*3.+IICC*1.
      GO TO 125
  110 C3=C3+10*10.+15*5.+IICC*3.
      GO TO 125
  120 C3=C3+10*12.+15*10.+IICC*5.
  125 CONTINUE
      COST(1)=COST(1)*1000.
      COST(2)=COST(2)+C2
      COST(5)=COST(5)*1000.
      COST(3)=COST(3)+C3
      COST(3)=COST(3)*1000.
      COST(6)=COST(6)*1000.
      COST(7)=COST(7)*1000.
      COST(8)=COST(8)*1000.
      RETURN
      END
C
C*************************************.*****************************
C
      SUBROUTINE ZERO(A,N)
C
      DIMENSION A(N)
      DO 10 I=1,N
   10 A(I)=0.0
      RETURN
```

```
      END
C
C*****************************************************************************
C
      FUNCTION EXM(A1)
C
      A2=0.0
      IF(A1.LT.230.) A2=EXP(-A1)
      EXM=A2
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE PRT(V,IQ,N,ID,NDX,NSPC)
C
C      SUBROUTINE PRT IDENTIFIES AND PRINTS OUT THE WASTE STREAMS
C      CLASSIFIED INTO THE FOUR TYPES : REGULAR, LAYERED, HOT, AND
C      NOT ACCEPTABLE
C
      COMMON/BAST/BAS(36,32),ISPC(4,36,11)
      DIMENSION LAB(4),IQ(36),NDX(36)
      DATA LAB/10HCH-STAB   ,10HCH-UNSTAB ,10HNCH-STAB  ,10HNCH-UNSTAB/
      IF(N.EQ.0)RETURN
      GO TO (10,10,50,70),ID
   10 IF(ID.EQ.1)WRITE(4,410)V
      IF(ID.EQ.2)WRITE(4,420)V
      DO 25 K=1,4
      IT=0
      VTOT=0.0
      DO 20 I=1,N
      ISTR=IQ(I)
      I8=ISPC(NSPC,ISTR,8)
      I7=ISPC(NSPC,ISTR,7)
      IF(NDX(ISTR).GT.1) I8=1
      IF(K.NE.1.AND.I7.EQ.1.AND.I8.EQ.1) GO TO 20
      IF(K.NE.2.AND.I7.EQ.1.AND.I8.EQ.0) GO TO 20
      IF(K.NE.3.AND.I7.EQ.0.AND.I8.EQ.1) GO TO 20
      IF(K.NE.4.AND.I7.EQ.0.AND.I8.EQ.0) GO TO 20
      IF(IT.EQ.0)WRITE(4,430)LAB(K),BAS(ISTR,1),BAS(ISTR,3)
      IF(IT.EQ.1)WRITE(4,440)BAS(ISTR,1),BAS(ISTR,3)
      IT=1
      VTOT=VTOT+BAS(ISTR,3)
   20 CONTINUE
      IF(IT.EQ.1) WRITE(4,470)VTOT
   25 CONTINUE
      RETURN
   50 WRITE(4,450)V
      DO 55 I=1,N
      ISTR=IQ(I)
   55 WRITE(4,440)BAS(ISTR,1),BAS(ISTR,3)
      RETURN
   70 WRITE(4,460)V
      DO 75 I=1,N
      ISTR=IQ(I)
   75 WRITE(4,440)BAS(ISTR,1),BAS(ISTR,3)
  410 FORMAT(1P,/2X,*REGULAR WASTE *,21X,E10.3,5H M**3)
  420 FORMAT(1P,/2X,*LAYERED WASTE *,21X,E10.3,5H M**3)
  450 FORMAT(1P,7X,A10,A10,E10.3)
  440 FORMAT(1P,17X,A10,E10.3)
```

```
450 FORMAT(1P,//2X,*UNIT WASTE      *,21X,E10.3,3H ***)
460 FORMAT(1P,//2X,*UNIT ACCEPTABLE*,21X,E10.3,3H ***)
470 FORMAT(1P,1HX,*TOTAL VOLUME   *,5X,E10.3,3H ***)
    RETURN
    END
```

```
      PROGRAM INVERSI(INPUT,OUTPUT,TAPE1,TAPE4=OUTPUT,TAPE5=INPUT)
C
C*****************************************************************************
C       THIS IS THE INVERSE INTRUDER AND ACCIDENT CODE. IT FINDS              *
C       THE INDIVIDUAL NUCLIDE CONCENTRATIONS NECESSARY TO REACH              *
C       DOSE LIMITATIONS DEFINED BY NRC, AND ASSIGNED BY ARRAYS               *
C       DLC, DLCEA, DLCE=, AND DLCAC FOR INADVERTENT INTRUDER                 *
C       AND ACCIDENT SCENARIOS.                                               *
C       TAPE1 CONTAINS NSTR(NUMBER OF STREAMS), NNUC(NUMBER OF                *
C        NUCLIDES), FICRP(ICRP FACTORS), THE DCF MATRIX, AND                  *
C        THE DTIS AND NUCS BLOCKS.                                            *
C       TAPE4 CONTAINS PROGRAM OUTPUT                                         *
C       TAPE5 IS USED TO INPUT TITLES, AND IRDC AND ISPC VALUES.              *
C*****************************************************************************
C
      COMMON/BAST/DCF(23,7,8),FICRP(7)
     *      /NUCS/NUC(23),AL(23),FMF(23),HET(23,5)
     *      /DTNX/IRDC(12)
     *      /DTIS/FSC(6),FSA(6),PRC(6,2),QFC(6,5),TTM(6,3),TPC(6,3),
     *            AGF(6,3),PUP(6,3),DTTM(6),DTPC(6),TPD(6,2),NRET(6)
     *      /IMPS/DMY(23,8,14)
C
C       MOST OF THE MATRICES AND ARRAYS ABOVE ARE EXPLAINED IN TABLE B.12
C       DTNX BLOCK CONTAINS THE DISPOSAL TECHNOLOGY INDICES (IRDC).
C       DMY(23,8,14) WILL CONTAIN THE CONCENTRATIONS FOR ALL NUCLIDES,
C       7 ORGANS, AND SEVERAL PATHWAYS.
C
      DIMENSION NOTE(2),ORGAN(8),DES(20),ISPC(11)
      DATA ORGAN/10H   BODY   ,10H   BONE   ,10H   LIVER  ,
     *           10H  THYROID ,10H  KIDNEY  ,10H   LUNG   ,
     *           10H  GI-LLI  ,10H  MINIMUM /
      DATA DES/10H UNS1-CON ,10H UNS1-AGR ,10H STA1-CON ,10H STA1-AGR ,
     *         10H UNSL-CON ,10H UNSL-AGR ,10H STAL-CON ,10H STAL-AGR ,
     *         10H GEN5-CON ,10H GEN5-AGR ,10H HWF1-CON ,10H HWF1-AGR ,
     *         10H HWF2-CON ,10H HWF2-AGR ,10H INT-AIR  ,10H ERO-AIR  ,
     *         10H INT-WAT  ,10H ERO-WAT  ,10H ACC-CONT ,10H ACC-PIPE /
      DATA AL240/1.05E-04/
C
C       THE ABOVE ARRAYS ARE :
C         NOTE(2)     : HEADER LABEL FOR OUTPUT IDENTIFICATION.
C         ORGAN(8)    : DESCRIPTION OF 7 ORGANS AND A MINIMUM COLUMN.
C         DES(20)     : DESCRIPTIONS OF PATHWAYS IN INTRUDER AND
C                       ACCIDENT SCENARIOS.
C         ISPC(11)    : SPECTRUM INDICES READ IN THRU INPUT.
C
      REWIND 1
C
      CALL READIN(NNUC)
C
C       NEXT SECTION READS INPUT VALUES FROM TAPE5
C
      READ(5,110) IREP
      DO 150 IREP=1,IREP
      READ(5,120) NOTE
      READ(5,130) (IRDC(I),I=1,12),NREST
      READ(5,140) (ISPC(J),J=4,9)
  110 FORMAT(I2)
  120 FORMAT(2A10)
  130 FORMAT(9I2,I3,I2,I4,I2)
  140 FORMAT(6I2)
```

INVERSI

```
C
      WRITE(4,1005) NOTE
      WRITE(4,1010)(IRDC(I),I=1,12)
      WRITE(4,1020)(ISPC(J),J=4,9)
      WRITE(4,1025) NHEST
C
      CALL ZERO(DMY,2576)
      CALL MINV(ISPC,NNUC,NHEST)
      CALL MIN(DMY,14)
C
C      DO 40 LOOP CONSIDERS DAUGHTER IN-GROWTH AND PRINTS OUT INTRUDER
C      CONCENTRATIONS TO OUTPUT.
C
      WRITE(4,1006)
      DO 40 K=1,14
      A1=DMY(17,8,K)
      A2=DMY(22,8,K)
      A3=A1*AL(22)/AL(17)
      IF(A1.NE.A2.AND.A3.LT.A2) DMY(22,8,K)=A3
      A1=DMY(17,8,K)
      A2=DMY(23,8,K)
      A3=A1*AL(23)/AL200
      IF(A1.NE.A2.AND.A3.LT.A2) DMY(23,8,K)=A3
      A1=DMY(20,8,K)
      A2=DMY(18,8,K)
      A3=A1*AL(18)/AL(20)
      IF(A1.NE.A2.AND.A3.LT.A2) DMY(18,8,K)=A3
      WRITE(4,1001) DES(K),(ORGAN(J),J=1,8)
      WRITE(4,1002)(NUC(I),(DMY(I,J,K),J=1,8),I=1,NNUC)
   40 CONTINUE
C
      CALL ZERO(DMY,1104)
      CALL AINV(ISPC,NNUC)
      CALL MIN(DMY,6)
C
C      DO 50 LOOP IS SIMILAR TO 40 LOOP, ONLY NOW FOR ACCIDENT
C      SCENARIOS.
C
      WRITE(4,1007)
      DO 50 K=1,6
      KK=K+14
      WRITE(4,1001) DES(KK),(ORGAN(J),J=1,8)
      WRITE(4,1002)(NUC(I),(DMY(I,J,K),J=1,8),I=1,NNUC)
   50 CONTINUE
   60 CONTINUE
  150 CONTINUE
 1001 FORMAT(//2X,A9,2X,8A10)
 1002 FORMAT(1P,2X,A10,8E10.2)
 1005 FORMAT(1H1/2X,2A10)
 1006 FORMAT(//2X,*INTRUDER CONCENTRATIONS*)
 1007 FORMAT(//2X,*ACCIDENT CONCENTRATIONS*)
 1010 FORMAT(/2X,*DISPOSAL TECHNOLOGY INDICES*/2X
     *            *IH =*I2*  ID =*I2*  IC =*I2*  IX =*I2/2X
     *            *IE =*I2*  IS =*I2*  IL =*I2*  IG =*I2/2X
     *            *IH =*I2*  ICL=*I2*  IPU=*I2*  IIC=*I2)
 1020 FORMAT(/2X,**ASTE FORM BEHAVIOR INDICES*/2X
     *            *FLAM  =*I2*   DISP  =*I2/2X
     *            *LEACH =*I2*   CHEM  =*I2/2X
     *            *STAHI =*I2*   ACCES =*I2/)
 1025 FORMAT(/2X,*NHEST =*I2/)
```

```
      STOP
      END
C
C*****************************************************************************
C
      SUBROUTINE READIN(NNUC)
C
C       THIS ROUTINE READS IN VALUES IN THE COMMON BLOCKS OFF
C       OF TAPE 1.
C
      COMMON/BAST/DCF(23,7,8),FICRP(7)
     *       /NUCS/NUC(23),AL(23),EMF(23),RET(23,5)
     *       /DTIS/FSC(6),FSA(6),PRC(6,2),WFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),POP(6,3),DTTM(6),DTPC(6),TPD(6,2),RRET(6)
      READ(1,101)NSTR,NNUC,FICRP
      DO 20 I=1,NNUC
      READ(1,102)NUC(I),AL(I),EMF(I),RET(I,1),RET(I,4)
      DO 10 K=1,8
      READ(1,104)(DCF(I,J,K),J=1,7)
   10 CONTINUE
   20 CONTINUE
      DO 30 I=1,6
      READ(1,103)FSC(I),FSA(I),(PRC(I,J),J=1,2),(WFC(I,J),J=1,3),
     *           (TTM(I,J),J=1,3),(TPC(I,J),J=1,3),
     *           (RGF(I,J),J=1,3),(POP(I,J),J=1,3),RRET(I),
     *           DTTM(I),DTPC(I),(TPD(I,J),J=1,2)
   30 CONTINUE
  101 FORMAT(2I5,7F5.2)
  102 FORMAT(A10,4E10.3)
  103 FORMAT(10X,7E10.3/10X,6E10.3/10X,6E10.3,I5/10X,4E10.3)
  104 FORMAT(10X,7E10.3)
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE RINV(ISPC,NNUC,NREST)
C
C       THIS ROUTINE DOES MOST OF THE WORK IN CALCULATING THE
C       CONCENTRATIONS FOR THE INTRUDER SCENARIOS, IT IS SIMILAR
C       TO SUBROUTINE RCLAIM IN THE OTHER CODES, EXCEPT HERE THE
C       PATHWAY EQUATIONS HAVE BEEN MODIFIED TO FIND A CONCENTRATION
C       WHEN A DOSE IS GIVEN.
C
      COMMON/BAST/DCF(23,7,8)
     *       /NUCS/NUC(23),AL(23),EMF(23),RET(23,5)
     *       /DTNX/IR,ID,IC,IX,IE,IS,IL,IG,IM,ICL,IPD,TIC
     *       /DTIS/FSC(6),FSA(6)
     *       /IMPS/DMY(23,8,14)
      DIMENSION EMP(3),DLC(7),ISPC(11)
      DATA EMP/.5,.75,.5/,
     *     DLC/2*500.,1500.,3000.,3*1500./
C
C       THE ABOVE ARRAYS ARE :
C         EMP(3)      : VOLUME EMPLACEMENT EFFICIENCIES
C         DLC(7)      : DOSE LIMITING CRITERIA FOR 7 ORGANS.
C         ISPC(11)    : SPECTRUM INDICES PASSED FROM MAIN PROGRAM
C
      IS=ISPC(5)
      IG=ISPC(6)
```

```
      I7=ISPC(7)
      I8=ISPC(8)
      I9=ISPC(9)
      NSTM=0
      IF(I8.EQ.1.AND.IS.EQ.1)NSTM=1
      A7=1.0
      IF(I6.EQ.2.OR.I6.EQ.3) A7=0.80
      IF(I7.EQ.1.OR.I8.EQ.0) I6=I6=1
      FDES=EMP(IE)*(1.+.9*IG)
      IF(I9.EQ.3)A7=A7*10.
      A5=1.0
      IF(I5.LT.5) A5=10.**(I5-5)
      A6=1.0
      IF(I6.GT.1) A6=4.**(1-I6)
      A9=1.0
      IF(I9.GT.1) A9=10.**(1-I9)
C
C      DO LOOP SO IN CONCENTRATION CALCULATIONS SETS UP
C      PARAMETERS NEEDED FOR TESTING WASTE STREAMS AT ALL THREE
C      CLASSIFICATION LEVELS: REGULAR, LAYERED, AND HOT.
C
      DO 50 I3=1,7
      GO TO (11,12,13,14,15,16,17),I3
   11 GDEL=IPU+IIC
      IF(IC.EQ.3) GDEL=IPU+500.
      A4C=1.0
      A4A=1.0
      A8C=A7
      A8A=A7
      GO TO 20
   12 GDEL=IPU+IIC
      IF(IC.EQ.3) GDEL=IPU+500.
      A4C=0.012
      A4A=0.0
      A8C=0.012*A7
      A8A=0.0
      GO TO 20
   13 GDEL=IPU+IIC
      IF(IC.EQ.3) GDEL=IPU+500.
      A4C=0.1
      A4A=0.0
      A8C=A7/1200.
      A8A=0.0
      GO TO 20
   14 GDEL=IPU+IIC
      IF(IC.EQ.3)GDEL=IPU+500.
      A4C=0.012
      A4A=0.0
      A8C=0.012*A7/1200.
      A8A=0.0
      GO TO 20
   15 GDEL=IPU+500.
      A4C=1.0
      A4A=1.0
      A8C=A7
      A8A=A7
      GO TO 20
   16 GDEL=IPU+IIC
      IF(IC.EQ.3)GDEL=IPU+500.
      A4C=0.01
```

```
      ABC=0.1**7/1.44E6
      IF(IG.EQ.0)ABC=0.1*ABC
      AQA=0.0
      ABA=0.0
      GO TO 20
   17 GDEL=IPD+1000.
      AQC=1.0
      ABC=A7
      IF(IG.EQ.0)ABC=0.1*ABC
      AQA=1.0
      ABA=ABC
C
C       DO LOOP 40 IS THE MAIN CALCULATION LOOP.
C
   20 DO 40 INUC=1,NNUC
      A1=A9*FDES*EXM(AL(INUC)*GDEL)
      DO 30 I=1,7
      A2=DCF(INUC,I,5)
      B5=0.25*A1*ABA*A2*0.27
      B2=A1*ABC*A2*0.057
      IF(NREST.EQ.0) GO TO 25
      B1=A1*AQC*A5*FSC(IR)*DCF(INUC,I,2)
      B3=0.25*A1*AQA*A5*FSA(IR)*DCF(INUC,I,3)
      B4=0.5*0.25*A1*AQA*A6*FMF(INUC)*DCF(INUC,I,4)
      GO TO 35
   25 B1=A1*AQC*FSC(IR)*DCF(INUC,I,2)
      B3=0.25*A1*AQA*FSA(IR)*DCF(INUC,I,3)
      B4=0.5*0.25*A1*AQA*DCF(INUC,I,4)*FMF(INUC)
   35 J=(I3-1)*2
      A2=B1+B2
      A3=B3+B4+B5
      IF(A2.NE.0.)DMY(INUC,I,J+1)=DLC(I)/A2
      IF(A3.NE.0.)DMY(INUC,I,J+2)=DLC(I)/A3
C
C       DMY CONTAINS CONCENTRATIONS FOR 2 INTRUDER PATHWAYS
C         (J+1) :  CONSTRUCTION
C         (J+2) :  AGRICULTURE
C
   30 CONTINUE
   40 CONTINUE
   50 CONTINUE
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE AINV(ISPC,NNUC)
C
C       THIS ROUTINE PERFORMS FUNCTIONS SIMILAR TO SUBROUTINE
C       RINV, ONLY NOW FOR THE ACCIDENT SCENARIOS.
C
      COMMON/MAST/DCF(23,7,8)
     *       /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *       /DINX/IW,ID,IC,IX,IE,IS,IL,IG,IM,ICL,IPD,ITC
     *       /DTIS/FSC(6),FSA(6),PRC(6,2),QFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),PUP(6,3),DTTM(6),DTPC(6),TPD(6,2),NRET(6)
     *       /IMPS/DMY(23,8,6)
      DIMENSION EMP(3),FFF(2),SEFF(2),DLCEA(7),DLCEM(7),DLCAC(7),
     *          ISPC(11)
      DATA EMP/.5,.75,.5/,
```

```
     *     EFF/0.4,7.0/,
     *     SEFF/0.9,0.35/,
     *     DLCEA/7*100./,
     *     DLCEW/7*4./,
     *     DLCAC/7*500./
C
C      THE ABOVE ARRAYS ARE:
C        EMP(5)     : VOLUME EMPLACEMENT EFFICIENCIES
C        EFF(2)     : LAND USE VOLUME EFFICIENCIES
C        SEFF(2)    : LAND USE SURFACE AREA EFFICIENCIES
C        DLCEA(7)   : DOSE LIMITING CRITERIA FOR EROSION AIR PATH
C        DLCEW(7)   : DOSE LIMITING CRITERIA FOR EROSION WATER PATH
C        DLCAC(7)   : DOSE LIMITING CRITERIA FOR CONTAINER ACCIDENT
C        ISPC(11)   : SPECTRUM INDICES PASSED FROM MAIN PROGRAM
C
      GREC=IPU+IIC
      GERU=IPU+2000.
      IF(IC.EQ.2)GERU=IPU+3000.
      IF(IC.EQ.3)GERU=IPU+10000.
      AREA=1.ME3*EMP(IE)/4.0
C     AREA=18.*EMP(IE)/4.0
C     AREA=2.*EMP(IE)*0.012
C     AREA=200.*EMP(IE)*0.012
C     AREA=0.2*EMP(IE)
C
C      NEXT SECTION ESTABLISHES AREAL FACTORS FOR 4 EXPOSURE PATHWAYS
C
      FRA=5.72E-5*POP(IR,1)*AREA
      VOR=EFF(IO)*1E-6
      FEA=8.09E-6*POP(IR,2)/VOR
      FRW=1.15E-4*POP(IR,3)*AREA
      FEW=1.15E-4*POP(IR,3)/VOR
      IS=ISPC(5)
      AS=1.0
      IF(IS.LT.3) AS=10.**(IS-3)
      I9=ISPC(9)
      A9=1.0
      IF(I9.GT.1) A9=10.**(1-I9)
C
C      LOOP 20 IS MAIN LOOP FOR EXPOSURE CONCENTRATION CALCULATIONS
C
      DO 20 INUC=1,NNUC
      A6=EXM(GREC*AL(INUC))
      A7=EXM(GERU*AL(INUC))
      DO 10 IORG=1,7
      F1=FRA**A6*DCF(INUC,IORG,6)*AS*A9
      F2=FEA**A7*DCF(INUC,IORG,6)
      F3=FRW**A6*AS*DCF(INUC,IORG,7)
      F4=FEW**A7*DCF(INUC,IORG,7)
      IF(F1.NE.0.) DMY(INUC,IORG,1)=DLCEA(IORG)/F1
      IF(F3.NE.0.) DMY(INUC,IORG,3)=DLCEW(IORG)/F3
      IF(F2.NE.0.) DMY(INUC,IORG,2)=DLCEA(IORG)/F2
      IF(F4.NE.0.) DMY(INUC,IORG,4)=DLCEW(IORG)/F4
   10 CONTINUE
   20 CONTINUE
C
C      NEXT SECTION SETS UP PARAMETERS FOR FIRE(FAF) AND SINGLE
C      CONTAINER(FAS) ACCIDENTS.
C
      FAF=TPU(IR,1)*0.1
```

```
      FAS=IPD(IR,2)
      I4=ISPC(4)
      I5=ISPC(5)
      I6=ISPC(6)
      I9=ISPC(9)
      A6=1.0
      IF(I5.EQ.3) A6=1.0
      IF(I5.LT.3.AND.I6.EQ.1) A6=0.1
      IF(I6.EQ.2.OR.I6.EQ.3) A6=0.01
      IF(I6.EQ.4) A6=0.001
      FAS=FAS*A6
      IF(I4.LT.3) FAF=FAFA(20.**(I4-3))
      A9=1.0
      IF(I9.GT.1) A9=0.0
      IF(I5.EQ.1.AND.I4.NE.3) FAF=0.
C
C     LOOP 70 IS MAIN LOOP FOR ACCIDENT CONCENTRATION CALCULATIONS
C
      DO 70 INUC=1,NNUC
      DO 70 IORG=1,7
      A1=A9*FAS*DCF(INUC,IORG,1)
      A2=A9*FAF*DCF(INUC,IORG,1)
      IF(A1.NE.0.) DMY(INUC,IORG,5)=DLCAC(IORG)/A1
      IF(A2.NE.0.) DMY(INUC,IORG,6)=DLCAC(IORG)/A2
   70 CONTINUE
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE ZERO(A,N)
      DIMENSION A(N)
      DO 10 I=1,N
   10 A(I)=0.
      RETURN
      END
C
C*****************************************************************************
C
      FUNCTION EXM(A1)
      A2=0.0
      IF(A1.LT.230.)A2=EXP(-A1)
      EXM=A2
      RETURN
      END
C
C*****************************************************************************
C
      SUBROUTINE MIN(D,N)
      DIMENSION D(23,8,14),X(7)
      DO 10 I=1,23
      DO 10 K=1,N
      DO 5 J=1,7
      X(J)=D(I,J,K)
      IF(X(J).EQ.0.) X(J)=1.E+99
    5 CONTINUE
      D(I,8,K)=AMIN1(X(1),X(2),X(3),X(4),X(5),X(6),X(7))
   10 CONTINUE
      RETURN
      END
```

```
      PROGRAM INVERSW(INPUT,OUTPUT,TAPE1,TAPE4=OUTPUT,TAPE5=INPUT)
C
C*****************************************************************
C     THIS IS THE INVERSE GROUNDWATER CODE. IT FINDS INDIVIDUAL   *
C     NUCLIDE CONCENTRATIONS NECESSARY TO REACH DOSE LIMITATIONS  *
C     DEFINED BY NRC AND ASSIGNED BY ARRAY DLC FOR GROUNDWATER    *
C     MIGRATION.                                                  *
C     TAPE1 CONTAINS NSTR(NUMBER OF STREAMS), NNUC(NUMBER OF      *
C      NUCLIDES), FICRP(ICRP FACTORS), DCF MATRICES, AND THE      *
C      DIIS AND NUCS BLOCKS.                                      *
C     TAPE4 CONTAINS PROGRAM OUTPUT.                              *
C     TAPE5 IS USED TO INPUT TITLES, AND IRDC AND ISPC VALUES.    *
C*****************************************************************
C
      COMMON/HAST/DCF(23,7,8),FICRP(7)
     *      /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *      /DINX/IRDC(12)
     *      /DTIS/FSC(6),FSA(6),PRC(6,2),UFC(6,3),TTM(6,3),TPC(6,3),
     *            RGF(6,3),POP(6,3),DTTM(6),DTPC(6),TPD(6,2),NRET(6)
     *      /IMPS/DMY(23,8,5)
C
C     MOST OF THE MATRICES AND ARRAYS ABOVE ARE EXPLAINED IN TABLE 8.12
C     DINX BLOCK CONTAINS THE DISPOSAL TECHNOLOGY INDICES (IRDC)
C     DMY(23,8,5) WILL CONTAIN THE CONCENTRATIONS OBTAINED FROM
C     SUBROUTINE GINV.
C
      DIMENSION NOTE(2),ORGAN(8),DES(3),LIM(3),CP(3),ISPC(11)
      DATA ORGAN/10H   BODY   ,10H   BONE   ,10H   LIVER   ,
     *           10H  THYROID ,10H  KIDNEY  ,10H   LUNG   ,
     *           10H  GI-LLI  ,10H  MINIMUM /
      DATA DES/10H INT-WELL ,10H MON-WELL ,10H POP-WELL /
      DATA LIM/8H ACTUAL ,8H  LOWER ,8H HIGHER /
      DATA CP/1.0,0.5,4.0/
      DATA AL240/1.05E-04/
C
C     THE ABOVE ARRAYS ARE :
C       NOTE(2)     : HEADER LABEL FOR OUTPUT IDENTIFICATION
C       ORGAN(8)    : DESCRIPTION OF 7 ORGANS AND A MINIMUM COLUMN
C       DES(3)      : DESCRIPTION OF 3 GROUNDWATER PATHWAYS
C       LIM(3)      : DESCRIPTION OF 3 RETARDATION LEVELS
C       CP(3)       : MULTIPLIER USED IN MODIFYING RETARDATION LEVEL
C       ISPC(11)    : SPECTRUM INDICES READ IN THRU INPUT
C
      REWIND 1
C
      CALL READIN(NNUC)
C
C     THE NEXT SECTION COMPUTES THE REMAINING RETARDATION COEFFICIENTS
C
      DO 20 INUC=1,NNUC
      A2=RET(INUC,4)
      A1=(A2/RET(INUC,1))**0.333
      RET(INUC,5)=A2*A1
      RET(INUC,3)=A2/A1
   20 RET(INUC,2)=RET(INUC,1)*A1
C
C     THE NEXT SECTION READS THE INPUT VALUES AND TITLES
C     FROM INPUT
C
      READ(5,110) IREP
```

INVERSW

```
      DO 150 IRE=1,IREP
      READ(5,120) NOTE
      READ(5,130) (IRDC(J),J=1,12)
      READ(5,140) (ISPC(J),J=4,9)
  110 FORMAT(I2)
  120 FORMAT(20A4)
  130 FORMAT(4I2,I5,I2,I4)
  140 FORMAT(6I2)
C
      WRITE(4,1001) NOTE
      WRITE(4,1010) IRDC
      WRITE(4,1020)(ISPC(J),J=4,9)
C
C       LOOP 55 FINDS THE GROUNDWATER CONCENTRATIONS FOR EACH OF
C       THE 5 RETARDATION COEFFICIENTS, SUBROUTINE GINV IS UTILIZED
C       FOR MOST OF THE CALCULATIONS, DAUGHTER IN-GROWTH IS ALSO
C       CONSIDERED.
C
      DO 55 IRET=1,5
      WRITE(4,1004) IRET
C
      CALL ZERO(DMY,920)
      CALL GINV(ISPC,NNUC,IRET)
      CALL MIN(DMY,3)
C
      DO 50 K=1,3
      A1=DMY(17,8,K)
      A2=DMY(22,8,K)*AL(17)/AL(22)
      IF(A1.GT.A2) DMY(17,8,K)=A2
      A1=DMY(17,8,K)
      A2=DMY(23,8,K)*AL240/AL(23)
      IF(A1.GT.A2) DMY(17,8,K)=A2
      A1=DMY(20,8,K)
      A2=DMY(18,8,K)*AL(20)/AL(18)
      IF(A1.GT.A2) DMY(20,8,K)=A2
      WRITE(4,1002) DES(K),(ORGAN(J),J=1,8)
      WRITE(4,1003)(NUC(I),(DMY(I,J,K),J=1,8),I=1,NNUC)
   50 CONTINUE
   55 CONTINUE
   40 IR=IRDC(1)
      NR=NRET(IR)
C
C       LOOP 60 FINDS THE GROUNDWATER CONCENTRATIONS FOR THE
C       RETARDATION COEFFICIENT AS IMPLIED BY THE IR INDEX OF
C       THE IRDC VALUES, THIS LOOP WILL VARY THE PERCOLATION
C       VALUE OBTAINED FROM HAVING READ IN BY HALVING AND
C       DOUBLING THE VALUE.
C
      DO 60 KN=1,3
      A1=DMY(17,8,K)
      A2=DMY(22,8,K)*AL(17)/AL(22)
      IF(A1.GT.A2) DMY(17,8,K)=A2
      A1=DMY(17,8,K)
      A2=DMY(23,8,K)*AL240/AL(23)
      IF(A1.GT.A2) DMY(17,8,K)=A2
      A1=DMY(20,8,K)
      A2=DMY(18,8,K)*AL(20)/AL(18)
      IF(A1.GT.A2) DMY(20,8,K)=A2
      WRITE(4,1005) LIM(KN)
C
```

```
      CALL ZERO(DMY,920)
C
      PHC(IR,1)=PHC(IR,1)*CP(KN)
      PHC(IR,2)=PHC(IR,2)*CP(KN)
C
      CALL GINV(ISPC,NNUC,NR)
      CALL MIN(DMY,3)
C
      DO 50 K=1,3
      WRITE(4,1002) DES(K),(ORGAN(J),J=1,8)
      WRITE(4,1003)(NUC(I),(DMY(I,J,K),J=1,8),I=1,NNUC)
   50 CONTINUE
   60 CONTINUE
  150 CONTINUE
 1001 FORMAT(1H1/2X,2A10)
 1002 FORMAT(//2X,A9,2X,8A10)
 1003 FORMAT(1P,2X,A10,8E10.2)
 1004 FORMAT(//2X,'RETARDATION COEFF.',I2)
 1005 FORMAT(//2X,A7,'PERCOLATION VALUES')
 1010 FORMAT(/2X,'DISPOSAL TECHNOLOGY INDICES'/2X,
     *            'IR =',I2,'  IO =',I2,'  IC =',I2,'  IX =',I2/2X,
     *            'IE =',I2,'  IS =',I2,'  IL =',I2,'  IG =',I2/2X,
     *            'IM =',I2,'  ICL=',I2,'  IPO=',I2,'  ITC=',I4)
 1020 FORMAT(//2X,'WASTE FORM BEHAVIOR INDICES'/2X,
     *            'FLAM  =',I2,'    DISP  =',I2/2X,
     *            'LEACH =',I2,'    CHEM  =',I2/2X,
     *            'START =',I2,'    ACCES =',I2)
      STOP
      END
C
C*****************************************************************************
C
      SUBROUTINE READIN(NNUC)
C
C      THIS ROUTINE READS IN VALUES IN THE COMMON BLOCKS OFF
C      OF TAPE 1.
C
      COMMON/BAST/DCF(23,7,8),FICRP(7)
     *      /NUCS/NUC(23),AL(23),FMF(23),RET(23,5)
     *      /DTIS/FSC(6),FSA(6),PHC(6,2),QFC(6,3),TTM(6,3),TPC(6,3),
     *            RGF(6,3),PUP(6,3),DTTM(6),DTPC(6),TPD(6,2),NRET(6)
      READ(1,101)NSTR,NNUC,FICRP
      DO 20 I=1,NNUC
      READ(1,102)NUC(I),AL(I),FMF(I),RET(I,1),RET(I,4)
      DO 10 K=1,8
      READ(1,104)(DCF(I,J,K),J=1,7)
   10 CONTINUE
   20 CONTINUE
      DO 30 I=1,6
      READ(1,103)FSC(I),FSA(I),(PHC(I,J),J=1,2),(QFC(I,J),J=1,3),
     *           (TTM(I,J),J=1,3),(TPC(I,J),J=1,3),
     *           (RGF(I,J),J=1,3),(PUP(I,J),J=1,3),NRET(I),
     *           DTTM(I),DTPC(I),(TPD(I,J),J=1,2)
   30 CONTINUE
  101 FORMAT(2I5,7F5.2)
  102 FORMAT(A10,4E10.3)
  103 FORMAT(10X,7E10.3/10X,6E10.3/10X,8E10.3,I5/10X,4E10.3)
  104 FORMAT(10X,7E10.3)
      RETURN
      END
```

```
C
C*****************************************************************
C
      SUBROUTINE GINV(ISPC,NNUC,NNT)
C
C       THIS SUBROUTINE CONTAINS THE CALCULATION OF THE
C       CONCENTRATIONS, IT IS SIMILAR TO THE SUBROUTINES
C       AINV AND RINV IN THE INVERSI CODE.
C
      COMMON/BAST/DCF(23,7,8)
     *       /NUCS/NUC(23),AL(23),EMP(23),RET(23,5)
     *       /DIMX/IR,ID,IC,IX,IE,IS,IL,IG,IH,ICL,IPU,TIC
     *       /DTIS/FSC(6),FSA(6),PRC(6,2),WFC(6,3),TTM(6,3),TPC(6,3),
     *             RGF(6,3),POP(6,3),DTTM(6),DTPC(6),TPD(6,2),WRE(6)
     *       /IMPS/DMY(23,8,5)
      DIMENSION EMP(3),EFF(2),SEFF(2),DLC(7,3),ISPC(11)
      DATA EMP/.5,.75,.5/
      DATA EFF/0.4,7.0/
      DATA SEFF/0.9,0.35/
      DATA DLC/2*500.,1500.,3000.,3*1500.,3*25.,75.,3*25.,7*0./
      DATA NSEC/10/
C
C       THE MATRICES INTRODUCED ABOVE ARE :
C         EMP(3)      : VOLUME EMPLACEMENT EFFICIENCIES
C         EFF(2)      : LAND USE VOLUME EFFICIENCIES
C         SEFF(2)     : LAND USE SURFACE AREA EFFICIENCIES
C         DLC(7,3)    : DOSE LIMITING CRITERIA FOR 7 ORGANS
C                       AND 3 PATHWAYS,
C         ISPC(11)    : SPECTRUM INDICES PASSED FROM MAIN PROGRAM
C
      VOL=1.0/(EMP(IE)*EFF(ID))
      IF(IC.EQ.1)PRCD=PRC(IR,1)
      IF(IC.GT.1)PRCD=PRC(IR,2)
      IF(IX.EQ.1)PRCD=4.*PRC(IR,1)
      IF(IX.GT.1)PRCD=2.25*PRCD
      I6=ISPC(6)
      I7=ISPC(7)
      I8=ISPC(8)
      I9=ISPC(9)
      PERC=PRCD
      IF(IS.EQ.0.OR.I7.EQ.1) I6=I6-1
      IF(IH.NE.1.OR.IS.NE.1)GO TO 20
      IF(IC.EQ.1)PERC=PRC(IR,1)
      IF(IC.GT.1)PERC=PRC(IR,2)
   20 IVOL=352000.*SQRT(PRC(IR,1)*27.8)
      IF(ID.EQ.2.OR.IH.EQ.1)PERC=PRC(IR,2)/16.
      PERC=PERC*(1.0-0.9*IG)
      A6=1.0
      IF(I6.GT.1)A6=4.0**(1-I6)
      A9=1.0
      IF(I9.GT.1)A9=10.0**(1-I9)
      I1=NNT
      IF(IS.EQ.0.OR.I7.EQ.1)I1=I1-1
      IDUM=1.0/(PERC*VOL*A6*A9)
      IF(I1.LE.0)I1=1
C
C       DO 80 LOOP CALCULATES THE CONCENTRATIONS WITH THE
C       GIVEN DOSE.
C
      DO 80 INUC=1,NNUC
```

```
      IDUR=IDUR/FLOAT(INUC)
      DO 70 IPTH=1,3
      I2=0
      IF(IPTH.EQ.3) I2=7
      H2=HGF(IR,IPTH)/(WFC(IR,IPTH)*NSEC*IDUR)
      IF(IVOL.GT.WFC(IR,IPTH)) H2=H2*WFC(IR,IPTH)/IVOL
      A$=0.0
      INRT=HEI(INUC,I1)*TTH(IR,IPTH)
      DO 40 ISEC=1,NSEC
      H$=INRT+HEI(INUC,I1)*(ISEC-1)*DTH(IR)
      IF(H$.GE.INRT+IDUR)GO TO 50
      AQ=ISEC*EXM(AL(INUC)*H$)
      A$=AMAX1(A$,AQ)
   40 CONTINUE
   50 DO 60 IORG=1,7
      AD=1.E6*A$*H2*DCF(INUC,IORG,I2)
      A1=0.0
      IF(AD.NE.0) A1=DLC(IORG,IPTH)/AD
   60 CMY(INUC,IORG,IPTH)=A1
   70 CONTINUE
   80 CONTINUE
      RETURN
      END
C
C*******************************************************************************
C
      SUBROUTINE ZERO(A,N)
C
      DIMENSION A(N)
      DO 10 I=1,N
   10 A(I)=0.0
      RETURN
      END
C
C*******************************************************************************
C
      FUNCTION EXM(A1)
C
      A2=0.0
      IF(A1.LT.230.)A2=EXP(-A1)
      EXM=A2
      RETURN
      END
C
C*******************************************************************************
C
      SUBROUTINE MIN(D,N)
C
      DIMENSION D(23,8,5),X(7)
      DO 10 I=1,23
      DO 10 K=1,N
      DO 5 J=1,7
      X(J)=D(I,J,K)
      IF(X(J).EQ.0.) X(J)=1.E+99
    5 CONTINUE
      D(I,8,K)=AMIN1(X(1),X(2),X(3),X(4),X(5),X(6),X(7))
   10 CONTINUE
      RETURN
      END
```

APPENDIX 2

Outputs from Sample Problems

INTRUDE=SPECIMEN 1

SPECIMEN 1

DISPOSAL TECHNOLOGY INDICES
IM = 2 ID = 1 IC = 1 IX = 1
IE = 1 IS = 0 IL = 0 IG = 0
IH = 0 ICL=13 IPO= 2 IIC= 100
NBEST= 0

B=INHBSIN

YR = 50.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	6.197E+04	6.196E+04	6.196E+04	6.196E+04	6.196E+04	6.196E+04	6.196E+04	8.983E+04
INT=AGRI	7.343E+04	7.346E+04	7.340E+04	7.345E+04	7.338E+04	7.338E+04	7.338E+04	1.065E+05

YR = 100.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	1.930E+04	1.931E+04	1.931E+04	1.930E+04	1.930E+04	1.930E+04	1.930E+04	2.799E+04
INT=AGRI	2.287E+04	2.291E+04	2.286E+04	2.293E+04	2.286E+04	2.285E+04	2.285E+04	3.316E+04

YR = 150.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	6.087E+03	6.096E+03	6.095E+03	6.089E+03	6.090E+03	6.089E+03	6.085E+03	8.828E+03
INT=AGRI	7.212E+03	7.229E+03	7.212E+03	7.281E+03	7.209E+03	7.208E+03	7.207E+03	1.048E+04

YR = 200.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	1.924E+03	1.932E+03	1.931E+03	1.927E+03	1.927E+03	1.926E+03	1.923E+03	2.794E+03
INT=AGRI	2.280E+03	2.288E+03	2.281E+03	2.352E+03	2.280E+03	2.279E+03	2.278E+03	3.309E+03

YR = 300.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	1.993E+02	2.064E+02	2.050E+02	2.022E+02	2.019E+02	2.015E+02	1.989E+02	2.907E+02
INT=AGRI	2.361E+02	2.404E+02	2.382E+02	3.102E+02	2.371E+02	2.367E+02	2.361E+02	3.453E+02

YR = 400.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	2.805E+01	3.431E+01	3.306E+01	3.097E+01	3.050E+01	3.007E+01	2.744E+01	4.210E+01
INT=AGRI	3.317E+01	3.657E+01	3.511E+01	1.075E+02	3.417E+01	3.384E+01	3.333E+01	5.100E+01

YR = 500.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	1.097E+01	1.643E+01	1.547E+01	1.393E+01	1.296E+01	1.292E+01	1.[illegible]E+01	1.727E+01
INT=AGRI	1.296E+01	1.593E+01	1.469E+01	8.730E+01	1.387E+01	1.362E+01	1.315E+01	2.103E+01

YR =1000.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	8.769E+00	1.270E+01	1.170E+01	1.186E+01	9.925E+00	1.065E+01	8.532E+00	1.374E+01
INT=AGRI	1.044E+01	1.255E+01	1.155E+01	8.483E+01	1.103E+01	1.108E+01	1.049E+01	1.786E+01

YR =2000.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	8.361E+00	1.110E+01	1.020E+01	1.154E+01	8.938E+00	1.020E+01	8.213E+00	1.291E+01
INT=AGRI	1.001E+01	1.157E+01	1.069E+01	8.444E+01	1.037E+01	1.064E+01	1.029E+01	1.709E+01

INTRODF=SPECTRUM 2

SPECTRUM 2

DISPOSAL TECHNOLOGY INDICES
IM = 2 ID = 1 IC = 1 IX = 1
IE = 1 IS = 0 IL = 0 IG = 0
IH = 0 ICL=13 IP= 2 TIC= .00
NBEST= 6

B=INHESIN

YR = 50.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	3.005E+04	3.005E+04	3.005E+04	3.004E+04	3.004E+04	3.004E+04	3.004E+04	4.357E+04
INT=AGRI	3.561E+04	3.569E+04	3.559E+04	3.562E+04	3.558E+04	3.558E+04	3.558E+04	5.163E+04

YR = 100.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	9.358E+03	9.365E+03	9.364E+03	9.358E+03	9.360E+03	9.359E+03	9.356E+03	1.357E+04
INT=AGRI	1.109E+04	1.112E+04	1.109E+04	1.113E+04	1.108E+04	1.108E+04	1.108E+04	1.608E+04

YR = 150.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	2.951E+03	2.957E+03	2.956E+03	2.953E+03	2.953E+03	2.953E+03	2.951E+03	4.281E+03
INT=AGRI	3.497E+03	3.507E+03	3.497E+03	3.539E+03	3.496E+03	3.495E+03	3.495E+03	5.073E+03

YR = 200.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	9.330E+02	9.380E+02	9.371E+02	9.345E+02	9.347E+02	9.344E+02	9.325E+02	1.354E+03
INT=AGRI	1.105E+03	1.111E+03	1.107E+03	1.150E+03	1.106E+03	1.105E+03	1.105E+03	1.605E+03

YR = 300.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	9.671E+01	1.010E+02	1.002E+02	9.843E+01	9.827E+01	9.802E+01	9.642E+01	1.412E+02
INT=AGRI	1.145E+02	1.171E+02	1.158E+02	1.595E+02	1.152E+02	1.149E+02	1.146E+02	1.674E+02

YR = 400.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	1.365E+01	1.705E+01	1.669E+01	1.542E+01	1.502E+01	1.487E+01	1.340E+01	2.070E+01
INT=AGRI	1.613E+01	1.819E+01	1.731E+01	6.117E+01	1.675E+01	1.654E+01	1.623E+01	2.515E+01

YR = 500.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	5.365E+00	8.797E+00	8.088E+00	7.158E+00	6.569E+00	6.543E+00	5.141E+00	8.000E+00
INT=AGRI	6.331E+00	8.134E+00	7.384E+00	5.139E+01	6.887E+00	6.733E+00	6.450E+00	1.090E+01

YR =1000.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	4.281E+00	6.863E+00	6.057E+00	6.154E+00	4.981E+00	5.422E+00	4.137E+00	6.820E+00
INT=AGRI	5.102E+00	6.379E+00	5.776E+00	5.019E+01	5.459E+00	5.493E+00	5.253E+00	9.022E+00

YR =2000.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	4.072E+00	5.732E+00	5.190E+00	5.999E+00	4.421E+00	5.149E+00	3.982E+00	6.370E+00
INT=AGRI	4.888E+00	5.833E+00	5.300E+00	5.000E+01	5.105E+00	5.269E+00	5.059E+00	8.648E+00

INTAKE=SPECTRUM 3

SPECTRUM 3

DISPOSAL TECHNOLOGY INDICES
IM = 2 ID = 1 IC = 1 IX = 1
IE = 1 IS = 0 IL = 0 IG = 0
IH = 0 ICL=13 IP(= 2 TIC= 100
NBEST= 0

MIXRESIN

YR = 50,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	1.878E+04	1.878E+04	1.878E+04	1.878E+04	1.878E+04	1.878E+04	1.877E+04	2.763E+04
INT=AGRI	2.225E+04	2.229E+04	2.224E+04	2.226E+04	2.224E+04	2.224E+04	2.224E+04	3.220E+04

YR = 100,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	5.849E+03	5.852E+03	5.851E+03	5.849E+03	5.849E+03	5.849E+03	5.848E+03	8.481E+03
INT=AGRI	6.935E+03	6.943E+03	6.928E+03	6.947E+03	6.926E+03	6.926E+03	6.925E+03	1.005E+04

YR = 150,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	1.845E+03	1.847E+03	1.847E+03	1.845E+03	1.845E+03	1.845E+03	1.844E+03	2.675E+03
INT=AGRI	2.185E+03	2.190E+03	2.185E+03	2.206E+03	2.185E+03	2.184E+03	2.184E+03	3.170E+03

YR = 200,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	5.831E+02	5.856E+02	5.851E+02	5.838E+02	5.839E+02	5.838E+02	5.828E+02	8.460E+02
INT=AGRI	6.908E+02	6.933E+02	6.913E+02	7.128E+02	6.908E+02	6.906E+02	6.904E+02	1.003E+03

YR = 300,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	6.091E+01	6.255E+01	6.213E+01	6.127E+01	6.118E+01	6.106E+01	6.026E+01	8.899E+01
INT=AGRI	7.154E+01	7.284E+01	7.219E+01	9.401E+01	7.185E+01	7.172E+01	7.155E+01	1.048E+02

YR = 400,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	8.560E+00	1.080E+01	1.002E+01	9.384E+00	9.183E+00	9.111E+00	8.376E+00	1.270E+01
INT=AGRI	1.005E+01	1.108E+01	1.064E+01	3.257E+01	1.036E+01	1.026E+01	1.010E+01	1.545E+01

YR = 500,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	3.324E+00	5.081E+00	4.687E+00	4.221E+00	3.927E+00	3.914E+00	3.213E+00	5.235E+00
INT=AGRI	3.726E+00	4.828E+00	4.453E+00	2.645E+01	4.204E+00	4.127E+00	3.986E+00	6.553E+00

YR =1000,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	2.657E+00	3.850E+00	3.546E+00	3.594E+00	3.008E+00	3.224E+00	2.585E+00	4.183E+00
INT=AGRI	3.163E+00	3.802E+00	3.500E+00	2.571E+01	3.342E+00	3.359E+00	3.239E+00	5.344E+00

YR =2000,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT=CONS	2.534E+00	3.363E+00	3.092E+00	3.497E+00	2.708E+00	3.092E+00	2.489E+00	3.911E+00
INT=AGRI	3.033E+00	3.506E+00	3.239E+00	2.559E+01	3.102E+00	3.224E+00	3.119E+00	5.174E+00

INTRUSE=SPECTRUM 4

SPECTRUM 4

DISPOSAL TECHNOLOGY INDICES
IR = 2 ID = 1 IC = 1 TX = 1
IE = 1 IS = 0 IL = 0 TG = 0
IM = 0 ICL=13 IPO= 2 TIC= 100
NBEST= 0

0=EXPOSURE

YR = 50,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	1.690E+05	1.690E+05	1.690E+05	1.690E+05	1.690E+05	1.690E+05	1.690E+05	2.450E+05
INT=AGRI	2.002E+05	2.006E+05	2.002E+05	2.003E+05	2.001E+05	2.001E+05	2.001E+05	2.904E+05

YR = 100,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	5.264E+04	5.267E+04	5.266E+04	5.264E+04	5.264E+04	5.264E+04	5.263E+04	7.633E+04
INT=AGRI	6.237E+04	6.249E+04	6.235E+04	6.253E+04	6.233E+04	6.233E+04	6.233E+04	9.044E+04

YR = 150,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	1.660E+04	1.663E+04	1.662E+04	1.661E+04	1.661E+04	1.661E+04	1.660E+04	2.408E+04
INT=AGRI	1.967E+04	1.971E+04	1.967E+04	1.986E+04	1.966E+04	1.966E+04	1.966E+04	2.853E+04

YR = 200,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	5.248E+03	5.270E+03	5.266E+03	5.254E+03	5.255E+03	5.254E+03	5.245E+03	7.614E+03
INT=AGRI	6.217E+03	6.239E+03	6.222E+03	6.415E+03	6.217E+03	6.216E+03	6.214E+03	9.023E+03

YR = 300,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	5.437E+02	5.629E+02	5.592E+02	5.514E+02	5.507E+02	5.495E+02	5.423E+02	7.920E+02
INT=AGRI	6.437E+02	6.550E+02	6.496E+02	8.460E+02	6.465E+02	6.454E+02	6.438E+02	9.416E+02

YR = 400,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	7.650E+01	9.357E+01	9.017E+01	8.445E+01	8.265E+01	8.199E+01	7.538E+01	1.150E+02
INT=AGRI	9.035E+01	9.920E+01	9.565E+01	2.930E+02	9.310E+01	9.219E+01	9.080E+01	1.384E+02

YR = 500,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	2.991E+01	4.537E+01	4.218E+01	3.799E+01	3.534E+01	3.522E+01	2.892E+01	4.711E+01
INT=AGRI	3.523E+01	4.294E+01	3.997E+01	2.340E+02	3.774E+01	3.704E+01	3.577E+01	5.878E+01

YR =1000,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	2.392E+01	3.484E+01	3.191E+01	3.234E+01	2.707E+01	2.905E+01	2.327E+01	3.740E+01
INT=AGRI	2.837E+01	3.373E+01	3.140E+01	2.313E+02	2.998E+01	3.013E+01	2.905E+01	4.640E+01

YR =2000,	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	1CRP
INT=CONS	2.280E+01	3.027E+01	2.783E+01	3.148E+01	2.437E+01	2.783E+01	2.240E+01	3.520E+01
INT=AGRI	2.721E+01	3.112E+01	2.907E+01	2.302E+02	2.819E+01	2.893E+01	2.798E+01	4.644E+01

GRWATER-CASE 4A

SPECTRUM 1

DISPOSAL TECHNOLOGY INDICES
IH = 2 ID = 1 IC = 1 IX = 1
IE = 4 IS = 1 IL = 1 IG = 0
IM = 0 ICL=13 IPD= 2 TIC= 100
NOPT= 1 NBEST= 0

VREG = 5.82E+05 VLAY = 9.77E+04 VHOT = 0. VNOT = 1.94E+04

YR = 40.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 50.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 60.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	1.26?E-02	7.623E-10	1.269E-02	1.269E-02	1.269E-02	1.269E-02	1.269E-02	1.088E-02
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 70.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	3.985E+00	2.394E-07	3.985E+00	3.985E+00	3.985E+00	3.985E+00	3.985E+00	5.300E+00
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 80.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	2.348E+00	1.410E-07	2.348E+00	2.348E+00	2.348E+00	2.348E+00	2.348E+00	3.122E+00
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 90.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	1.337E+00	8.032E-08	1.337E+00	1.337E+00	1.337E+00	1.337E+00	1.337E+00	1.778E+00
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 100.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	7.614E-01	4.574E-08	7.614E-01	7.614E-01	7.614E-01	7.614E-01	7.614E-01	1.013E+00
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 120.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	2.470E-01	1.484E-08	2.470E-01	2.470E-01	2.470E-01	2.470E-01	2.470E-01	3.288E-01
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 200.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	8.034E-03	3.310E-06	8.036E-03	8.745E-03	8.087E-03	8.032E-03	8.173E-03	1.074E-02
POP-CELL	0.	0.	0.	0.	0.	0.	0.	0.
POP-SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 300.	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
BOD-CELL	1.128E-02	4.697E-03	4.276E-03	8.048E+00	9.678E-03	1.004E-03	6.589E-03	2.540E-01

POP=*ELL	0.	0.	0.	0.	0.	0.	0.	0.
POP=SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 400.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	1.125E=02	4.700E=03	4.241E=03	8.049E+00	9.694E=03	9.658E=04	6.690E=03	2.540E=01
POP=*ELL	5.601E=09	3.365E=16	5.601E=09	5.601E=09	5.601E=09	5.601E=09	5.601E=09	7.450E=09
POP=SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 500.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	2.212E=02	9.241E=03	8.334E=03	1.583E+01	1.896E=02	1.899E=03	1.288E=02	5.004E=01
POP=*ELL	7.982E=11	4.795E=18	7.982E=11	7.982E=11	7.982E=11	7.982E=11	7.982E=11	1.062E=10
POP=SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 600.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	2.251E=02	9.489E=03	8.495E=03	1.610E+01	1.935E=02	1.949E=03	1.325E=02	5.093E=01
POP=*ELL	5.553E=13	3.336E=20	5.553E=13	5.553E=13	5.553E=13	5.553E=13	5.553E=13	7.389E=13
POP=SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 700.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	3.430E=02	6.031E=02	1.918E=02	1.737E+01	3.089E=02	1.212E=02	2.434E=02	5.880E=01
POP=*ELL	2.572E=15	1.585E=22	2.572E=15	2.572E=15	2.572E=15	2.572E=15	2.572E=15	3.420E=15
POP=SURF	0.	0.	0.	0.	0.	0.	0.	0.

YR = 800.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	4.399E=02	6.537E=02	2.297E=02	2.415E+01	3.922E=02	1.315E=02	3.002E=02	7.830E=01
POP=*ELL	1.287E=17	7.731E=25	1.287E=17	1.287E=17	1.287E=17	1.287E=17	1.287E=17	1.716E=17
POP=SURF	4.122E=20	2.475E=27	4.122E=20	4.122E=20	4.122E=20	4.122E=20	4.122E=20	5.496E=20

YR = 900.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	4.388E=02	6.476E=02	2.285E=02	2.416E+01	3.915E=02	1.303E=02	3.004E=02	7.830E=01
POP=*ELL	5.347E=20	3.212E=27	5.347E=20	5.347E=20	5.347E=20	5.347E=20	5.347E=20	7.116E=20
POP=SURF	5.887E=22	3.535E=29	5.887E=22	5.887E=22	5.887E=22	5.887E=22	5.887E=22	7.849E=22

YR = 1000.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	5.498E=02	6.884E=02	2.695E=02	3.219E+01	4.859E=02	1.387E=02	3.630E=02	1.037E+00
POP=*ELL	1.636E=15	2.505E=15	3.544E=15	5.415E=13	4.164E=14	3.418E=16	1.069E=13	2.735E=14
POP=SURF	4.030E=24	2.420E=31	4.030E=24	4.030E=24	4.030E=24	4.030E=24	4.030E=24	5.374E=24

YR = 2000.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	1.100E=01	1.679E=01	5.996E=02	6.441E+01	1.032E=01	3.379E=02	7.853E=02	2.087E+00
POP=*ELL	1.063E=02	4.441E=03	4.086E=03	7.605E+00	9.189E=03	9.123E=04	6.296E=03	2.480E=01
POP=SURF	1.827E=24	2.784E=24	3.935E=24	6.104E=22	4.620E=23	3.786E=25	1.187E=22	3.065E=23

YR = 4000.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	1.542E=01	2.556E=01	8.408E=02	8.051E+01	1.379E=01	5.139E=02	1.066E=01	2.620E+00
POP=*ELL	3.664E=02	2.038E=02	1.449E=02	2.543E+01	3.190E=02	4.158E=03	2.162E=02	8.067E=01
POP=SURF	8.082E=04	3.365E=04	3.033E=04	5.797E=01	6.929E=04	6.780E=05	4.711E=04	1.633E=02

YR = 6000.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	1.616E=01	2.929E=01	9.152E=02	8.051E+01	1.452E=01	5.884E=02	1.138E=01	2.640E+00
POP=*ELL	4.223E=02	4.833E=02	2.008E=02	2.544E+01	3.704E=02	9.748E=03	2.710E=02	8.174E=01
POP=SURF	1.616E=03	6.724E=04	6.058E=04	1.159E+00	1.376E=03	1.355E=04	9.177E=04	3.666E=02

YR = 8000.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	1.553E=01	2.615E=01	8.523E=02	8.050E+01	1.388E=01	5.256E=02	1.071E=01	2.620E+00
POP=*ELL	4.499E=02	6.215E=02	2.284E=02	2.544E+01	3.977E=02	1.251E=02	2.976E=02	8.220E=01
POP=SURF	1.695E=03	1.068E=03	6.847E=04	1.159E+00	1.454E=03	2.146E=04	9.922E=04	3.681E=02

YR =10000.

	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT	IGHP
BOD=*ELL	1.461E=01	2.154E=01	7.599E=02	8.048E+01	1.294E=01	4.333E=02	9.759E=02	2.610E+00

POP=WELL	4.617E-02	6.805E-02	2.401E-02	2.544E+01	4.091E-02	1.349E-02	3.084E-02	8.248E-01
POP=SURF	2.047E-03	3.028E-03	1.077E-03	1.160E+00	1.804E-03	6.068E-04	1.380E-03	3.757E-02

H=3		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BOU=WELL	0.	0.	0.	0.	0.	0.	0.
40.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
40.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOU=WELL	0.	0.	0.	0.	0.	0.	0.
50.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
50.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOU=WELL	1.269E+02	7.623E-10	1.269E+02	1.269E+02	1.269E+02	1.269E+02	1.269E+02
60.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
60.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU=WELL	3.985E+00	2.394E-07	3.985E+00	3.985E+00	3.985E+00	3.985E+00	3.985E+00
70.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
70.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU=WELL	2.348E+00	1.410E-07	2.348E+00	2.348E+00	2.348E+00	2.348E+00	2.348E+00
80.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
80.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU=WELL	1.337E+00	8.032E-08	1.337E+00	1.337E+00	1.337E+00	1.337E+00	1.337E+00
90.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
90.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU=WELL	7.614E-01	4.574E-08	7.614E-01	7.614E-01	7.614E-01	7.614E-01	7.614E-01
100.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOU=WELL	2.470E-01	1.484E-08	2.470E-01	2.470E-01	2.470E-01	2.470E-01	2.470E-01
120.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU=WELL	8.032E-03	4.825E-10	8.032E-03	8.032E-03	8.032E-03	8.032E-03	8.032E-03
200.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU=WELL	3.922E-05	2.356E-12	3.922E-05	3.922E-05	3.922E-05	3.922E-05	3.922E-05
300.	POP=WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU=WELL	2.109E-07	1.267E-14	2.109E-07	2.109E-07	2.109E-07	2.109E-07	2.109E-07
400.	POP=WELL	5.601E-09	3.365E-16	5.601E-09	5.601E-09	5.601E-09	5.601E-09	5.601E-09
400.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOU=WELL	8.855E-10	5.320E-17	8.855E-10	8.855E-10	8.855E-10	8.855E-10	8.855E-10
500.	POP=WELL	7.982E-11	4.795E-18	7.982E-11	7.982E-11	7.982E-11	7.982E-11	7.982E-11
500.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU=WELL	4.078E-12	2.450E-19	4.078E-12	4.078E-12	4.078E-12	4.078E-12	4.078E-12
600.	POP=WELL	5.553E-13	3.336E-20	5.553E-13	5.553E-13	5.553E-13	5.553E-13	5.553E-13
600.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOU=WELL	1.626E-14	9.769E-22	1.626E-14	1.626E-14	1.626E-14	1.626E-14	1.626E-14
700.	POP=WELL	2.572E-15	1.545E-22	2.572E-15	2.572E-15	2.572E-15	2.572E-15	2.572E-15
700.	POP=SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU=WELL	5.835E-17	3.506E-24	5.835E-17	5.835E-17	5.835E-17	5.835E-17	5.835E-17
800.	POP=WELL	1.287E-17	7.731E-25	1.287E-17	1.287E-17	1.287E-17	1.287E-17	1.287E-17
800.	POP=SURF	4.122E-20	2.475E-27	4.122E-20	4.122E-20	4.122E-20	4.122E-20	4.122E-20
900.	BOU=WELL	2.094E-19	1.258E-26	2.094E-19	2.094E-19	2.094E-19	2.094E-19	2.094E-19
900.	POP=WELL	5.347E-20	3.212E-27	5.347E-20	5.347E-20	5.347E-20	5.347E-20	5.347E-20
900.	POP=SURF	5.887E-22	3.535E-29	5.887E-22	5.887E-22	5.887E-22	5.887E-22	5.887E-22
1000.	BOU=WELL	7.515E-22	4.514E-29	7.515E-22	7.515E-22	7.515E-22	7.515E-22	7.515E-22
1000.	POP=WELL	2.374E-22	1.426E-29	2.374E-22	2.374E-22	2.374E-22	2.374E-22	2.374E-22
1000.	POP=SURF	4.030E-24	2.420E-31	4.030E-24	4.030E-24	4.030E-24	4.030E-24	4.030E-24
2000.	BOU=WELL	2.661E-46	1.599E-53	2.661E-46	2.661E-46	2.661E-46	2.661E-46	2.661E-46
2000.	POP=WELL	8.412E-47	5.053E-54	8.412E-47	8.412E-47	8.412E-47	8.412E-47	8.412E-47
2000.	POP=SURF	3.740E-48	2.246E-55	3.740E-48	3.740E-48	3.740E-48	3.740E-48	3.740E-48
4000.	BOU=WELL	3.339E-95	2.006-102	3.339E-95	3.339E-95	3.339E-95	3.339E-95	3.339E-95
4000.	POP=WELL	1.055E-95	6.339-103	1.055E-95	1.055E-95	1.055E-95	1.055E-95	1.055E-95

4000.	PUP=SURF	4.692F-07	2.817+104	4.692E-07	4.692F-07	4.692F-07	4.692F-07	4.692E-07
6000.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
6000.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
6000.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
8000.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
8000.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
8000.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
10000.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
10000.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
10000.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.

C=14		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G=I TRACT
40.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOU=*ELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU=*ELL	1.842F-05	9.210E-05	1.842E-05	1.842F-05	1.842F-05	1.842E-05	1.842E-05
600.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOU=*ELL	1.003F-02	5.017E-02	1.003E-02	1.003E-02	1.003E-02	1.003E-02	1.003E-02
700.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU=*ELL	1.026F-02	5.128E-02	1.026E-02	1.026E-02	1.026E-02	1.026E-02	1.026E-02
800.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOU=*ELL	1.013F-02	5.066E-02	1.013E-02	1.013F-02	1.013F-02	1.013E-02	1.013E-02
900.	PUP=*ELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP=SURF	0.	0.	0.	0.	0.	0.	0.

100.	BUU-CELL	1.001E-02	5.005E-02	1.001E-02	1.001E-02	1.001E-02	1.001E-02	1.001E-02
100.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BUU-CELL	2.607E-02	1.304E-01	2.607E-02	2.607E-02	2.607E-02	2.607E-02	2.607E-02
200.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BUU-CELL	4.174E-02	2.087E-01	4.174E-02	4.174E-02	4.174E-02	4.174E-02	4.174E-02
400.	PUP-CELL	1.108E-03	5.542E-03	1.108E-03	1.108E-03	1.108E-03	1.108E-03	1.108E-03
400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BUU-CELL	4.920E-02	2.460E-01	4.920E-02	4.920E-02	4.920E-02	4.920E-02	4.920E-02
600.	PUP-CELL	6.699E-03	3.350E-02	6.699E-03	6.699E-03	6.699E-03	6.699E-03	6.699E-03
600.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BUU-CELL	4.292E-02	2.146E-01	4.292E-02	4.292E-02	4.292E-02	4.292E-02	4.292E-02
800.	PUP-CELL	9.464E-03	4.732E-02	9.464E-03	9.464E-03	9.464E-03	9.464E-03	9.464E-03
800.	PUP-SURF	7.908E-05	3.953E-04	7.908E-05	7.908E-05	7.908E-05	7.908E-05	7.908E-05
1000.	BUU-CELL	3.369E-02	1.685E-01	3.369E-02	3.369E-02	3.369E-02	3.369E-02	3.369E-02
1000.	PUP-CELL	1.064E-02	5.327E-02	1.064E-02	1.064E-02	1.064E-02	1.064E-02	1.064E-02
1000.	PUP-SURF	4.714E-04	2.356E-03	4.714E-04	4.714E-04	4.714E-04	4.714E-04	4.714E-04

FE-55		BODY		LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BUU-CELL	0.	[illegible]	0.	0.	0.	0.	0.
40.	PUP-CELL	0.	[illegible]	0.	0.	0.	0.	0.
40.	PUP-SURF	0.	[illegible]	0.	0.	0.	0.	0.
50.	BUU-CELL	0.	[illegible]	0.	0.	0.	0.	0.
50.	PUP-CELL	0.	[illegible]	0.	0.	0.	0.	0.
50.	PUP-SURF	0.	[illegible]	0.	0.	0.	0.	0.
60.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-CELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BUU-CELL	0.	0.	0.	0.	0.	0.	0.

700.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
700.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
800.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
900.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
4000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
6000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
8000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
10000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.

NI=59		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
40.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
40.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
50.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
60.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
60.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
70.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
80.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
90.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
400.	POP-WELL	0.	0.	0.	0.	0.	0.	0.

400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
4000.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
6000.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
8000.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
10000.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.

CO-60		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BUU-WELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.

200.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
4000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
6000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
8000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
10000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.

NI-63		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.

90.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
400.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
400.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
500.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
500.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
600.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
600.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
700.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
700.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
800.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
900.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
4000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
6000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
8000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
10000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.

NB-94		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
40.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
40.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
50.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
60.	POP-WELL	0.	0.	0.	0.	0.	0.	0.

60.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
70.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
80.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
90.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
400.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
400.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
500.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
500.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
600.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
600.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
700.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
700.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
800.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
900.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
4000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
6000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
8000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
10000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.

SR-90	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT

40.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
40.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
40.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
50.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
60.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
60.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
70.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
80.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
90.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
120.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
300.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
400.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
400.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
500.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
500.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
600.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
600.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
700.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
700.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
800.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
900.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BOU-WELL	1.382E-20	5.630E-20	1.277E-23	1.277E-23	1.277E-23	1.277E-23	1.634E-21
2000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
4000.	BOU-WELL	1.524E-41	6.205E-41	1.407E-44	1.407E-44	1.407E-44	1.407E-44	1.801E-42
4000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.
6000.	BOU-WELL	8.947E-63	3.644E-62	8.265E-66	8.265E-66	8.265E-66	8.265E-66	1.061E-63
6000.	POP-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	POP-SURF	0.	0.	0.	0.	0.	0.	0.

800.	BOD-WELL	3.895E-04	1.586E-03	3.598E-07	3.598E-07	3.598E-07	3.598E-07	4.616E-05
800.	PUP-WELL	1.897E-05	7.725E-05	1.752E-08	1.752E-08	1.752E-08	1.752E-08	2.249E-06
800.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.

TC-99		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I THALI
40.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOD-WELL	1.166E-06	2.902E-06	4.319E-06	5.801E-12	5.433E-05	3.671E-07	1.412E-04
200.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOD-WELL	4.215E-05	1.049E-04	1.562E-04	2.097E-10	1.965E-03	1.327E-05	5.104E-03
300.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOD-WELL	4.330E-05	1.078E-04	1.604E-04	2.155E-10	2.018E-03	1.363E-05	5.244E-03
400.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOD-WELL	8.291E-05	2.064E-04	3.072E-04	4.126E-10	3.864E-03	2.611E-05	1.004E-02
500.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOD-WELL	8.538E-05	2.125E-04	3.164E-04	4.249E-10	3.980E-03	2.688E-05	1.034E-02
600.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOD-WELL	9.235E-05	2.299E-04	3.422E-04	4.595E-10	4.304E-03	2.908E-05	1.118E-02
700.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOD-WELL	1.274E-04	3.172E-04	4.721E-04	6.340E-10	5.938E-03	4.012E-05	1.543E-02
800.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOD-WELL	1.285E-04	3.199E-04	4.762E-04	6.396E-10	5.991E-03	4.047E-05	1.556E-02
900.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOD-WELL	1.693E-04	4.215E-04	6.274E-04	8.426E-10	7.892E-03	5.331E-05	2.050E-02
1000.	PUP-WELL	8.823E-16	2.196E-15	3.269E-15	4.390E-21	4.112E-14	2.778E-16	1.068E-13
1000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BOD-WELL	3.377E-04	8.405E-04	1.251E-03	1.680E-09	1.574E-02	1.063E-04	4.089E-02

2000.	PUP-SURF	4.071E-05	1.013E-04	1.508E-04	2.026E-10	1.897E-03	1.282E-05	4.929E-03
2000.	PUP-SURF	9.789E-25	2.438E-24	3.627E-24	4.809E-30	4.562E-23	3.082E-25	1.180E-22
4000.	BOU-MELL	4.168E-04	1.037E-03	1.543E-03	2.072E-09	1.941E-02	1.311E-04	5.043E-02
4000.	PUP-MELL	1.316E-04	3.276E-04	4.877E-04	6.549E-10	6.134E-03	4.144E-05	1.594E-02
4000.	PUP-SURF	3.044E-06	7.582E-06	1.128E-05	1.496E-11	1.419E-04	9.585E-07	3.687E-04
6000.	BOU-MELL	4.137E-04	1.030E-03	1.533E-03	2.059E-09	1.928E-02	1.303E-04	5.010E-02
6000.	PUP-MELL	1.308E-04	3.255E-04	4.845E-04	6.507E-10	6.094E-03	4.117E-05	1.583E-02
6000.	PUP-SURF	5.886E-06	1.466E-05	2.181E-05	2.892E-11	2.743E-04	1.853E-06	7.129E-04
8000.	BOU-MELL	4.110E-04	1.023E-03	1.523E-03	2.045E-09	1.916E-02	1.294E-04	4.977E-02
8000.	PUP-MELL	1.299E-04	3.234E-04	4.813E-04	6.464E-10	6.055E-03	4.090E-05	1.573E-02
8000.	PUP-SURF	5.848E-06	1.457E-05	2.167E-05	2.873E-11	2.725E-04	1.841E-06	7.083E-04
10000.	BOU-MELL	4.083E-04	1.016E-03	1.513E-03	2.032E-09	1.903E-02	1.286E-04	4.945E-02
10000.	PUP-MELL	1.291E-04	3.213E-04	4.782E-04	6.422E-10	6.015E-03	4.064E-05	1.563E-02
10000.	PUP-SURF	5.810E-06	1.447E-05	2.153E-05	2.854E-11	2.708E-04	1.829E-06	7.036E-04

I=129		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BOU-MELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOU-MELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOU-MELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU-MELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU-MELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU-MELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU-MELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOU-MELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU-MELL	9.935E-07	4.072E-07	3.618E-07	7.137E-04	6.806E-07	8.441E-08	1.282E-07
200.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU-MELL	1.120E-02	4.592E-03	4.080E-03	8.048E+00	7.675E-03	9.519E-04	1.446E-03
300.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU-MELL	1.120E-02	4.593E-03	4.081E-03	8.049E+00	7.675E-03	9.520E-04	1.446E-03
400.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOU-MELL	2.204E-02	9.034E-03	8.027E-03	1.583E+01	1.510E-02	1.873E-03	2.845E-03
500.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU-MELL	2.241E-02	9.185E-03	8.161E-03	1.610E+01	1.535E-02	1.904E-03	2.892E-03
600.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOU-MELL	2.417E-02	9.906E-03	8.802E-03	1.736E+01	1.656E-02	2.053E-03	3.120E-03
700.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU-MELL	3.361E-02	1.378E-02	1.224E-02	2.414E+01	2.302E-02	2.856E-03	4.338E-03
800.	PUP-MELL	0.	0.	0.	0.	0.	0.	0.

800.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOD-WELL	3.362E-02	1.378E-02	1.224E-02	2.415E+01	2.393E-02	2.857E-03	4.340E-03
900.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOD-WELL	4.480E-02	1.836E-02	1.631E-02	3.218E+01	3.069E-02	3.806E-03	5.786E-03
1000.	PUP-WELL	7.539E-16	3.090E-16	2.745E-16	5.415E-13	5.164E-16	6.405E-17	9.730E-17
1000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BOD-WELL	8.962E-02	3.674E-02	3.264E-02	6.438E+01	6.139E-02	7.615E-03	1.157E-02
2000.	PUP-WELL	1.059E-02	4.339E-03	3.856E-03	7.605E+00	7.252E-03	8.995E-14	1.366E-03
2000.	PUP-SURF	8.478E-25	3.463E-25	3.076E-25	6.104E-22	5.803E-25	7.039E-25	1.069E-25
4000.	BOD-WELL	1.120E-01	4.592E-02	4.080E-02	8.047E+01	7.673E-02	9.517E-03	1.446E-02
4000.	PUP-WELL	3.540E-02	1.451E-02	1.289E-02	2.543E+01	2.425E-02	3.008E-03	4.570E-03
4000.	PUP-SURF	8.051E-04	3.299E-04	2.932E-04	5.797E-01	5.511E-04	6.835E-05	1.024E-04
6000.	BOD-WELL	1.120E-01	4.591E-02	4.079E-02	8.046E+01	7.673E-02	9.517E-03	1.446E-02
6000.	PUP-WELL	3.540E-02	1.451E-02	1.289E-02	2.543E+01	2.425E-02	3.008E-03	4.569E-03
6000.	PUP-SURF	1.610E-03	6.598E-04	5.840E-04	1.159E+00	1.102E-03	1.337E-04	2.040E-04
8000.	BOD-WELL	1.120E-01	4.591E-02	4.079E-02	8.046E+01	7.672E-02	9.516E-03	1.446E-02
8000.	PUP-WELL	3.540E-02	1.451E-02	1.289E-02	2.543E+01	2.425E-02	3.008E-03	4.569E-03
8000.	PUP-SURF	1.610E-03	6.577E-04	5.840E-04	1.159E+00	1.102E-03	1.337E-04	2.040E-04
10000.	BOD-WELL	1.120E-01	4.590E-02	4.079E-02	8.045E+01	7.672E-02	9.515E-03	1.446E-02
10000.	PUP-WELL	3.540E-02	1.451E-02	1.289E-02	2.543E+01	2.425E-02	3.007E-03	4.569E-03
10000.	PUP-SURF	1.610E-03	6.576E-04	5.839E-04	1.159E+00	1.102E-03	1.337E-04	2.040E-04

CS-135		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOD-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.

50.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.

CS-137		BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT
40.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
40.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
50.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
50.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
60.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
60.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
70.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
70.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
80.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
80.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
90.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
90.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
100.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
100.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
120.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
120.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
200.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
200.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
300.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.

300.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
300.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
400.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
400.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
500.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
500.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
600.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
600.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
700.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
700.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
800.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
800.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
900.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
900.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
1000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
1000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
2000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
2000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
4000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
4000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
6000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
6000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
8000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
8000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.
10000.	BOU-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	PUP-WELL	0.	0.	0.	0.	0.	0.	0.
10000.	PUP-SURF	0.	0.	0.	0.	0.	0.	0.

```
OPTIONS=CASE 1GC

SPECTRUM  1

DISPOSAL TECHNOLOGY INDICES
IR = 2   ID = 1   IC = 2   IX = 2
IE = 4   IS = 1   IL = 1   IG = 0
IH = 0   ICL=12   IPO= 2   TIC=  100
         NBEST= 0

WASTE STREAMS TREATED SPECIALLY ARE :
 P=IXRESIN
 P=FSLUDGE
 P=FCARTRG
 B=IXRESIN
 B=FSLUDGE
 P=NCTRASH
 B=NCTRASH
 L=NFRCOMP
 L=OFCONNS
 N=ISOPROD
 G=HIGHACT
 N=TRITIUM
 N=TARGETS

REGULAR WASTE :                                  9.777E+05 M**3
     CH=STAB     I=ABSLIQD 4.62BE+03
                 I+ABSLIQD 4.62BE+03
                 N=TRITIUM 9.616E+02
                 TOTAL VOLUME  :        1.022E+04 M**3
     CH=UNSTAB   I=LWSCNVI 4.072E+04
                 I+LWSCNVI 4.072E+04
                 I=BIOWAST 8.332E+03
                 I+BIOWAST 8.332E+03
                 N=LOWASTE 1.665E+04
                 TOTAL VOLUME  :        1.148E+05 M**3
     NCH=STAB    P=IXRESIN 9.566E+03
                 P=CONCLID 9.417E+04
                 P=FSLUDGE 1.182E+03
                 P=FCARTRG 6.014E+03
                 B=IXRESIN 2.106E+04
                 B=CONCLID 8.129E+04
                 B=FSLUDGE 4.669E+04
                 P=NCTRASH 6.017E+04
                 B=NCTRASH 2.734E+04
                 P=PROCESS 2.159E+04
                 B=PROCESS 7.765E+03
                 N=SSWASTE 1.751E+04
                 L=NFRCOMP 7.975E+02
                 G=HIGHACT 7.204E+02
                 N=TARGETS 3.702E+02
                 TOTAL VOLUME  :        3.962E+05 M**3
     NCH=UNSTAB  P=COTRASH 1.172E+05
                 B=COTRASH 5.762E+04
                 F=COTRASH 6.517E+04
                 F=NCTRASH 1.152E+04
                 I=COTRASH 3.887E+04
                 I+COTRASH 3.887E+04
                 N=SSTRASH 4.961E+04
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                  *+SSTRASH 4.961E+04
                  *=LITRASH 1.399E+04
                  *+LITRASH 1.399E+04
                  TOTAL VOLUME  :       4.565E+05 M**3

LAYERED WASTE :                         1.866E+03 M**3
     CH=STAB      *=ISOPROD 1.866E+03
                  TOTAL VOLUME  :       1.866E+03 M**3

NOT ACCEPTABLE:                         1.938E+04 M**3
                  L=DECONRS 1.933E+04
                  *=SOURCES 5.152E+01
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INTRUDER IMPACTS	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
INT-CONS	2.517E+01	2.639E+01	2.506E+01	2.482E+01	2.498E+01	2.496E+01	2.484E+01	3.650E+01
INT-AGRI	1.507E+01	1.881E+01	1.399E+01	1.396E+01	1.396E+01	1.397E+01	1.400E+01	2.194E+01
INT-CONS	1.526E+00	4.522E+00	3.956E+00	1.523E+00	2.623E+00	2.787E+00	1.332E+00	2.923E+00
INT-AGRI	1.756E+00	3.462E+00	2.713E+00	5.982E+00	2.195E+00	2.241E+00	1.097E+00	3.016E+00
INT-CONS	2.404E-01	2.262E+00	1.773E+00	3.097E-01	8.694E-01	1.470E+00	1.178E-01	8.631E-01
INT-AGRI	2.781E-01	1.428E+00	8.838E-01	4.580E+00	5.370E-01	7.573E-01	2.521E-01	7.768E-01

EXPOSE/ACC IMPACTS								
INT-AIR	1.392E+03	2.520E+04	1.438E+04	4.409E+03	9.093E+03	1.141E+04	3.062E+01	7.327E+03
ERO-AIR	6.097E+00	1.195E+02	7.922E+01	6.436E+01	2.743E+01	1.088E+02	3.540E-01	4.179E+01
INT-WAT	1.408E-03	4.338E-03	9.930E-04	7.445E-05	3.853E-04	1.643E-04	1.778E-04	2.043E-03
ERO-WAT	8.805E-02	7.014E-01	1.409E-01	9.916E-01	1.072E-01	5.395E-02	1.088E-01	2.340E-01
ACC-SNGC	1.312E+00	2.944E+00	2.531E+00	1.118E+00	1.724E+00	1.258E+01	1.183E+00	3.535E+00
ACC-FIRE	3.875E-01	1.237E+00	6.423E-01	2.094E-01	4.133E-01	1.868E+00	1.030E-01	8.395E-01
ACC-AVG	8.499E-01	2.091E+00	1.586E+00	6.635E-01	1.089E+00	7.222E+00	6.752E-01	2.187E+00

OTHER IMPACTS	WASTE PROCESSING: GENERAT	DISPOSAL	TRANSP	DISPOSAL	POST OPERATIONAL COSTS TOTAL	CLOSURE	OBSERVE	INSTITUT.
COST ($)	2.83E+08	0.	2.05E+08	2.08E+08	1.84E+07	3.67E+06	0.	1.47E+07
UNIT COST ($/MT)	2.89E+02	0.	2.09E+02	2.13E+02	1.87E+01	3.75E+00	0.	1.50E+01
POP DOSE (MREM)	0.	0.	5.10E+05	0.				
OCC DOSE (MREM)	2.23E+06	0.	5.82E+06	2.46E+06				
LAND USE (M2)	0.	0.	0.	3.40E+05				
ENERGY USE (GAL)	8.11E+06	0.	1.50E+07	1.61E+06				
INTEREST RATE	.100							
INFLATION RATE	.090							

SINGLE CONTAINER ACCIDENT - ALL STREAMS

STREAM	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
P-EXPRESIN	2.075E-02	2.200E-01	1.779E-01	5.344E-03	8.432E-02	1.110E-01	5.591E-03	7.670E-02
P-CONCLTD	4.456E-03	2.932E-02	2.388E-02	2.617E-03	1.232E-02	3.706E-02	2.795E-03	1.484E-02
P-FSLUDGE	5.956E+00	2.379E+01	2.082E+01	4.692E+00	1.249E+01	5.651E+01	5.634E+00	1.803E+01
P-FCARTRG	1.027E+00	3.966E+00	3.319E+00	8.344E-01	1.988E+00	1.039E+01	8.954E-01	3.147E+00
H-EXPRESIN	1.617E+00	2.318E+00	2.196E+00	1.407E+00	1.717E+00	1.441E+01	1.495E+00	3.991E+00
H-CONCLTD	1.452E-02	1.123E-01	9.519E-02	7.796E-03	4.592E-02	1.175E-01	8.334E-03	5.129E-02
H-FSLUDGE	2.280E+01	5.044E+01	4.501E+01	1.988E+01	3.043E+01	2.241E+02	2.123E+01	6.215E+01
P-CNTRASH	1.279E-02	6.401E-02	5.291E-02	9.167E-03	2.932E-02	1.191E-01	9.821E-03	4.056E-02
P-NCTRASH	0.	0.	0.	0.	0.	0.	0.	0.
H-CNTRASH	1.900E-02	2.465E-02	2.190E-02	8.459E-03	1.421E-02	9.494E-02	9.025E-03	2.731E-02
H-NCTRASH	0.	0.	0.	0.	0.	0.	0.	0.
F-CNTRASH	3.287E-06	5.414E-05	1.081E-07	1.081E-07	1.246E-05	5.879E-03	5.752E-07	7.161E-04
F-NCTRASH	0.	0.	0.	0.	0.	0.	0.	0.
I-CNTRASH	2.133E-02	6.680E-02	2.007E-02	8.564E-03	1.499E-02	9.235E-02	9.122E-03	4.333E-02
I+CNTRASH	2.133E-02	6.680E-02	2.007E-02	8.564E-03	1.499E-02	9.235E-02	9.122E-03	4.333E-02
N-SSTRASH	6.574E-06	1.083E-04	2.161E-07	2.161E-07	2.492E-05	1.176E-02	1.150E-06	1.432E-03
N+SSTRASH	6.574E-06	1.083E-04	2.161E-07	2.161E-07	2.492E-05	1.176E-02	1.150E-06	1.432E-03
N-LNTRASH	6.664E-03	2.088E-02	6.279E-03	2.676E-03	4.689E-03	2.886E-02	2.850E-03	1.354E-02
N+LNTRASH	6.664E-03	2.088E-02	6.279E-03	2.676E-03	4.689E-03	2.886E-02	2.850E-03	1.354E-02
F-PROCESS	6.386E-04	1.052E-02	2.105E-05	2.105E-05	2.421E-03	1.142E+00	1.118E-04	1.391E-01
U-PROCESS	2.163E-03	3.654E-02	2.973E-05	2.973E-05	8.351E-03	3.958E+00	3.393E-04	4.820E-01
I-LWSCNVL	1.162E-01	4.623E-01	8.097E-04	8.097E-04	8.097E-04	9.597E-04	9.105E-04	1.720E-01
I+LWSCNVL	1.162E-01	4.623E-01	8.097E-04	8.097E-04	8.097E-04	9.597E-04	9.105E-04	1.720E-01
I-AHSLIQD	2.007E-01	5.528E-01	9.415E-02	8.543E-02	8.822E-02	9.165E-01	9.114E-02	4.000E-01
I+AHSLIQD	2.007E-01	5.528E-01	9.415E-02	8.543E-02	8.822E-02	9.165E-01	9.114E-02	4.000E-01
I-HIOWAST	3.720E-01	1.412E+00	3.088E-02	2.264E-02	2.543E-02	1.902E-01	2.370E-02	5.698E-01
I+HIOWAST	3.720E-01	1.412E+00	3.088E-02	2.264E-02	2.543E-02	1.902E-01	2.370E-02	5.698E-01
N-SSWASTE	1.278E-03	2.106E-02	4.210E-05	4.210E-05	4.846E-03	2.286E+00	2.238E-04	2.785E-01

N=LOWASTE	1.184E-01	4.323E-01	1.499E-02	1.305E-02	1.369E-02	1.307E-01	1.341E-02	1.889E-01
L=NERCOMP	0.	0.	0.	0.	0.	0.	0.	0.
L=DECONRS	0.	0.	0.	0.	0.	0.	0.	0.
N=ISOPROD	3.980E+00	1.566E+01	2.875E-01	8.072E-02	1.589E-01	1.407E-01	8.487E-02	5.911E+00
N=HIGHACT	0.	0.	0.	0.	0.	0.	0.	0.
N=TRITIUM	9.694E+00	4.018E-01	9.694E+00	9.694E+00	9.694E+00	9.694E+00	4.018E-01	1.236E+01
N=SOURCES	0.	0.	0.	0.	0.	0.	0.	0.
N=TARGETS	3.345E-02	1.387E-03	3.345E-02	3.345E-02	3.345E-02	3.345E-02	1.387E-03	4.273E-02

ACCIDENT BY FIRE - ALL STREAMS

STREAM	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	G-I TRACT	ICRP
P=INHFSTD	0.	0.	0.	0.	0.	0.	0.	0.
P=CONCLID	0.	0.	0.	0.	0.	0.	0.	0.
P=FSLUDGE	0.	0.	0.	0.	0.	0.	0.	0.
P=FCARTRG	0.	0.	0.	0.	0.	0.	0.	0.
H=INHFSTD	0.	0.	0.	0.	0.	0.	0.	0.
H=CONCLID	0.	0.	0.	0.	0.	0.	0.	0.
H=FSLUDGE	0.	0.	0.	0.	0.	0.	0.	0.
P=CUTRASH	7.042E-01	3.525E+00	2.914E+00	5.049E-01	1.615E+00	6.561E+00	5.409E-01	2.234E+00
P=NCTRASH	0.	0.	0.	0.	0.	0.	0.	0.
H=CUTRASH	5.507E-01	1.357E+00	1.206E+00	4.659E-01	7.827E-01	5.228E+00	4.970E-01	1.504E+00
H=NCTRASH	0.	0.	0.	0.	0.	0.	0.	0.
F=CUTRASH	1.810E-04	2.982E-03	5.952E-06	5.952E-06	6.862E-04	3.238E-01	3.188E-05	3.984E-02
F=NCTRASH	0.	0.	0.	0.	0.	0.	0.	0.
I=CUTRASH	1.175E+00	3.679E+00	1.105E+00	4.716E-01	8.257E-01	5.086E+00	5.023E-01	2.386E+00
I+CUTRASH	1.175E+00	3.679E+00	1.105E+00	4.716E-01	8.257E-01	5.086E+00	5.023E-01	2.386E+00
N=SSTRASH	0.	0.	0.	0.	0.	0.	0.	0.
N+SSTRASH	0.	0.	0.	0.	0.	0.	0.	0.
N=LOTRASH	3.670E-01	1.150E+00	3.458E-01	1.474E-01	2.582E-01	1.589E+00	1.570E-01	7.457E-01
N+LOTRASH	3.670E-01	1.150E+00	3.458E-01	1.474E-01	2.582E-01	1.589E+00	1.570E-01	7.457E-01
F=PROCESS	0.	0.	0.	0.	0.	0.	0.	0.
U=PROCESS	0.	0.	0.	0.	0.	0.	0.	0.
I=LQSCNVL	6.399E-01	2.546E+00	4.459E-03	4.459E-03	4.459E-03	5.285E-03	5.014E-03	9.470E-01
I+LQSCNVL	6.399E-01	2.546E+00	4.459E-03	4.459E-03	4.459E-03	5.285E-03	5.014E-03	9.470E-01
I=AHSLIQD	1.127E+00	3.044E+00	5.185E-01	4.705E-01	4.858E-01	5.047E+00	5.022E-01	2.203E+00
I+AHSLIQD	1.127E+00	3.044E+00	5.185E-01	4.705E-01	4.858E-01	5.047E+00	5.022E-01	2.203E+00
I=BIOWAST	0.	0.	0.	0.	0.	0.	0.	0.
I+BIOWAST	0.	0.	0.	0.	0.	0.	0.	0.
N=SWASTE	0.	0.	0.	0.	0.	0.	0.	0.
N=LOWASTE	6.519E-01	2.381E+00	8.253E-02	7.187E-02	7.537E-02	7.200E-01	7.661E-02	1.040E+00
L=NERCOMP	0.	0.	0.	0.	0.	0.	0.	0.
L=DECONRS	0.	0.	0.	0.	0.	0.	0.	0.
N=ISOPROD	0.	0.	0.	0.	0.	0.	0.	0.
N=HIGHACT	0.	0.	0.	0.	0.	0.	0.	0.
N=TRITIUM	5.338E+01	2.213E+00	5.338E+01	5.338E+01	5.338E+01	5.338E+01	2.213E+00	6.820E+01
N=SOURCES	0.	0.	0.	0.	0.	0.	0.	0.
N=TARGETS	0.	0.	0.	0.	0.	0.	0.	0.

INVERSI CO-TRASH

DISPOSAL TECHNOLOGY INDICES
IR = 2 ID = 1 IC = 1 IX = 1
IE = 1 IS = 0 IL = 0 IG = 0
IH = 0 ICL=13 IPU= 2 IIC= 100

WASTE FORM BEHAVIOR INDICES
FLAM = 3 DISP = 2
LEACH = 1 CHEM = 0
START = 0 ACCES = 1

NBEST = 0

INTRUDER CONCENTRATIONS

UNSI-CON	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.32E+06	2.99E+08	3.97E+06	7.94E+06	3.97E+06	3.97E+06	4.42E+06	1.32E+06
C-14	7.54E+02	1.42E+02	2.26E+03	4.53E+03	2.26E+03	2.26E+03	2.28E+03	1.32E+02
FE-55	3.60E+15	6.95E+14	2.55E+15	3.95E+18	1.98E+18	4.79E+14	4.74E+15	4.79E+14
NI-59	2.83E+00	2.80E+00	8.46E+00	1.70E+01	8.50E+00	8.48E+00	8.49E+00	2.80E+00
CO-60	8.12E+02	8.12E+02	2.40E+03	4.81E+03	2.40E+03	2.40E+03	2.40E+03	8.02E+02
NI-63	1.35E+03	3.40E+01	1.48E+03	4.12E+06	2.06E+06	3.85E+03	8.23E+03	3.40E+01
NB-94	1.83E-03	1.83E-03	5.48E-03	1.10E-02	5.48E-03	5.48E-03	5.48E-03	1.83E-03
SR-90	4.10E+00	1.79E+00	2.14E+01	4.27E+01	2.14E+01	2.14E+01	2.03E+01	1.74E+00
TC-99	1.68E+04	9.20E+03	1.66E+04	3.93E+05	1.45E+03	1.48E+04	6.47E+02	6.07E+02
I-129	8.80E-01	9.02E-01	2.71E+00	1.78E-01	2.68E+00	2.74E+00	2.74E+00	1.78E-01
CS-135	3.18E+02	1.18E+02	3.85E+02	5.88E+05	1.02E+03	3.06E+03	1.86E+04	1.18E+02
CS-137	5.29E-02	5.29E-02	1.59E-01	3.17E-01	1.59E-01	1.59E-01	1.59E-01	5.29E-02
U-235	1.16E-01	1.06E-01	3.51E-01	7.02E-01	3.43E-01	3.94E-02	3.50E-01	3.94E-02
U-238	2.92E+00	8.87E-01	1.02E+01	2.04E+01	6.20E+00	4.76E-02	9.46E+00	4.76E-02
NP-237	7.04E-02	4.08E-03	1.14E-01	1.60E+00	3.70E-02	2.73E-01	7.96E-01	4.08E-03
PU-238	5.63E-01	2.76E-02	1.21E-01	1.23E+04	3.84E-01	8.29E-02	2.16E+02	2.76E-02
PU-239	2.22E-01	1.04E-02	4.79E-02	1.12E+03	1.56E-01	3.90E-02	9.03E+01	1.04E-02
PU-241	3.46E+03	1.41E+02	6.93E+02	6.19E+07	2.19E+03	4.65E+03	1.07E+06	2.74E+01
PU-242	2.30E-01	1.11E-02	4.91E-02	4.31E+06	1.55E-01	4.06E-02	1.10E+02	1.11E-02
AM-241	8.02E-02	7.89E-03	2.54E-02	1.59E+00	4.28E-02	2.71E-01	7.91E-01	7.89E-03
AM-243	4.90E-02	6.42E-03	2.15E-02	5.71E-01	3.51E-02	1.42E-01	2.85E-01	6.42E-03
CM-243	3.10E-01	6.27E-02	2.04E-01	2.52E+00	4.80E-01	8.96E-01	1.26E+00	6.27E-02
CM-244	9.86E+00	6.28E-01	1.99E+00	1.04E+05	6.48E+00	1.89E+01	4.90E+03	6.28E-01

UNSI-AGR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	3.62E+01	7.56E+08	1.09E+02	2.17E+02	1.09E+02	1.09E+02	1.09E+02	3.62E+01
C-14	3.75E+00	7.50E+01	1.12E+01	2.25E+01	1.12E+01	1.12E+01	1.12E+01	7.50E+01
FE-55	2.10E+15	3.52E+14	1.47E+15	9.99E+18	4.99E+18	8.94E+14	2.60E+15	3.52E+14
NI-59	2.35E+00	2.15E+00	6.91E+00	1.43E+01	7.17E+00	7.17E+00	7.12E+00	2.15E+00
CO-60	6.77E+02	6.77E+02	2.03E+03	4.06E+03	2.03E+03	2.03E+03	2.03E+03	6.77E+02
NI-63	1.03E+02	3.45E+00	1.49E+02	1.04E+07	5.21E+06	9.23E+03	7.20E+02	3.45E+00
NB-94	1.54E-03	1.54E-03	4.63E-03	9.26E-03	4.63E-03	4.63E-03	4.63E-03	1.54E-03
SR-90	1.50E-01	3.76E-02	1.80E+01	3.61E+01	1.80E+01	1.80E+01	3.24E+00	3.76E-02
TC-99	1.66E+01	4.25E+00	8.57E+00	9.93E+05	6.82E-01	1.01E+02	2.62E-01	2.08E-01
I-129	4.89E-01	6.15E-01	1.90E+00	8.19E-03	1.57E+00	2.31E+00	2.28E+00	8.19E-03
CS-135	2.11E+02	8.43E+01	2.74E+02	1.49E+06	7.25E+02	2.35E+03	1.21E+04	8.43E+01
CS-137	4.47E-02	4.47E-02	1.34E-01	2.68E-01	1.34E-01	1.34E-01	1.34E-01	4.47E-02

U-235	4.84E-02	9.26E-02	2.90E-01	5.93E-01	2.02E-01	8.14E-02	2.95E-01	8.14E-02
U-238	2.59E-06	1.00E+00	8.61E+00	1.72E+01	6.05E+00	1.19E-01	7.89E+00	1.19E-01
NP-237	1.16E-01	9.94E-03	2.24E-01	1.36E+00	8.53E-02	4.12E-01	6.71E-01	9.94E-03
PU-238	1.42E+00	6.91E-02	3.05E-01	1.04E+04	9.86E-01	2.10E-01	1.56E+02	6.91E-02
PU-239	5.58E-01	2.60E-02	1.21E-01	9.49E+02	3.92E-01	9.85E-02	6.89E+01	2.60E-02
PU-241	8.66E+03	3.52E+02	1.75E+03	5.40E+07	5.51E+03	1.17E+04	7.65E+05	6.44E+01
PU-242	5.79E-01	2.78E-02	1.24E-01	1.09E+07	3.91E-01	1.03E-01	7.94E+01	2.78E-02
AM-241	1.26E-01	1.87E-02	6.01E-02	1.34E+00	9.70E-02	4.08E-01	6.64E-01	1.87E-02
AM-243	6.10E-02	1.46E-02	4.71E-02	4.82E-01	7.07E-02	1.92E-01	2.40E-01	1.46E-02
CM-243	3.17E-01	1.22E-01	3.90E-01	2.13E+00	8.88E-01	9.37E-01	1.06E+00	1.22E-01
CM-244	2.46E+01	1.58E+00	5.03E+00	8.77E+04	1.63E+01	4.77E+01	3.45E+03	1.58E+00

STAT-CON	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.10E+08	2.49E+10	3.31E+08	6.62E+08	3.31E+08	3.31E+08	3.69E+08	1.10E+08
C-14	6.29E+04	1.26E+04	1.89E+05	3.77E+05	1.89E+05	1.89E+05	1.90E+05	1.26E+04
FE-55	3.00E+17	5.79E+16	2.12E+17	3.29E+20	1.65E+20	3.99E+16	3.95E+17	3.94E+16
NI-59	2.35E+02	2.33E+02	7.05E+02	1.42E+03	7.08E+02	7.07E+02	7.07E+02	2.33E+02
CO-60	6.68E+04	6.68E+04	2.00E+05	4.01E+05	2.00E+05	2.00E+05	2.00E+05	6.68E+04
NI-63	8.59E+04	2.84E+03	1.23E+05	3.44E+08	1.72E+08	3.04E+05	6.86E+05	2.84E+03
NB-94	1.52E-01	1.52E-01	4.57E-01	9.14E-01	4.57E-01	4.57E-01	4.57E-01	1.52E-01
SR-90	3.42E+02	1.49E+02	1.78E+03	3.56E+03	1.78E+03	1.78E+03	1.69E+03	1.49E+02
TC-99	1.40E+06	7.66E+05	1.40E+06	3.27E+07	1.21E+05	1.56E+06	5.55E+04	5.55E+04
I-129	7.34E+01	7.52E+01	2.26E+02	1.48E+01	2.23E+02	2.28E+02	2.28E+02	1.48E+01
CS-135	2.65E+04	9.85E+03	3.21E+04	4.90E+07	8.48E+04	2.55E+05	1.55E+05	9.85E+03
CS-137	4.41E+00	4.41E+00	1.32E+01	2.64E+01	1.32E+01	1.32E+01	1.32E+01	4.41E+00
U-235	9.09E+00	8.84E+00	2.92E+01	5.85E+01	2.86E+01	3.29E+00	2.91E+01	3.29E+00
U-238	2.43E+02	7.39E+01	8.50E+02	1.70E+03	5.17E+02	3.97E+00	7.88E+02	3.97E+00
NP-237	5.86E+00	3.40E-01	9.51E+00	1.34E+02	3.08E+00	2.28E+01	6.63E+01	3.40E-01
PU-238	4.69E+01	2.30E+00	1.01E+01	1.03E+06	3.20E+01	6.91E+00	1.80E+04	2.30E+00
PU-239	1.85E+01	8.64E-01	4.00E+00	9.37E+04	1.30E+01	3.25E+00	7.52E+03	8.64E-01
PU-241	2.88E+05	1.18E+04	5.77E+04	5.16E+09	1.82E+05	3.87E+05	8.90E+07	2.24E+01
PU-242	1.92E+01	9.23E-01	4.09E+00	3.59E+08	1.29E+01	3.38E+00	9.18E+03	9.23E-01
AM-241	6.68E+00	6.58E-01	2.11E+00	1.33E+02	3.57E+00	2.26E+01	6.59E+01	6.58E-01
AM-243	4.08E+00	5.52E-01	1.79E+00	4.76E+01	2.92E+00	1.35E+01	2.37E+01	5.52E-01
CM-243	2.58E+01	5.23E+00	1.70E+01	2.10E+02	4.00E+01	7.47E+01	1.05E+02	5.23E+00
CM-244	8.22E+02	5.23E+01	1.66E+02	8.65E+06	5.40E+02	1.57E+03	4.09E+05	5.23E+01

STAT-AGR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	0.	0.	0.	0.	0.	0.	0.	1.00E+99
C-14	0.	0.	0.	0.	0.	0.	0.	1.00E+99
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	0.	0.	0.	0.	0.	0.	0.	1.00E+99
SR-90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC-99	0.	0.	0.	0.	0.	0.	0.	1.00E+99
I-129	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CS-135	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NP-237	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99

AM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

UNSL-CON	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.32E+07	2.99E+09	3.97E+07	7.94E+07	3.97E+07	3.97E+07	4.42E+07	1.32E+07
C-14	7.54E+03	1.52E+03	2.26E+04	4.53E+04	2.26E+04	2.26E+04	2.28E+04	1.52E+03
FE-55	3.60E+16	6.95E+15	2.55E+16	3.95E+19	1.98E+19	4.79E+15	4.74E+16	4.74E+15
NI-59	2.89E+03	1.31E+03	6.56E+03	2.04E+04	1.02E+04	8.37E+03	9.28E+03	1.31E+03
CO-60	9.62E+05	9.42E+05	2.89E+06	5.77E+06	2.89E+06	2.71E+06	2.88E+06	9.62E+05
NI-63	1.63E+04	3.80E+02	1.48E+04	4.12E+07	2.06E+07	3.65E+06	8.23E+04	3.40E+02
NB-94	2.19E+00	2.19E+00	6.58E+00	1.32E+01	6.58E+00	6.56E+00	6.57E+00	2.19E+00
SR-90	9.56E+01	2.38E+01	2.56E+04	5.11E+04	2.56E+04	2.45E+04	3.40E+03	2.38E+01
TC-99	1.68E+05	9.20E+04	1.68E+05	3.93E+06	1.45E+04	1.88E+05	8.67E+03	8.67E+03
I-129	1.97E+02	4.27E+02	1.40E+03	1.84E+00	8.44E+02	3.24E+03	2.71E+03	1.84E+00
CS-135	3.18E+03	1.18E+03	3.85E+03	5.88E+06	1.02E+04	3.06E+04	1.86E+05	1.18E+03
CS-137	6.24E+01	8.22E+01	1.85E+02	3.81E+02	1.89E+02	1.90E+02	1.90E+02	8.22E+01
U-235	8.04E+01	1.06E+01	4.21E+02	8.42E+02	1.09E+02	4.44E-01	2.91E+02	4.44E-01
U-238	1.95E+02	1.20E+01	1.22E+04	2.45E+04	1.56E+02	4.78E-01	1.18E+03	4.78E-01
NP-237	9.52E-01	4.14E-02	1.33E+00	1.92E+03	3.88E-01	4.13E+00	4.81E+02	4.14E-02
PU-238	5.83E+00	2.76E-01	1.21E+00	1.24E+07	3.84E+00	8.29E-01	2.23E+03	2.76E-01
PU-239	2.22E+00	1.04E-01	4.79E-01	1.32E+06	1.56E+00	3.90E-01	1.07E+03	1.04E-01
PU-241	5.86E+04	1.41E+03	6.93E+03	1.13E+10	2.19E+04	8.65E+04	1.10E+07	2.83E+00
PU-242	2.30E+00	1.11E-01	4.91E-01	4.31E+07	1.55E+00	4.06E-01	1.10E+03	1.11E-01
AM-241	1.15E+04	8.13E-02	2.62E-01	1.91E+03	4.52E-01	4.09E+00	5.23E+02	8.13E-02
AM-243	1.00E+00	7.11E-02	2.32E-01	6.85E+02	3.99E-01	3.72E+00	2.47E+02	7.11E-02
CM-243	1.16E+01	7.36E-01	2.43E+00	3.02E+03	7.70E+00	3.04E+01	1.29E+03	7.36E-01
CM-244	9.47E+01	6.28E+00	1.99E+01	1.18E+08	6.48E+01	1.89E+02	5.41E+04	6.28E+00

UNSL-AGR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	0.	0.	0.	0.	0.	0.	0.	1.00E+99
C-14	0.	0.	0.	0.	0.	0.	0.	1.00E+99
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	0.	0.	0.	0.	0.	0.	0.	1.00E+99
SR-90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC-99	0.	0.	0.	0.	0.	0.	0.	1.00E+99
I-129	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CS-135	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NP-237	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

STAL-CON	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.10E+09	2.49E+11	3.31E+09	6.62E+09	3.31E+09	3.31E+09	3.69E+09	1.10E+09
C-14	6.29E+05	1.26E+05	1.89E+06	3.77E+06	1.89E+06	1.89E+06	1.90E+06	1.26E+05

FE-55	5.[illegible]E+1[illegible]	5.79E+17	2.12E+18	5.29E+21	1.45E+21	5.99E+17	3.95E+18	3.99E+17
NI-59	7.77E+05	1.48E+05	1.5[illegible]E+06	1.69E+07	8.46E+06	2.67E+06	4.28E+06	1.00E+05
CO-60	7.99E+08	8.01E+08	2.40E+09	4.81E+09	2.40E+09	1.45E+09	2.35E+09	7.99E+08
NI-63	8.59E+05	2.86E+06	1.23E+06	5.46E+09	1.72E+09	5.[illegible]E+06	8.86E+06	2.04E+06
NB-94	1.83E+03	1.83E+03	5.48E+03	1.10E+04	5.48E+03	5.31E+03	5.38E+03	1.83E+03
SN-90	8.64E+03	1.99E+03	2.09E+07	4.17E+07	2.09E+07	1.87E+07	3.22E+05	1.99E+03
TC-99	1.40E+07	7.66E+06	1.40E+07	5.27E+08	1.21E+06	1.50E+07	5.55E+05	5.55E+05
I-129	1.96E+04	5.87E+04	1.89E+05	1.53E+02	9.14E+04	2.40E+06	8.68E+05	1.53E+02
CS-135	2.65E+05	9.85E+04	3.21E+05	4.90E+08	8.88E+05	2.55E+06	1.55E+07	9.85E+04
CS-137	4.52E+04	8.38E+04	1.24E+05	3.17E+05	1.45E+05	1.53E+05	1.58E+05	4.38E+04
U-235	1.36E+04	9.43E+02	3.44E+05	6.99E+05	1.19E+04	3.70E+01	6.41E+04	3.70E+01
U-238	1.70E+04	1.00E+03	1.01E+07	2.03E+07	1.31E+04	5.99E+01	1.07E+05	5.99E+01
NP-237	7.96E+01	3.45E+00	1.11E+02	1.60E+06	3.23E+01	3.45E+02	7.30E+04	3.45E+00
PU-238	4.69E+02	2.30E+01	1.01E+02	4.20E+09	3.20E+02	6.91E+01	1.86E+05	2.30E+01
PU-239	1.85E+02	8.64E+00	4.00E+01	9.12E+08	1.30E+02	3.25E+01	8.90E+04	8.64E+00
PU-241	2.88E+06	1.18E+05	5.77E+05	1.08E+12	1.82E+06	3.87E+06	9.20E+08	2.30E+02
PU-242	1.92E+02	9.23E+00	4.09E+01	5.59E+09	1.29E+02	3.38E+01	9.18E+04	9.23E+00
AM-241	9.58E+01	6.78E+00	2.18E+01	1.59E+06	3.77E+01	5.42E+02	8.58E+04	6.78E+00
AM-243	8.41E+01	5.93E+00	1.93E+01	5.70E+05	3.33E+01	3.13E+02	5.83E+04	5.93E+00
CM-243	9.84E+02	6.14E+01	2.03E+02	2.51E+06	6.45E+02	2.58E+03	4.56E+05	6.14E+01
CM-244	8.22E+03	5.23E+02	1.66E+03	6.73E+10	5.40E+03	1.97E+04	4.51E+06	5.23E+02

STAL-AGR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	0.	0.	0.	0.	0.	0.	0.	1.00E+99
C-14	0.	0.	0.	0.	0.	0.	0.	1.00E+99
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E 99
NB-94	0.	0.	0.	0.	0.	0.	0.	1.00E+99
SN-90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC-99	0.	0.	0.	0.	0.	0.	0.	1.00E+99
I-129	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CS-135	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NP-237	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

GENS-CON	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	7.98E+15	1.80E+18	2.39E+16	4.79E+16	2.39E+16	2.39E+16	2.67E+16	7.98E+15
C-14	7.92E+02	1.59E+02	2.37E+03	4.75E+03	2.37E+03	2.37E+03	2.40E+03	1.59E+02
FE-55	8.70E+61	1.68E+61	6.15E+61	9.53E+64	4.77E+64	1.16E+61	1.14E+62	1.10E+61
NI-59	2.84E+00	2.80E+00	8.49E+00	1.71E+01	8.53E+00	8.51E+00	8.52E+00	2.80E+00
CO-60	6.83E+25	6.83E+25	2.05E+26	4.10E+26	2.05E+26	2.05E+26	2.05E+26	6.83E+25
NI-63	2.10E+04	6.92E+02	3.01E+04	8.38E+07	4.19E+07	7.42E+04	1.67E+05	6.92E+02
NB-94	1.85E-03	1.85E-03	5.56E-03	1.11E-02	5.56E-03	5.56E-03	5.56E-03	1.85E-03
SN-90	8.01E+04	3.09E+04	4.17E+05	8.35E+05	4.17E+05	4.17E+05	3.96E+05	3.49E+04
TC-99	1.68E+04	9.21E+03	1.68E+04	3.93E+05	1.45E+03	1.88E+04	6.67E+02	6.67E+02
I-129	8.80E-01	9.02E-01	2.71E+00	1.78E-01	2.68E+00	2.74E+00	2.70E+00	1.78E-01

CS-135	3.18E+02	1.18E+02	3.85E+02	5.88E+05	1.02E+03	5.06E+03	1.86E+04	1.18E+02
CS-137	5.45E+02	5.45E+02	1.63E+03	3.27E+03	1.63E+03	1.63E+03	1.63E+03	5.45E+02
U-235	1.18E+01	1.06E+01	3.51E+01	7.02E+01	3.43E+01	3.94E+12	3.50E+01	3.44E+02
U-238	2.92E+00	8.87E+01	1.02E+01	2.04E+01	6.20E+00	4.76E+02	9.86E+00	4.70E+02
NP-237	7.04E+02	2.08E+03	1.14E+11	1.60E+00	3.70E+02	2.73E+01	7.96E+01	4.08E+03
PU-238	1.39E+01	6.81E+01	2.98E+00	3.05E+05	9.49E+00	2.05E+00	5.33E+03	6.81E+01
PU-239	2.25E+01	1.05E+02	4.85E+02	1.14E+03	1.57E+01	3.94E+02	9.13E+01	1.05E+02
PU-241	4.56E+12	1.86E+11	9.13E+11	8.17E+16	2.89E+12	6.13E+12	1.41E+15	5.02E+01
PU-242	2.30E+01	1.11E+02	4.91E+02	4.31E+06	1.55E+01	4.06E+02	1.10E+02	1.11E+02
AM-241	1.47E+01	1.48E+02	4.64E+02	2.91E+00	7.43E+02	4.96E+01	1.45E+00	1.44E+02
AM-243	5.07E+02	6.86E+03	2.22E+02	5.91E+01	3.43E+02	1.88E+01	2.95E+01	6.80E+03
CM-243	1.82E+03	3.89E+02	1.20E+03	1.48E+04	2.82E+03	5.27E+03	7.40E+03	8.01E+00
CM-244	6.89E+07	4.39E+06	1.39E+07	7.25E+11	4.93E+07	1.32E+08	3.48E+10	3.93E+00

GENS-AGR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	2.18E+11	4.56E+18	6.55E+11	1.31E+12	6.55E+11	6.55E+11	6.55E+11	2.18E+11
C-14	3.94E+00	7.87E+01	1.18E+01	2.36E+01	1.18E+01	1.18E+01	1.18E+01	7.87E+01
FE-55	5.87E+01	8.48E+00	3.55E+01	2.41E+05	1.21E+05	2.10E+01	6.20E+01	8.40E+00
NI-59	2.36E+00	2.10E+00	6.93E+00	1.44E+01	7.20E+00	7.20E+00	7.14E+00	2.10E+00
CO-60	5.77E+25	5.77E+25	1.73E+26	3.46E+26	1.73E+26	1.73E+26	1.73E+26	5.77E+25
NI-63	2.09E+03	7.02E+01	3.04E+03	2.12E+08	1.06E+08	1.88E+05	1.46E+04	7.02E+01
NB-94	1.57E-03	1.57E-03	4.70E-03	9.39E-03	4.70E-03	4.70E-03	4.70E-03	1.57E-03
SR-90	2.94E+03	7.35E+02	3.52E+05	7.05E+05	3.52E+05	3.52E+05	6.32E+04	7.35E+02
TC-99	1.06E+01	4.26E+00	8.59E+00	9.95E+05	6.82E-01	1.01E+02	2.03E-01	2.03E+01
I-129	4.49E+01	6.15E+01	1.96E+00	8.19E+03	1.57E+00	2.31E+00	2.24E+00	8.19E+03
CS-135	2.11E+02	8.43E+01	2.74E+02	1.49E+06	7.25E+02	2.35E+03	1.21E+04	8.43E+01
CS-137	4.60E+02	4.60E+02	1.38E+03	2.76E+03	1.38E+03	1.38E+03	1.38E+03	4.60E+02
U-235	9.84E-02	9.26E-02	2.96E-01	5.93E-01	2.92E-01	8.14E-02	2.95E-01	8.14E-02
U-238	2.59E+00	1.00E+00	8.61E+00	1.72E+01	6.05E+00	1.19E-01	7.89E+00	1.19E-01
NP-237	1.16E-01	9.95E-03	2.24E-01	1.36E+00	8.53E-02	4.12E-01	6.71E-01	9.95E-03
PU-238	3.50E+01	1.71E+00	7.53E+00	2.58E+05	2.39E+01	5.18E+00	3.86E+03	1.71E+00
PU-239	5.64E+01	2.63E+02	1.22E+01	9.60E+02	3.96E+01	9.97E+02	6.77E+01	2.63E+02
PU-241	1.15E+13	4.65E+11	2.31E+12	7.12E+16	7.26E+12	1.55E+13	1.01E+15	1.19E+00
PU-242	5.40E+01	2.78E+02	1.24E+01	1.09E+07	3.91E+01	1.03E+01	7.95E+01	2.78E+02
AM-241	2.30E+01	3.81E+02	1.10E+01	2.46E+00	1.77E+01	7.47E+01	1.21E+00	3.41E+02
AM-243	6.31E+02	1.51E+02	4.87E+02	4.99E+01	7.32E+02	1.99E+01	2.48E+01	1.51E+02
CM-243	1.86E+03	7.16E+02	2.29E+03	1.25E+04	4.05E+03	5.51E+03	6.25E+03	2.01E+01
CM-244	1.73E+08	1.10E+07	3.52E+07	6.13E+11	1.14E+08	3.33E+08	2.41E+10	9.80E+00

MAFI-CON	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.32E+08	2.99E+10	3.97E+08	7.94E+08	3.97E+08	3.97E+08	4.42E+08	1.32E+08
C-14	7.54E+04	1.52E+04	2.26E+05	4.53E+05	2.26E+05	2.26E+05	2.28E+05	1.50E+04
FE-55	3.60E+17	6.95E+16	2.55E+17	3.95E+20	1.98E+20	4.79E+16	4.74E+17	4.74E+16
NI-59	1.29E+05	2.14E+04	1.84E+05	4.15E+08	2.07E+08	4.66E+05	1.04E+06	2.14E+04
CO-60	2.27E+10	6.59E+10	9.88E+10	3.95E+11	1.98E+11	4.37E+08	1.18E+10	4.37E+08
NI-63	1.03E+05	3.40E+03	1.48E+05	4.12E+08	2.06E+08	3.65E+05	8.23E+05	3.40E+03
NB-94	1.52E+05	1.46E+05	4.47E+05	9.31E+05	4.48E+05	1.99E+04	3.24E+04	1.44E+04
SR-90	9.86E+02	2.39E+02	1.02E+08	2.04E+08	1.02E+08	5.61E+06	3.92E+04	2.39E+02
TC-99	1.08E+06	9.20E+05	1.68E+06	3.93E+07	1.45E+05	1.88E+06	6.67E+04	6.67E+04
I-129	2.41E+03	6.98E+03	2.44E+04	1.84E+01	1.13E+04	2.53E+06	1.52E+05	1.04E+01
CS-135	3.18E+04	1.18E+04	3.85E+04	5.88E+07	1.02E+05	3.06E+05	1.86E+06	1.18E+04
CS-137	3.74E+04	3.04E+04	6.68E+04	3.74E+07	1.95E+05	5.23E+05	3.42E+06	3.04E+04
U-235	1.88E+03	1.14E+02	7.92E+06	1.58E+07	1.47E+03	4.44E+00	9.81E+03	4.44E+00
U-238	2.05E+03	1.20E+02	1.96E+08	3.11E+08	1.58E+03	4.78E+00	1.30E+04	4.78E+00
NP-237	9.55E+00	4.14E-01	1.33E+01	3.08E+07	3.88E+00	4.15E+01	9.63E+03	4.14E-01
PU-238	5.63E+01	2.76E+00	1.21E+01	7.62E+08	3.84E+01	8.29E+00	2.23E+04	2.76E+00
PU-239	2.22E+01	1.04E+00	4.79E+00	5.77E+08	1.50E+01	3.90E+00	1.08E+04	1.04E+00
PU-241	3.46E+05	1.41E+04	6.93E+04	1.32E+11	2.19E+05	4.65E+05	1.10E+06	2.83E+01

PU-242	2.50E+01	1.11E+00	4.91E+00	4.31E+08	1.55E+01	4.06E+00	1.10E+04	1.11E+00
AM-241	1.15E+01	8.14E-01	2.62E+00	6.55E+07	4.53E+00	4.11E+01	1.15E+04	8.14E-01
AM-243	1.01E+01	7.12E-01	2.32E+00	5.09E+07	4.00E+00	3.76E+01	8.79E+03	7.12E-01
CM-243	1.18E+02	7.37E+00	2.44E+01	9.06E+07	7.74E+01	5.10E+02	8.56E+04	7.37E+00
CM-244	9.87E+02	6.28E+01	1.99E+02	2.29E+10	6.48E+02	1.49E+03	5.42E+05	6.20E+01

M4F1-AGR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	0.	0.	0.	0.	0.	0.	0.	1.00E+99
C-14	0.	0.	0.	0.	0.	0.	0.	1.00E+99
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	0.	0.	0.	0.	0.	0.	0.	1.00E+99
SR-90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC-99	0.	0.	0.	0.	0.	0.	0.	1.00E+99
I-129	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CS-135	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NP-237	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

M4F2-CUN	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.34E+28	3.03E+30	4.02E+28	8.05E+28	4.02E+28	4.02E+28	4.46E+28	1.34E+28
C-14	8.41E+02	1.69E+02	2.52E+03	5.05E+03	2.52E+03	2.52E+03	2.55E+03	1.69E+02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	2.79E+01	2.52E+01	8.18E+01	1.71E+02	8.56E+01	8.41E+01	8.49E+01	2.52E+01
CO-60	3.15E+55	3.15E+55	9.45E+55	1.89E+56	9.45E+55	9.39E+55	9.44E+55	3.15E+55
NI-63	9.05E+05	2.09E+04	1.30E+06	3.62E+09	1.81E+09	3.20E+06	7.22E+06	2.99E+04
NB-94	1.89E-02	1.89E-02	5.66E-02	1.13E-01	5.66E-02	5.66E-02	5.66E-02	1.89E-02
SR-90	5.84E+10	1.04E+10	9.64E+11	1.93E+12	9.64E+11	9.60E+11	6.24E+11	1.04E+10
TC-99	1.69E+04	9.22E+03	1.68E+04	3.94E+05	1.45E+03	1.88E+04	6.68E+02	6.68E+02
I-129	6.62E+00	8.08E+00	2.46E+01	1.83E-01	2.21E+01	2.74E+01	2.69E+01	1.83E-01
CS-135	3.18E+02	1.18E+02	3.85E+02	5.88E+05	1.02E+03	3.06E+03	1.86E+04	1.18E+02
CS-137	5.65E+08	5.64E+08	1.69E+09	3.39E+09	1.69E+09	1.70E+09	1.70E+09	5.64E+08
U-235	1.10E+00	5.78E-01	3.51E+00	7.02E+00	2.83E+00	4.39E-02	3.38E+00	4.39E-02
U-238	1.28E+01	1.16E+00	1.02E+02	2.04E+02	1.37E+01	4.78E-02	5.72E+01	4.78E-02
NP-237	9.22E-02	4.13E-03	1.31E-01	1.61E+01	3.96E-02	3.94E-01	7.41E+00	4.13E-03
PU-238	7.68E+02	3.76E+01	1.65E+02	1.66E+08	5.23E+02	1.13E+02	3.04E+05	3.76E+01
PU-239	2.28E+01	1.06E-02	4.92E-02	1.15E+04	1.60E-01	4.00E-02	1.08E+02	1.06E-02
PU-241	1.15E+24	4.67E+22	2.30E+23	1.44E+29	7.26E+23	1.54E+24	3.65E+26	1.10E+00
PU-242	2.31E-01	1.11E-02	4.92E-02	4.32E+06	1.56E-01	4.07E-02	1.10E+02	1.11E-02
AM-241	4.29E-01	3.16E-02	1.02E-01	6.20E+01	1.75E-01	1.52E+00	2.90E+01	3.16E-02
AM-243	9.88E-02	7.64E-03	2.49E-02	6.18E+00	4.26E-02	3.60E-01	2.99E+00	7.64E-03
CM-243	2.80E+08	2.20E+07	7.25E+07	7.64E+09	2.21E+08	7.55E+08	3.77E+09	8.13E+00
CM-244	2.48E+16	1.58E+15	5.01E+15	2.60E+21	1.63E+16	4.74E+16	1.35E+19	3.94E+00

M4F2-AGR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM

H-3	3.07E+23	7.96E+30	1.10E+24	2.20E+24	1.10E+24	1.10E+24	1.10E+24	3.07E+23
C-14	9.18E+00	8.36E-01	1.25E+01	2.51E+01	1.25E+01	1.25E+01	1.25E+01	8.30E-01
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	2.03E+01	1.14E+01	5.22E+01	1.45E+02	7.23E+01	7.19E+01	6.76E+01	1.14E+01
CO-60	2.66E+55	2.66E+55	7.96E+55	1.60E+56	7.98E+55	7.96E+55	7.97E+55	2.66E+55
NI-63	9.04E+04	3.03E+03	1.31E+05	9.15E+09	4.58E+09	8.10E+06	6.32E+05	3.03E+03
NB-94	1.59E-02	1.59E-02	4.78E-02	9.56E-02	4.78E-02	4.78E-02	4.78E-02	1.59E-04
SR-90	6.95E+08	1.71E+08	8.14E+11	1.63E+12	8.14E+11	8.13E+11	1.74E+10	1.71E+08
TC-99	1.06E+01	4.27E+00	8.60E+00	9.96E+05	6.84E-01	1.01E+02	2.63E-01	2.63E-01
I-129	9.42E-01	2.17E+00	7.25E+00	8.20E-03	4.05E+00	2.31E+01	1.72E+01	8.20E-03
CS-135	2.11E+02	8.43E+01	2.74E+02	1.49E+06	7.25E+02	2.35E+03	1.21E+04	8.43E+01
CS-137	4.77E+08	4.76E+08	1.43E+09	2.86E+09	1.43E+09	1.43E+09	1.43E+09	4.70E+08
U-235	9.49E-01	5.91E-01	2.96E+00	5.93E+00	2.56E+00	1.08E-01	2.84E+00	1.08E-01
U-238	1.37E+01	1.08E+00	8.61E+01	1.72E+02	1.44E+01	1.21E-01	4.49E+01	1.21E-01
NP-237	2.17E-01	1.04E-02	5.19E-01	1.36E+01	9.42E-02	9.08E-01	6.14E+00	1.04E-02
PU-238	1.93E+03	9.42E+01	4.15E+02	1.42E+08	1.32E+03	2.80E+02	2.19E+05	9.42E+01
PU-239	5.74E-01	2.67E-02	1.24E-01	9.73E+03	4.02E-01	1.01E-01	7.86E+01	2.67E-02
PU-241	2.88E+24	1.17E+23	5.80E+23	1.56E+29	1.83E+24	3.89E+24	2.60E+26	2.75E+00
PU-242	5.80E-01	2.78E-02	1.24E-01	1.09E+07	3.92E-01	1.03E-01	7.96E+01	2.78E-02
AM-241	9.92E-01	7.85E-02	2.54E-01	5.23E+01	4.34E-01	3.50E+00	2.32E+01	7.85E-02
AM-243	2.08E-01	1.88E-02	6.18E-02	5.22E+00	1.04E-01	7.38E-01	2.45E+00	1.88E-02
CM-243	4.91E+08	5.34E+07	1.76E+08	6.45E+09	8.99E+08	1.37E+09	3.17E+09	2.04E+01
CM-244	6.23E+16	3.47E+15	1.20E+16	2.20E+21	4.09E+16	1.20E+17	9.34E+18	1.00E+01

ACCIDENT CONCENTRATIONS

INT-AIR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.56E+06	1.33E+09	1.56E+06	1.56E+06	1.56E+06	1.56E+06	1.60E+06	1.56E+06
C-14	8.45E+02	1.69E+02	8.45E+02	8.45E+02	8.45E+02	8.45E+02	8.47E+02	1.69E+02
FE-55	3.09E+15	7.23E+14	9.71E+14	9.25E+15	9.25E+15	5.32E+14	1.59E+15	5.36E+14
NI-59	1.48E+03	2.87E+02	7.83E+02	8.62E+03	8.62E+03	3.85E+03	2.90E+03	2.87E+02
CO-60	5.82E+07	6.69E+07	6.25E+07	6.69E+07	6.69E+07	5.93E+06	2.97E+07	5.93E+06
NI-63	1.43E+03	4.78E+01	6.50E+02	3.07E+06	3.07E+06	5.43E+03	3.46E+03	4.70E+01
NB-94	3.65E+02	3.64E+02	3.65E+02	3.66E+02	3.65E+02	1.68E+02	1.03E+02	1.03E+02
SR-90	1.40E+01	3.59E+00	1.65E+04	1.65E+04	1.65E+04	1.39E+04	1.41E+02	3.54E+00
TC-99	2.60E+04	1.15E+04	7.50E+03	2.92E+05	6.11E+02	2.28E+04	2.47E+02	2.47E+02
I-129	2.41E+01	5.85E+01	6.57E+01	3.39E-02	3.83E+01	2.59E+02	1.77E+02	3.39E-02
CS-135	3.88E+02	1.54E+02	1.67E+02	4.37E+05	4.03E+02	1.43E+03	7.42E+03	1.54E+02
CS-137	4.37E+02	3.43E+02	2.83E+02	9.64E+03	7.89E+02	1.99E+03	6.01E+03	2.83E+02
U-235	4.13E+01	2.61E+00	1.06E+03	1.00E+03	1.11E+01	6.61E-02	3.80E+01	6.61E-02
U-238	4.04E+01	2.74E+00	1.53E+04	1.53E+04	1.20E+01	7.12E-02	5.55E+01	7.12E-02
NP-237	4.24E-01	1.84E-02	1.97E-01	1.66E+03	5.74E-02	6.16E-01	3.84E+01	1.84E-02
PU-238	2.50E+00	1.22E-01	1.79E-01	2.61E+04	5.68E-01	1.23E-01	9.50E+01	1.22E-01
PU-239	9.86E-01	4.59E-02	7.12E-02	3.01E+04	2.31E-01	5.80E-02	4.61E+01	4.59E-02
PU-241	1.53E+04	6.22E+02	1.03E+03	9.83E+08	3.24E+03	6.91E+03	4.66E+05	6.22E+02
PU-242	1.02E+00	4.90E-02	7.24E-02	1.54E+04	2.30E-01	6.03E-02	4.69E+01	4.90E-02
AM-241	5.10E-01	3.61E-02	3.89E-02	3.29E+03	6.70E-02	6.11E-01	4.77E+01	3.61E-02
AM-243	4.48E-01	3.16E-02	3.45E-02	2.46E+03	5.91E-02	5.60E-01	3.55E+01	3.16E-02
CM-243	5.25E+00	3.27E-01	3.62E-01	8.31E+03	1.15E+00	4.61E+00	3.46E+02	3.27E-01
CM-244	4.38E+01	2.79E+00	2.96E+00	7.24E+05	9.58E+00	2.81E+01	2.27E+03	2.79E+00

ERO-AIR	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	3.02E+49	2.59E+52	3.02E+49	3.02E+49	3.02E+49	3.02E+49	3.10E+49	3.02E+49
C-14	7.22E-01	1.45E-01	7.22E-01	7.22E-01	7.22E-01	7.22E-01	7.23E-01	1.45E-01
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	1.02E+00	1.98E-01	5.40E-01	5.95E+00	5.95E+00	2.65E+00	2.00E+00	1.98E-01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99

NI-63	1.59E+06	5.30E+04	7.86E+05	3.40E+09	3.40E+09	6.02E+06	3.84E+06	5.30E+04
NB-94	2.65E-01	2.64E-01	2.64E-01	2.65E-01	2.64E-01	1.21E-01	7.50E-02	7.50E-02
SR-90	2.38E+18	5.86E+17	2.70E+21	2.70E+21	2.70E+21	2.28E+21	2.30E+19	5.86E+17
TC-99	1.77E+01	7.85E+00	5.12E+00	2.00E+02	8.17E-01	1.56E+01	1.68E-01	1.07E-01
I-129	1.64E-02	3.97E-02	4.46E-02	2.30E-05	2.40E-02	1.76E-01	1.20E-01	2.30E-05
CS-135	2.63E-01	1.05E-01	1.14E-01	2.97E+02	3.01E-01	9.72E-01	5.04E+00	1.05E-01
CS-137	3.42E+18	2.99E+18	2.21E+18	7.57E+19	6.16E+18	1.56E+19	4.70E+19	2.21E+18
U-235	2.80E-02	1.77E-03	6.81E-01	6.81E-01	7.53E-03	4.08E-05	2.58E-02	4.48E-05
U-238	5.15E-02	1.86E-03	1.04E-01	1.04E+01	8.15E-03	4.83E-05	3.76E-02	4.83E-05
NP-237	2.88E-04	1.25E-05	1.34E-04	1.13E+00	3.90E-05	4.19E-04	2.81E-02	1.25E-05
PU-238	7.04E+03	3.43E+02	5.05E+02	7.36E+07	1.40E+03	3.47E+02	2.67E+05	3.43E+02
PU-239	7.08E-04	3.29E-05	5.10E-05	2.16E+01	1.65E-04	4.15E-05	3.30E-02	3.29E-05
PU-241	2.18E+00	8.84E+02	1.46E+03	1.40E+09	4.60E+03	9.82E+03	6.82E+05	8.84E+02
PU-242	6.97E-04	3.34E-05	4.97E-05	1.05E+01	1.57E-04	4.12E-05	3.20E-02	3.34E-05
AM-241	6.10E-03	2.32E-04	4.65E-04	3.94E+01	8.01E-04	7.30E-03	5.70E-01	4.32E-04
AM-243	3.59E-04	2.53E-05	2.70E-05	1.97E+00	8.74E-05	4.48E-04	2.84E-02	2.53E-05
CM-243	2.87E+15	1.79E+14	1.98E+14	4.54E+18	8.26E+14	2.52E+15	1.89E+17	1.79E+14
CM-244	9.65E+30	6.14E+29	6.52E+29	1.59E+35	2.11E+30	6.18E+30	4.99E+32	6.14E+29

INT-AT	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.82E+06	3.03E+13	1.82E+06	1.82E+06	1.82E+06	1.82E+06	1.82E+06	1.82E+06
C-14	3.72E+02	7.43E+01	3.72E+02	3.72E+02	3.72E+02	3.72E+02	3.72E+02	7.43E+01
FE-55	2.09E+15	4.01E+14	5.71E+14	1.08E+16	1.08E+16	9.82E+14	9.57E+14	4.01E+14
NI-59	1.41E+03	2.86E+02	7.37E+02	1.00E+04	1.00E+04	1.00E+04	2.79E+03	2.00E+02
CU-60	8.66E+07	7.84E+07	7.26E+07	7.84E+07	7.84E+07	7.84E+07	3.12E+07	3.12E+07
NI-63	1.32E+03	4.42E+01	6.37E+02	6.96E+10	6.96E+10	1.23E+08	3.05E+03	4.42E+01
NB-94	4.29E+02	4.17E+02	4.24E+02	4.34E+02	4.24E+02	4.34E+02	3.08E+00	3.00E+00
SR-90	1.69E+01	4.15E+00	1.94E+04	1.94E+04	1.94E+04	1.94E+04	1.03E+02	4.15E+00
TC-99	3.26E+04	1.31E+04	8.79E+03	6.63E+09	6.99E+02	1.03E+05	2.69E+02	2.09E+04
I-129	3.14E+02	7.70E+02	8.67E+02	4.37E+01	4.59E+02	3.79E+03	2.47E+03	4.37E+01
CS-135	9.57E+01	3.92E+01	4.25E+01	9.92E+09	1.12E+02	3.75E+02	1.82E+03	3.92E+01
CS-137	1.12E+02	1.00E+02	7.35E+01	1.13E+04	2.14E+02	6.20E+02	2.66E+03	7.35E+01
U-235	6.54E+01	4.19E+00	1.17E+03	1.17E+03	1.77E+01	6.58E+02	4.16E+01	4.19E+00
U-238	7.39E+01	4.39E+00	1.78E+04	1.78E+04	1.92E+01	1.48E+03	6.10E+01	4.39E+00
NP-237	5.37E+01	2.23E+00	2.54E+01	1.94E+03	7.39E+00	1.70E+03	3.80E+01	2.23E+00
PU-238	4.18E+02	1.07E+01	7.46E+01	3.05E+04	9.86E+01	2.56E+03	9.96E+01	1.07E+01
PU-239	1.67E+02	4.09E+00	2.99E+01	3.52E+04	3.95E+01	1.27E+03	4.84E+01	4.09E+00
PU-241	2.04E+06	4.12E+04	7.81E+05	2.23E+13	4.43E+05	1.57E+08	4.87E+05	4.12E+04
PU-242	1.72E+02	4.40E+00	3.09E+01	1.80E+04	4.08E+01	1.27E+03	4.92E+01	4.40E+00
AM-241	4.33E+01	2.89E+00	8.16E+00	3.84E+03	5.81E+00	3.01E+03	3.18E+01	2.89E+00
AM-243	3.81E+01	2.50E+00	7.31E+00	2.88E+03	5.12E+00	2.35E+03	2.34E+01	2.50E+00
CM-243	6.05E+02	3.77E+01	9.86E+01	9.74E+03	1.36E+02	8.91E+03	3.02E+02	3.77E+01
CM-244	5.10E+03	3.05E+02	7.06E+02	8.44E+05	1.10E+03	3.63E+05	1.95E+03	3.05E+02

ERO-AT	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	7.49E+48	1.25E+50	7.49E+48	7.49E+48	7.49E+48	7.49E+48	7.49E+48	7.49E+48
C-14	6.73E-02	1.35E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02	6.73E-02	1.35E-02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	2.06E-01	3.89E-02	1.08E-01	1.47E+00	1.47E+00	1.47E+00	4.08E-01	3.89E-02
CU-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	3.10E+05	1.04E+04	1.50E+05	1.64E+13	1.64E+13	2.90E+10	7.19E+05	1.04E+04
NB-94	6.59E-02	6.41E-02	6.52E-02	6.67E-02	6.53E-02	6.67E-02	4.74E-04	4.74E-04
SR-90	5.86E+17	1.04E+17	6.73E+20	6.73E+20	6.73E+20	6.73E+20	4.95E+18	1.44E+17
TC-99	4.72E+00	1.89E+00	1.27E+00	9.60E+05	1.01E-01	1.50E+01	3.90E-02	3.90E-02
I-129	4.53E-02	1.11E-01	1.25E-01	6.29E-05	6.62E-02	5.05E-01	3.56E-01	6.29E-05
CS-135	1.38E-02	5.65E-03	6.12E-03	1.43E+06	1.42E-02	5.40E-02	2.62E-01	5.65E-03
CS-137	1.85E+17	1.60E+17	1.22E+17	1.88E+19	3.55E+17	1.03E+18	4.74E+18	1.22E+17
U-235	9.42E-03	6.03E-04	1.69E-01	1.69E-01	2.55E-03	9.47E-02	5.99E-03	6.03E-04

U-238	1.06E-02	6.32E-04	2.57E+00	2.57E+00	2.77E-03	2.13E-01	8.79E-03	6.32E-04
NP-237	7.73E-03	3.21E-04	3.65E-03	2.79E-01	1.07E-03	2.45E-01	5.47E-03	3.21E-04
PU-238	2.50E+05	6.38E+03	4.06E+04	1.82E+07	5.89E+04	1.53E+05	5.95E+04	6.30E+03
PU-239	2.54E-02	6.21E-04	4.54E-03	5.35E+00	6.00E-03	1.93E-01	7.36E-03	6.21E-04
PU-241	6.15E+05	1.24E+04	2.35E+05	6.72E+52	1.34E+05	4.72E+07	1.47E+05	1.24E+04
PU-242	2.49E-02	6.37E-04	4.48E-03	2.60E+00	5.91E-03	1.84E-01	7.12E-03	6.37E-04
AM-241	1.10E-01	7.33E-03	2.07E-02	9.75E+00	1.47E-02	7.63E+00	8.06E-02	7.33E-03
AM-243	6.98E-03	4.25E-04	1.24E-03	4.89E-01	8.71E-04	3.99E-01	3.98E-03	4.25E-04
CM-243	7.02E+16	4.37E+15	1.14E+16	1.13E+18	1.58E+16	1.03E+18	3.50E+16	4.37E+15
CM-244	2.38E+32	1.42E+31	3.30E+31	3.95E+34	5.13E+31	1.70E+34	9.13E+31	1.46E+31

ACC-CONT	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.20E+06	7.90E+07	1.20E+06	1.20E+06	1.20E+06	1.20E+06	2.90E+07	1.20E+06
C-14	4.75E+05	1.07E+05	4.75E+05	4.75E+05	4.75E+05	4.75E+05	5.96E+05	1.07E+05
FE-55	8.34E+04	7.98E+04	8.24E+04	9.33E+04	9.33E+04	7.23E+03	7.82E+04	7.23E+03
NI-59	4.07E+04	1.60E+04	2.97E+04	5.84E+04	5.84E+04	2.60E+04	5.28E+04	1.60E+04
CO-60	8.38E+02	6.44E+02	8.39E+02	8.44E+02	8.44E+02	5.71E+01	6.01E+02	5.71E+01
NI-63	4.92E+04	1.57E+03	2.29E+04	9.65E+06	9.65E+06	1.71E+04	2.02E+05	1.57E+03
NB-94	2.47E+03	2.46E+03	2.46E+03	2.47E+03	2.46E+03	1.13E+03	2.20E+03	1.13E+03
SR-90	6.23E+01	1.56E+01	9.02E+03	9.02E+03	9.02E+03	7.60E+03	7.93E+03	1.56E+01
TC-99	1.28E+06	1.55E+06	6.60E+05	1.98E+06	7.54E+04	2.03E+05	1.91E+05	7.54E+04
I-129	1.65E+03	1.77E+03	1.77E+03	2.93E+01	1.77E+03	1.76E+03	1.77E+03	2.93E+01
CS-135	6.35E+04	1.56E+04	1.70E+04	2.96E+06	4.52E+04	1.01E+05	1.50E+06	1.50E+04
CS-137	3.34E+03	2.37E+03	1.93E+03	6.22E+03	3.53E+03	4.56E+03	6.18E+03	1.93E+03
U-235	7.30E+02	4.91E+01	6.80E+03	6.80E+03	9.07E+02	4.48E+01	2.91E+03	4.48E+01
U-238	8.48E+02	5.22E+01	1.03E+05	1.03E+05	2.29E+02	4.82E+01	5.91E+03	4.82E+01
NP-237	2.89E+00	1.25E+01	1.34E+00	1.12E+04	3.92E+01	4.18E+00	4.02E+03	1.25E+01
PU-238	7.52E+00	3.69E+01	5.37E+01	7.82E+04	1.71E+00	3.69E+01	4.54E+03	3.69E+01
PU-239	6.72E+00	3.13E+01	4.42E+01	2.03E+05	1.57E+00	3.92E+01	4.96E+03	1.13E+01
PU-241	4.95E+02	2.02E+01	3.30E+01	3.15E+07	1.04E+02	2.21E+02	2.70E+05	2.02E+01
PU-242	6.97E+00	3.36E+01	4.95E+01	1.04E+05	1.57E+00	4.09E+01	5.11E+03	3.36E+01
AM-241	2.98E+00	2.11E+01	2.27E+01	1.91E+04	3.92E+01	3.55E+00	4.19E+03	2.11E+01
AM-243	3.03E+00	2.14E+01	2.32E+01	1.65E+04	4.00E+01	3.76E+00	4.15E+03	2.14E+01
CM-243	3.92E+00	2.44E+01	2.69E+01	6.16E+03	8.55E+01	3.42E+00	2.74E+03	2.44E+01
CM-244	5.37E+00	3.42E+01	3.62E+01	8.32E+04	1.18E+00	3.42E+00	4.93E+03	3.42E+01

ACC-FINE	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	2.18E+04	5.26E+05	2.18E+04	2.18E+04	2.18E+04	2.18E+04	5.26E+05	2.18E+04
C-14	8.63E+03	1.94E+03	8.63E+03	8.63E+03	8.63E+03	8.63E+03	1.08E+04	1.94E+03
FE-55	1.51E+03	1.45E+03	1.13E+03	1.69E+03	1.69E+03	1.31E+02	1.42E+03	1.31E+02
NI-59	7.39E+02	2.91E+02	5.40E+02	1.06E+03	1.06E+03	4.73E+02	9.59E+02	2.91E+02
CO-60	1.16E+01	1.17E+01	1.16E+01	1.17E+01	1.17E+01	1.04E+00	1.09E+01	1.04E+00
NI-63	8.94E+02	2.85E+01	4.15E+02	1.75E+05	1.75E+05	3.10E+02	3.67E+03	2.85E+01
NB-94	4.48E+01	4.47E+01	4.47E+01	4.48E+01	4.47E+01	2.05E+01	4.00E+01	2.05E+01
SR-90	1.13E+00	2.84E+01	1.64E+02	1.64E+02	1.64E+02	1.38E+02	1.44E+02	2.84E+01
TC-99	2.32E+04	2.82E+04	1.20E+04	3.60E+04	1.37E+03	3.69E+03	3.47E+03	1.37E+03
I-129	2.99E+01	3.21E+01	3.21E+01	5.33E+01	3.21E+01	3.19E+01	3.21E+01	5.33E+01
CS-135	1.15E+03	2.83E+02	3.09E+02	5.38E+04	8.20E+02	1.83E+03	2.72E+04	2.83E+02
CS-137	6.07E+01	4.31E+01	3.51E+01	1.13E+02	6.42E+01	8.28E+01	1.12E+02	3.51E+01
U-235	1.33E+01	8.92E+01	1.23E+02	1.23E+02	3.76E+00	8.13E+03	5.28E+01	8.13E+03
U-238	1.61E+01	9.48E+01	1.88E+03	1.88E+03	4.16E+00	8.76E+03	1.07E+02	8.76E+03
NP-237	5.25E+02	2.28E+03	2.44E+02	2.04E+02	7.12E+03	7.59E+02	7.31E+01	2.28E+03
PU-238	1.37E+01	6.70E+03	9.76E+03	1.42E+03	3.10E+02	6.70E+03	8.25E+01	6.70E+03
PU-239	1.22E+01	5.69E+03	8.76E+03	3.69E+03	2.85E+02	7.12E+03	9.01E+01	5.69E+03
PU-241	8.99E+00	3.47E+01	5.99E+01	5.72E+05	1.90E+00	4.02E+00	4.91E+03	3.47E+01
PU-242	1.26E+01	6.10E+03	8.99E+03	1.90E+03	2.85E+02	7.42E+03	9.28E+01	6.10E+03
AM-241	5.42E+02	3.84E+03	4.11E+03	3.47E+02	7.12E+03	6.44E+02	7.62E+01	3.84E+03
AM-243	5.51E+02	3.48E+03	4.22E+03	3.00E+02	7.27E+03	6.83E+02	7.53E+01	3.88E+03

CM=243	7.11E-02	4.03E-03	4.8ME-03	1.12F+02	1.55F-02	6.21F-02	4.9ME+01	4.43E-03
CM=244	7.70E-02	6.21F-03	6.57E-03	1.60E+03	2.13F-02	6.21F-02	M.90F+01	6.21E-03

INVERSW CONTRASH

DISPOSAL TECHNOLOGY INDICES
IK = 2 ID = 1 IC = 1 IX = 1
IE = 1 IS = 0 IL = 0 IG = 0
IF = 0 ICL=15 IPD= 2 TIC= 100

SPECTRAL INDICES
FLAM = 5 DISP = 2
LEACH = 1 CHEM = 0
SIAHI = 0 ACCES = 1

METABOLATION COEFF. 1

INTAKE	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	8.52E-01	1.42E+07	2.56E+00	5.11E+00	2.56E+00	2.56E+00	2.56E+00	8.52E-01
C-14	5.55E-01	1.11E-01	1.66E+00	3.33E+00	1.66E+00	1.66E+00	1.66E+00	1.11E-01
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	1.27E+00	2.45E-01	2.02E+00	4.72E+01	2.36E+01	2.36E+01	7.37E+00	2.45E-01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	3.74E+57	1.25E+56	5.43E+57	1.01E+56	5.03E+55	8.90E+52	2.60E+58	1.25E+56
NB-94	2.64E+00	2.64E+00	7.92E+00	1.58E+01	7.92E+00	7.93E+00	1.73E+00	1.73E+00
SR-90	2.62E+01	6.44E+00	8.52E+04	1.70E+05	9.52E+04	8.52E+04	6.64E+02	6.44E+00
TC-99	8.55E-01	1.85E-01	3.68E-01	5.48E+05	2.93E-02	4.33E+00	1.13E-02	1.13E-02
I-129	4.42E+03	1.04E+02	3.64E+02	3.64E+05	1.94E+02	1.56E+01	1.03E-01	5.64E+05
CS-135	8.10E+00	1.64E+00	5.47E+00	5.87E+08	1.64E+01	4.82E+01	2.34E+02	1.64E+00
CS-137	2.64E+36	2.56E+36	5.66E+36	4.10E+38	1.58E+37	4.12E+37	1.22E+38	2.56E+36
U-235	8.42E-01	5.39E+02	4.45E+01	8.89E+01	4.45E+01	2.09E+01	1.81E+00	5.34E+02
U-238	4.50E-01	5.45E+02	6.76E+02	1.35E+03	7.02E-01	5.81E+01	2.36E+00	5.45E+02
NP-237	2.14E-01	8.94E-03	3.04E-01	6.17E+01	8.88E-02	1.83E+01	8.56E-01	8.94E-03
PU-236	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	1.64E+01	4.01E-01	8.78E+00	1.94E+04	1.16E+01	3.89E+02	1.43E+01	4.01E+01
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	2.15E+00	5.51E-02	1.16E+00	1.27E+03	1.53E+00	4.48E+01	1.85E+00	5.51E-02
AM-241	4.32E+07	2.91E+06	2.45E+07	1.39E+10	1.79E+07	5.44E+09	9.57E+07	2.91E+06
AM-243	7.21E-01	4.77E-02	4.16E-01	1.97E+02	2.93E-01	8.05E+01	1.34E+00	4.77E-02
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

BODY-WELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	7.64E+07	1.27E+15	7.64E+07	2.29E+08	7.64E+07	7.64E+07	7.64E+07	7.64E+07
C-14	1.35E-01	2.71E-02	1.35E-01	4.06E-01	1.35E-01	1.35E-01	1.35E-01	2.71E-02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	7.38E-01	1.42E-01	3.91E-01	1.37E+01	6.97E+00	6.97E+00	1.43E+00	1.42E-01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	1.04E+05	1.04E+05	1.04E+05	3.11E+05	1.04E+05	1.04E+05	2.26E+04	2.26E+04
SR-90	1.52E+35	3.72E+34	1.64E+38	4.92E+38	1.64E+38	1.64E+38	1.24E+36	3.72E+34
TC-99	7.21E-02	2.90E-02	1.95E-02	4.35E+04	1.55E-03	2.29E-01	5.95E-04	5.95E-04
I-129	6.99E-04	1.71E-03	1.92E-03	2.92E-06	1.02E-03	8.23E-03	5.42E-03	2.42E-06
CS-135	6.54E-01	2.48E-01	2.90E-01	4.68E+07	7.67E-01	2.56E+00	1.24E+01	2.58E-01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	1.33E-01	8.53E-03	2.35E+00	7.04E+00	3.41E-02	1.32E+00	8.47E-02	8.53E-03
U-238	1.50E-01	8.94E-03	3.57E+01	1.07E+02	3.91E-02	2.96E+00	1.24E+01	8.94E-03
NP-237	3.51E-02	1.46E-03	1.66E-02	3.42E+00	1.45E-03	1.00E+00	2.09E-02	1.46E-03
PU-236	0.	0.	0.	0.	0.	0.	0.	1.00E+99

PU-234	1.33E+04	3.24E+02	2.37E+03	7.85E+06	3.13E+03	9.02E+04	3.85E+03	3.24E+02
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	7.16E+01	1.74E+02	1.24E+01	2.11E+02	1.70E+01	4.98E+00	2.05E+01	1.84E+02
AM-241	1.85E+77	1.24E+76	3.49E+76	2.97E+79	2.49E+76	7.75E+78	1.56E+77	1.24E+76
AM-243	1.33E+03	8.41E+01	2.56E+02	1.82E+05	1.80E+02	4.95E+04	8.23E+02	8.41E+01
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

PUP-WELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.66E+18	2.76E+25	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18
C-14	5.03E-01	8.06E-02	5.03E-01	5.03E-01	5.03E-01	5.03E-01	5.03E-01	8.06E-02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	4.49E+00	1.87E+00	5.18E+00	7.05E+01	7.05E+01	7.05E+01	1.96E+01	1.87E+00
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	3.94E+11	3.83E+11	3.90E+11	3.96E+11	3.90E+11	3.99E+11	2.83E+09	2.83E+09
SR-90	2.13E+74	5.24E+73	2.45E+77	2.45E+77	2.45E+77	2.45E+77	1.80E+75	5.24E+73
TC-99	2.57E-01	1.03E-01	6.93E-02	5.23E+04	5.51E-03	8.16E-01	2.12E-03	2.16E-03
I-129	2.46E-03	6.02E-03	6.78E-03	5.42E-06	3.99E-03	2.96E-02	1.93E-02	5.42E-06
CS-135	5.46E-01	2.24E-01	2.42E-01	5.66E+07	6.41E-01	2.14E+00	1.04E+01	2.24E-01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	4.71E-01	3.02E-02	8.05E+00	8.45E+00	1.28E-01	4.74E+00	3.00E-01	3.02E-02
U-238	5.52E-01	3.16E-02	1.28E+02	1.28E+02	1.38E-01	1.07E+01	4.49E-01	3.16E-02
NP-237	1.18E-01	4.91E-03	5.58E-02	4.26E+00	1.63E-02	3.75E+00	8.36E-02	4.91E-03
PU-236	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	6.23E+08	1.53E+07	1.11E+08	1.31E+11	1.47E+08	4.73E+09	1.81E+08	1.53E+07
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	5.58E+00	1.43E-01	1.00E+00	5.83E+02	1.32E+00	4.12E+01	1.54E+00	1.43E-01
AM-241	0.	0.	0.	0.	0.	0.	0.	2.88E+97
AM-243	1.01E+08	6.66E+06	1.94E+07	7.66E+09	1.36E+07	6.25E+09	6.24E+07	6.66E+06
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

METABOLATION COEFF. 2

INT-WELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	8.52E-01	1.42E+07	2.96E+00	5.11E+00	2.96E+00	2.56E+00	2.56E+00	8.52E-01
C-14	5.55E-01	1.11E-01	1.66E+00	5.33E+00	1.66E+00	1.66E+00	1.66E+00	1.11E-01
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	1.27E+00	2.45E-01	2.02E+00	4.72E+01	2.36E+01	2.36E+01	7.37E+00	2.45E-01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	3.74E+57	1.25E+56	5.43E+57	1.01E+66	5.03E+65	8.90E+62	2.60E+58	1.25E+56
NB-94	2.64E+00	2.64E+00	7.92E+00	1.59E+01	7.92E+00	7.93E+00	1.73E+00	1.73E+00
SR-90	2.62E+01	6.44E+00	8.52E+04	1.70E+05	8.52E+04	8.52E+04	6.64E+02	6.44E+00
TC-99	4.55E-01	1.83E-01	3.68E-01	5.48E+05	2.93E-02	4.33E+00	1.13E-02	1.13E-02
I-129	4.42E-03	1.08E-02	3.64E-02	3.49E-05	1.94E-02	1.96E-01	1.03E-01	3.64E-05
CS-135	4.10E+00	1.68E+00	5.47E+00	5.87E+08	1.44E+01	4.82E+01	2.34E+02	1.68E+00
CS-137	2.84E+36	2.56E+36	5.66E+36	4.10E+38	1.58E+37	4.12E+37	1.22E+38	2.56E+36
U-235	8.42E-01	5.39E-02	4.45E+01	8.49E+01	4.45E+01	2.49E+01	1.61E+00	5.39E-02
U-238	9.50E-01	5.45E-02	6.76E+02	1.35E+03	7.02E+01	5.41E+01	2.36E+00	5.45E-02
NP-237	2.14E-01	8.94E-03	3.04E-01	4.17E+01	9.88E-02	1.83E+01	4.56E-01	8.94E-03
PU-236	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	1.64E+01	4.01E-01	8.78E+00	1.94E+04	1.16E+01	3.49E+02	1.43E+01	4.01E-01
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	2.15E+00	5.51E-02	1.16E+00	1.27E+03	1.53E+00	4.48E+01	1.85E+00	5.51E-02
AM-241	4.32E+07	2.91E+06	2.45E+07	1.39E+10	1.75E+07	5.44E+09	9.57E+07	2.91E+06
AM-243	7.21E-01	4.77E-02	4.16E-01	1.97E+02	2.93E-01	8.05E+01	1.54E+00	4.77E-02

CF-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CF-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

BIO-ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	7.64E+07	1.27E+15	7.64E+07	2.29E+08	7.64E+07	7.64E+07	7.64E+07	7.64E+07
C-14	1.35E+01	2.71E+02	1.35E+01	4.06E+01	1.35E+01	1.35E+01	1.35E+01	2.71E+02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	7.38E+01	1.42E+01	3.91E+01	1.37E+01	4.57E+00	4.57E+00	1.83E+00	1.42E+01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-90	1.04E+05	1.04E+05	1.04E+05	3.11E+05	1.04E+05	1.04E+05	2.26E+04	2.26E+04
SR-90	1.52E+35	3.72E+34	1.64E+36	4.92E+38	1.64E+38	1.64E+38	1.28E+36	3.76E+34
TC-99	7.21E+02	2.50E+02	1.95E+02	4.35E+04	1.55E+03	2.29E+01	5.95E+04	5.95E+04
I-129	6.99E+04	1.71E+03	1.92E+03	2.42E+06	1.02E+03	8.23E+03	5.42E+03	2.42E+06
CS-135	6.54E+01	2.48E+01	2.40E+01	4.68E+07	7.67E+01	2.56E+00	1.24E+01	2.60E+01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	1.33E+01	8.53E+03	2.72E+00	7.04E+00	3.41E+02	1.32E+00	8.07E+02	8.53E+03
U-238	1.50E+01	8.98E+03	3.57E+01	1.07E+02	3.91E+02	2.96E+00	1.24E+01	8.94E+03
NP-237	3.51E+02	1.46E+03	1.66E+02	3.42E+00	8.95E+03	1.00E+00	2.49E+02	1.46E+03
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	1.33E+04	3.24E+02	2.37E+03	7.85E+06	3.13E+03	9.82E+04	3.85E+03	3.24E+02
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	7.18E+01	1.84E+02	1.29E+01	2.11E+02	1.70E+01	4.98E+00	2.05E+01	1.84E+02
AM-241	1.85E+77	1.24E+76	3.49E+76	2.97E+79	2.09E+76	7.75E+78	1.36E+77	1.24E+76
AM-243	1.53E+03	8.81E+01	2.56E+02	1.82E+05	1.80E+02	4.95E+04	8.23E+02	8.81E+01
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

PUP-ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.66E+18	2.76E+25	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18
C-14	3.03E+01	6.06E+02	3.03E+01	3.03E+01	3.03E+01	3.03E+01	3.03E+01	6.06E+02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	9.89E+00	1.87E+00	5.18E+00	7.05E+01	7.05E+01	7.05E+01	1.96E+01	1.87E+00
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-90	3.94E+11	5.83E+11	3.90E+11	3.96E+11	3.90E+11	3.99E+11	2.83E+09	2.83E+09
SR-90	2.13E+74	5.24E+73	2.45E+77	2.45E+77	2.45E+77	5.45E+77	1.80E+75	5.24E+73
TC-99	2.57E+01	1.03E+01	6.93E+02	5.23E+04	3.51E+03	3.16E+01	2.12E+03	2.12E+03
I-129	2.46E+03	6.02E+03	6.78E+03	3.42E+06	3.59E+03	2.96E+02	1.93E+02	3.42E+06
CS-135	5.46E+01	2.24E+01	2.42E+01	5.66E+07	6.41E+01	2.14E+00	1.04E+01	2.24E+01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	4.71E+01	3.02E+02	8.45E+00	8.45E+00	1.28E+01	4.74E+00	3.00E+01	3.02E+02
U-238	5.32E+01	3.16E+02	1.28E+02	1.28E+02	1.38E+01	1.07E+01	4.39E+01	3.16E+02
NP-237	1.18E+01	4.91E+03	5.58E+02	4.26E+00	1.63E+02	3.75E+00	8.36E+02	4.91E+03
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	6.23E+08	1.53E+07	1.11E+08	1.31E+11	1.07E+08	4.73E+09	1.81E+08	1.53E+07
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	5.58E+00	1.83E+01	1.00E+00	5.83E+02	1.32E+00	4.12E+01	1.59E+00	1.83E+01
AM-241	0.	0.	0.	0.	0.	0.	0.	2.80E+97
AM-243	1.01E+08	6.66E+06	1.94E+07	7.66E+09	1.36E+07	6.25E+09	6.24E+07	6.66E+06
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

RETARDATION COEFF. 3

INT-ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM

H-3	8.52E-01	1.02E+07	2.56E+00	5.11E+00	2.56E+00	2.56E+00	2.56E+00	8.52E-01
C-14	5.55E-01	1.11E-01	1.66E+00	3.33E+00	1.66E+00	1.66E+00	1.66E+00	1.11E-01
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	2.36E+00	8.55E-01	3.76E+00	8.78E+01	8.34E+01	4.39E+01	1.37E+01	8.55E-01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	1.45E+01	1.43E+01	4.28E+01	8.57E+01	8.28E+01	4.28E+01	9.55E+00	9.55E+00
SR-90	3.53E+05	8.17E+04	1.08E+09	2.16E+09	1.08E+09	1.08E+09	8.42E+06	8.17E+04
TC-99	8.55E-01	1.43E+01	3.69E-01	5.49E+05	2.93E-02	8.34E+00	1.13E-02	1.13E-02
I-129	8.42E-03	1.08E-02	3.64E-02	1.69E-05	1.94E-02	1.56E-01	1.03E-01	3.64E-05
CS-135	8.16E+00	1.70E+00	5.54E+00	5.94E+08	1.46E+01	4.88E+01	2.37E+02	1.70E+00
CS-137	5.63E+73	5.06E+73	1.12E+74	8.11E+75	3.14E+74	8.17E+74	2.01E+75	5.06E+73
U-235	8.42E-01	5.40E-02	4.45E+01	8.9CE+01	8.45E+01	2.50E+01	1.81E+00	5.40E-02
U-238	9.50E+01	5.65E-02	8.76E+02	1.35E+03	7.02E+01	5.61E+01	2.36E+00	5.65E-02
NP-237	2.28E+01	9.51E-03	3.24E+01	4.94E+01	9.45E-02	1.95E+01	8.45E-01	9.51E-03
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	8.69E+01	1.15E+00	2.51E+01	5.55E+04	3.32E+01	1.00E+03	8.08E+01	1.15E+00
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	8.21E+00	1.08E-01	2.27E+00	2.48E+03	3.00E+00	8.76E+01	3.62E+00	1.08E-01
AM-241	1.41E+16	9.48E+14	7.99E+15	4.53E+18	9.71E+15	1.77E+18	3.12E+16	9.48E+14
AM-243	2.24E+00	1.66E-01	1.29E+00	8.12E+02	9.08E-01	2.50E+02	8.15E+00	1.48E-01
CM-245	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

BIOSHELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	7.64E+07	1.27E+15	7.64E+07	2.89E+08	7.64E+07	7.64E+07	7.64E+07	7.64E+07
C-14	1.35E-01	2.71E-02	1.35E-01	4.06E-01	1.35E-01	1.35E-01	1.35E-01	2.71E-02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	5.38E+00	1.04E+00	2.86E+00	1.0CE+02	3.34E+01	3.34E+01	1.04E+01	1.04E+00
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	9.89E+11	9.88E+11	9.88E+11	2.97E+12	9.88E+11	9.89E+11	2.15E+11	2.15E+11
SR-90	1.83E+74	4.49E+73	1.98E+77	5.94E+77	1.98E+77	1.98E+77	1.54E+75	4.49E+73
TC-99	7.23E-02	2.90E-02	1.95E-02	4.36E+04	1.55E-03	2.29E-01	5.97E-04	5.97E-04
I-129	6.99E-04	1.71E-03	1.92E-03	2.92E-06	1.02E-03	8.23E-03	5.42E-03	2.92E-06
CS-135	6.67E-01	2.73E-01	2.96E-01	4.77E+07	7.43E-01	2.61E+00	1.27E+01	2.73E-01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	1.33E-01	8.54E-03	2.35E+00	7.04E+00	3.62E-02	1.32E+00	8.47E-02	8.54E-03
U-238	1.50E-01	8.94E-03	3.57E-01	1.07E+02	3.91E-02	2.96E+00	1.24E-01	8.94E-03
NP-237	3.87E-02	1.41E-03	1.83E-02	3.77E+00	5.35E-03	1.10E+00	2.74E-02	1.41E-03
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	2.46E+08	7.25E+06	5.30E+07	1.75E+11	7.00E+07	2.11E+09	8.59E+07	7.25E+06
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	5.07E+00	7.87E-02	5.52E-01	9.04E+02	7.30E-01	2.13E+01	8.80E-01	7.87E-02
AM-241	0.	0.	0.	0.	0.	0.	0.	2.66E+97
AM-243	6.40E+07	4.24E+06	1.23E+07	8.77E+09	8.67E+06	2.38E+09	3.96E+07	4.24E+06
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

BIOSHELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.66E+18	2.76E+25	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18
C-14	3.03E-01	6.06E-02	3.03E-01	3.03E-01	3.03E-01	3.03E-01	3.03E-01	6.06E-02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	3.32E+02	6.28E+01	1.74E+02	2.37E+03	2.37E+03	2.37E+03	6.59E+02	6.28E+01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	3.57E+25	3.47E+25	3.53E+25	3.62E+25	3.54E+25	3.62E+25	2.57E+23	2.57E+23
SR-90	0.	0.	0.	0.	0.	0.	0.	1.00E+99

TC=99	2.58E+01	1.03E+01	6.96E+02	5.25E+04	5.53E+03	8.19E+01	2.13E+03	2.13E+03
I=129	2.46E+03	6.02E+03	6.78E+03	3.02E+06	3.59E+03	2.96E+02	1.93E+02	3.46E+06
CS=135	5.62E+01	2.30E+01	2.49E+01	5.42E+07	6.59E+01	2.20E+00	1.07E+01	2.30E+01
CS=137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U=235	4.72E+01	3.02E+02	8.46E+00	8.46E+00	1.28E+01	4.78E+00	3.00E+01	3.46E+02
U=238	5.42E+01	3.16E+02	1.28E+02	1.28E+02	1.38E+01	1.07E+01	4.59E+01	3.10E+02
NP=237	1.56E+01	5.44E+03	6.41E+02	4.89E+10	1.97E+02	4.30E+00	9.59E+02	5.64E+03
PU=238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=239	3.11E+17	7.42E+15	5.57E+16	8.55E+19	7.35E+16	2.36E+18	9.02E+16	7.66E+15
PU=241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=242	5.72E+01	1.66E+00	1.03E+01	5.98E+03	1.36E+01	4.23E+02	1.66E+01	1.40E+00
AM=241	0.	0.	0.	0.	0.	0.	0.	2.40E+97
AM=243	2.35E+17	1.54E+16	4.50E+16	1.77E+19	3.15E+16	1.40E+19	1.44E+17	1.32E+16
CM=243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM=244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

RETARDATION COEFF, A

INT=ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI=LLI	MINIMUM
H=3	8.52E+01	1.42E+07	2.56E+00	9.11E+00	2.56E+00	2.56E+00	2.56E+00	8.52E+01
C=14	5.55E+01	1.11E+01	1.66E+00	3.33E+00	1.66E+00	1.66E+00	1.66E+00	1.11E+01
FE=55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=59	3.27E+00	4.31E+01	5.20E+00	1.22E+02	4.08E+01	4.08E+01	1.90E+01	6.31E+01
CO=60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB=94	5.27E+02	5.27E+02	1.98E+03	3.17E+03	1.98E+03	1.58E+03	3.05E+02	3.05E+02
SR=90	5.13E+13	1.26E+13	1.67E+17	3.33E+17	1.67E+17	1.67E+17	1.30E+15	1.20E+13
TC=99	4.56E+01	1.83E+01	3.69E+01	5.50E+05	2.94E+02	4.35E+00	1.13E+02	1.13E+02
I=129	4.42E+03	1.08E+02	3.64E+02	3.69E+05	1.94E+02	1.56E+01	1.03E+01	3.64E+05
CS=135	4.26E+00	1.75E+00	5.68E+00	6.10E+08	1.90E+01	5.01E+01	2.43E+02	1.75E+00
CS=137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U=235	8.43E+01	5.40E+02	4.45E+01	8.91E+01	6.86E+01	2.50E+01	1.61E+00	5.40E+02
U=238	4.51E+01	5.45E+02	6.76E+02	1.35E+03	7.42E+01	5.61E+01	2.38E+00	5.65E+02
NP=237	2.56E+01	1.08E+02	3.67E+01	5.03E+01	1.07E+01	2.21E+01	5.49E+01	1.08E+02
PU=238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=239	3.97E+02	9.72E+00	2.13E+02	4.70E+05	2.42E+02	8.47E+03	3.46E+02	9.72E+00
PU=241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=242	7.81E+00	2.00E+01	4.21E+00	4.59E+03	9.97E+00	1.62E+02	5.71E+00	2.00E+01
AM=241	1.94E+33	1.31E+32	1.10E+33	6.25E+35	7.87E+32	2.45E+35	4.30E+33	1.31E+32
AM=243	2.18E+01	1.44E+00	1.26E+01	5.98E+03	8.47E+00	2.44E+03	4.05E+01	1.44E+00
CM=243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM=244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

BOU=ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI=LLI	MINIMUM
H=3	7.64E+07	1.27E+15	7.64E+07	2.29E+08	7.64E+07	7.64E+07	7.64E+07	7.64E+07
C=14	1.35E+01	2.71E+02	1.35E+01	4.06E+01	1.35E+01	1.35E+01	1.35E+01	2.71E+02
FE=55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=59	1.20E+02	2.31E+01	6.36E+01	8.23E+03	7.43E+02	7.43E+02	2.32E+02	2.31E+01
CO=60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB=94	8.41E+26	8.40E+26	8.41E+26	2.52E+27	8.41E+26	8.41E+26	1.43E+26	1.83E+26
SR=90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC=99	7.25E+02	2.91E+02	1.96E+02	4.37E+04	1.96E+03	2.30E+01	5.99E+04	5.99E+04
I=129	6.99E+04	1.71E+03	1.92E+03	2.92E+06	1.02E+03	8.23E+03	5.42E+03	2.42E+06
CS=135	6.95E+01	2.85E+01	3.08E+01	4.97E+07	8.15E+01	2.72E+00	1.32E+01	2.85E+01
CS=137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U=235	1.34E+01	8.56E+03	2.35E+00	7.05E+00	3.62E+02	1.32E+00	8.29E+02	8.56E+03

U=238	1.50E+01	6.94E+03	3.57E+01	1.07E+02	3.92E+02	2.96E+00	1.24E+01	8.94E+03
NP=237	4.71E+02	1.47E+03	2.23E+02	4.59E+00	6.51E+03	1.48E+00	3.34E+02	1.47E+03
PU=238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=239	2.04E+17	5.00E+15	3.65E+16	1.21E+20	8.43E+16	1.45E+18	5.43E+16	5.00E+15
PU=241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=242	2.60E+01	7.16E+01	5.03E+00	8.22E+03	6.60E+00	1.94E+02	8.00E+00	7.16E+01
AM=241	0.	0.	0.	0.	0.	0.	0.	2.80E+97
AM=243	1.71E+17	1.13E+16	3.29E+16	2.34E+19	2.31F+16	6.36E+18	1.06E+17	1.13E+16
CM=243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM=244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

POP=>ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI=LLI	MINIMUM
H=3	1.66E+18	2.76E+25	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18
C=14	5.03E=01	8.06E=02	3.03E=01	3.03E=01	3.03E=01	3.03E=01	3.03E=01	8.06E=02
FE=55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=59	1.65E+05	3.11E+04	8.63E+04	1.17E+06	1.17E+06	1.17E+06	3.27E+05	3.11E+04
CO=60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB=94	2.58E+55	2.51F+55	2.56E+55	2.62E+55	2.58E+55	2.62F+55	1.96E+55	1.80E+55
SR=90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC=99	2.54E=01	1.04F=01	6.99E=02	5.27E+04	5.55E=03	8.22E=01	2.14E=03	2.14E=03
I=129	2.46E=03	6.02F=03	6.78E=03	3.42E+06	3.99E=03	2.96E=02	1.95E=02	3.42E+06
CS=135	5.94E=01	2.04F=01	2.04E=01	6.16E+07	4.97E=01	2.33F+00	1.13F+01	2.44E=01
CS=137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U=235	4.73E=01	3.03E=02	8.48E+00	8.48E+00	1.28E=01	4.76F+00	3.01E=01	3.03E=02
U=238	5.32E=01	3.16E=02	1.28E+02	1.28E+02	1.38E=01	1.07F+01	4.49E=01	5.10E=02
NP=237	1.79E=01	7.04E=03	8.46E=02	6.46E+00	2.47E=02	5.67F+00	1.27E=01	7.44E=03
PU=238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=239	1.48F+35	3.43E+33	2.65E+34	3.12E+37	3.50E+34	1.12F+35	4.30E+34	3.43E+33
PU=241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=242	3.08E+03	7.87E+01	5.54E+02	3.22E+05	7.41E+02	2.28E+04	8.80E+02	7.87E+01
AM=241	0.	0.	0.	0.	0.	0.	0.	2.80E+97
AM=243	1.67E+36	1.10E+35	3.20E+35	1.26E+38	2.25F+35	1.03E+38	1.03E+36	1.10E+35
CM=243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM=244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

METABOLATION COEFF. 5

INT=>ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI=LLI	MINIMUM
H=3	8.52E=01	1.02F+07	2.56E+00	5.11E+00	2.56E+00	2.56E+00	2.56E+00	8.52E=01
C=14	5.55E=01	1.11E=01	1.66E+00	3.33E+00	1.66E+00	1.66E+00	1.66E+00	1.11E=01
FE=55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=59	6.34E+00	1.23E+00	1.02E+01	2.38E+02	1.19E+02	1.19E+02	3.71E+01	1.23E+00
CO=60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB=94	1.31E+06	1.31E+06	3.94E+06	7.88E+04	3.94E+06	3.94E+06	8.58E+05	8.58E+05
SR=90	1.79E+30	4.40F+29	5.82E+33	1.16E+34	5.82E+33	5.82E+33	4.53E+31	4.40E+29
TC=99	4.57E=01	1.84E=01	3.70E=01	5.52E+05	2.94E=02	4.36F+00	1.13E+00	1.13E=02
I=129	4.42E=03	1.08E=02	3.64E=02	3.69E=05	1.94F=02	1.56F=01	1.03E=01	3.69E=05
CS=135	4.49E+00	1.98E+00	5.98E+00	6.43E+08	1.98E+01	5.28F+01	2.56E+02	1.98E+00
CS=137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U=235	8.05E=01	5.41F=02	4.46E+01	8.93E+01	6.47E=01	2.50E+01	1.61F+00	5.41E=02
U=238	9.51E=01	5.65E=02	6.76E+02	1.35E+03	7.45E=01	5.61F+01	2.36E+00	5.65E=02
NP=237	3.53E=01	1.39E=02	4.73E=01	6.48E+01	1.38E=01	2.85F+01	7.08E=01	1.39E=02
PU=238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=239	3.23E+04	7.90E+02	1.73E+04	3.82E+07	2.29E+04	6.88E+05	2.81E+04	7.90E+02
PU=241	0.	0.	0.	0.	0.	0.	0.	1.00E+99

PL=242	1.51E+01	5.36E+01	7.08E+00	7.73E+03	9.36E+00	2.73E+02	1.13E+01	5.30E+01
AP=241	1.70E+08	1.14E+07	9.69E+07	5.47E+10	6.69E+07	2.14E+10	5.76E+08	1.14E+07
AP=243	2.27E+03	1.51E+02	1.31E+03	5.23E+05	9.24E+02	2.56E+05	8.22E+03	1.51E+06
CM=243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM=244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

BIO=ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H=3	7.64E+07	1.27E+15	7.64E+07	2.29E+08	7.64E+07	7.64E+07	7.64E+07	7.64E+07
C=14	1.35E+01	2.71E+02	1.35E+01	8.06E+01	1.35E+01	1.35E+01	1.35E+01	2.71E+02
FE=55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=59	7.11E+04	1.37E+04	5.77E+04	1.32E+06	8.81E+05	4.81E+05	1.38E+05	1.37E+04
CO=60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB=94	1.85E+59	1.85E+59	1.85E+59	5.56E+59	1.85E+59	1.85E+59	8.04E+58	4.04E+58
SR=90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC=99	7.28E+02	2.92E+02	1.96E+02	4.39E+04	1.56E+03	2.31E+01	6.01E+04	6.01E+04
I=129	6.44E+04	1.71E+03	1.92E+03	2.92E+06	1.02E+03	8.23E+03	5.42E+03	2.42E+06
CS=135	7.55E+01	3.09E+01	3.35E+01	5.40E+07	8.85E+01	2.96E+00	1.45E+01	3.09E+01
CS=137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U=235	1.34E+01	8.59E+03	2.36E+00	7.08E+00	5.43E+02	1.32E+00	8.52E+02	8.59E+03
U=238	1.50E+01	8.95E+03	5.57E+01	1.07E+02	3.92E+02	2.96E+00	1.24E+01	8.95E+03
NP=237	7.04E+02	2.94E+03	3.33E+02	6.85E+00	9.72E+02	5.01E+00	4.94E+02	2.94E+03
PU=238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=239	3.16E+35	7.74E+33	5.65E+34	1.87E+38	7.47E+34	2.25E+36	9.18E+34	7.74E+33
PU=241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=242	1.24E+03	3.18E+01	2.23E+02	5.45E+05	2.95E+02	8.81E+03	3.55E+02	3.18E+01
AP=241	0.	0.	0.	0.	0.	0.	0.	2.88E+97
AP=243	2.92E+36	1.87E+35	5.42E+35	3.44E+38	3.42E+35	1.05E+38	1.74E+36	1.87E+35
CM=243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM=244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

BIOP=ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H=3	1.66E+18	2.76E+25	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18	1.66E+18
C=14	3.03E+01	6.06E+02	3.03E+01	3.03E+01	3.03E+01	3.03E+01	3.03E+01	6.06E+02
FE=55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=59	5.79E+10	1.10E+10	3.04E+10	4.13E+11	4.13E+11	4.13E+11	1.15E+11	1.10E+10
CO=60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI=63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB=94	0.	0.	0.	0.	0.	0.	0.	1.00E+99
SR=90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC=99	2.60E+01	1.05E+01	7.03E+02	5.30E+04	4.99E+03	8.27E+01	2.15E+03	2.12E+03
I=129	2.96E+03	6.02E+03	6.78E+03	3.42E+06	5.99E+03	2.96E+02	1.93E+02	3.42E+06
CS=135	6.88E+01	2.74E+01	2.96E+01	6.92E+07	7.84E+01	2.62E+00	1.27E+01	2.74E+01
CS=137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U=235	4.75E+01	3.04E+02	8.52E+00	8.52E+00	1.29E+01	4.78E+00	3.02E+01	3.04E+02
U=238	5.32E+01	3.16E+02	1.29E+02	1.29E+02	1.39E+01	1.07E+01	4.40E+01	3.16E+02
NP=237	3.15E+01	1.31E+02	1.49E+01	1.14E+01	8.34E+02	9.99E+00	2.23E+01	1.31E+02
PU=238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=239	3.55E+71	8.88E+69	6.35E+70	7.47E+73	8.38E+70	2.69E+72	1.03E+71	8.88E+69
PU=241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU=242	5.30E+06	1.35E+05	9.53E+05	5.54E+08	1.26E+06	3.92E+07	1.51E+06	1.35E+05
AP=241	0.	0.	0.	0.	0.	0.	0.	2.88E+97
AP=243	4.55E+74	2.99E+73	8.73E+73	3.44E+76	6.12E+73	2.80E+76	2.80E+74	2.99E+73
CM=243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM=244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

ACTUALPERCOLATION VALUE

INT*ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H*3	8.52E*01	1.82E*07	2.56E*00	5.11E*00	2.56E*00	2.56E*00	2.56E*00	8.52E*01
C*14	5.55E*01	1.11E*01	1.66E*00	3.33E*00	1.66E*00	1.66E*00	1.66E*00	1.11E*01
FE*55	0.	0.	0.	0.	0.	0.	0.	1.00E*99
NI*59	2.36E*00	4.55E*01	3.76E*00	8.78E*01	4.39E*01	4.39E*01	1.37E*01	4.55E*01
CO*60	0.	0.	0.	0.	0.	0.	0.	1.00E*99
NI*63	0.	0.	0.	0.	0.	0.	0.	1.00E*99
NB*94	1.43E*01	1.43E*01	4.28E*01	8.57E*01	8.28E*01	4.28E*01	9.35E*00	9.35E*00
SR*90	5.33E*05	8.17E*04	1.08E*04	2.16E*09	1.08E*09	1.08E*09	8.92E*06	8.17E*04
TC*99	4.55E*01	1.85E*01	3.64E*01	5.46E*05	2.93E*02	4.34E*00	1.13E*02	1.13E*02
I*129	4.42E*03	1.08E*02	3.64E*02	5.69E*05	1.94E*02	1.56E*01	1.03E*01	5.69E*05
CS*135	4.16E*00	1.70E*00	5.54E*00	5.94E*08	1.06E*01	4.88E*01	2.37E*02	1.70E*00
CS*137	5.83E*73	5.06E*7.	1.12E*74	8.11E*75	3.14E*74	8.17E*74	2.91E*75	5.06E*73
U*235	6.42E*01	5.40E*02	4.85E*01	8.9CE*01	4.85E*01	2.50E*01	1.61E*00	5.40E*02
U*238	4.50E*01	5.85E*02	4.76E*02	1.35E*03	7.02E*01	5.61E*01	2.36E*00	5.85E*02
NP*237	2.28E*01	9.51E*03	3.24E*01	4.44E*01	9.45E*02	1.95E*01	8.85E*01	9.51E*03
PU*238	0.	0.	0.	0.	0.	0.	0.	1.00E*99
PU*239	8.89E*01	1.15E*00	2.51E*01	5.55E*04	3.32E*01	1.00E*03	8.08E*01	1.15E*00
PU*241	0.	0.	0.	0.	0.	0.	0.	1.00E*99
PU*242	8.21E*00	1.08E*01	2.27E*00	2.48E*03	3.00E*00	8.76E*01	3.82E*00	1.08E*01
AM*241	1.41E*16	9.48E*14	7.99E*15	8.53E*18	5.71E*15	1.77E*18	3.12E*16	9.48E*14
AM*243	2.24E*00	1.48E*01	1.29E*00	6.12E*02	9.08E*01	2.50E*02	8.15E*00	1.48E*01
CM*243	0.	0.	0.	0.	0.	0.	0.	1.00E*99
CM*244	0.	0.	0.	0.	0.	0.	0.	1.00E*99

BIO*ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H*3	7.64E*07	1.27E*15	7.64E*07	2.29E*08	7.64E*07	7.64E*07	7.64E*07	7.64E*07
C*14	1.35E*01	2.71E*02	1.35E*01	4.06E*01	1.35E*01	1.35E*01	1.35E*01	2.71E*02
FE*55	0.	0.	0.	0.	0.	0.	0.	1.00E*99
NI*59	5.38E*00	1.04E*00	2.86E*00	1.00E*02	3.34E*01	3.34E*01	1.04E*01	1.04E*00
CO*60	0.	0.	0.	0.	0.	0.	0.	1.00E*99
NI*63	0.	0.	0.	0.	0.	0.	0.	1.00E*99
NB*94	9.89E*11	9.88E*11	9.88E*11	2.97E*12	9.88E*11	9.89E*11	2.15E*11	2.15E*11
SR*90	1.83E*74	4.89E*73	1.98E*77	5.94E*77	1.98E*77	1.98E*77	1.54E*75	4.89E*73
TC*99	7.23E*02	2.90E*02	1.95E*02	4.36E*04	1.55E*03	2.29E*01	5.97E*04	5.97E*04
I*129	6.94E*04	1.71E*03	1.92E*03	2.92E*06	1.02E*03	8.23E*03	5.42E*03	2.92E*06
CS*135	6.67E*01	2.73E*01	2.96E*01	4.77E*07	7.83E*01	2.61E*00	1.27E*01	2.73E*01
CS*137	0.	0.	0.	0.	0.	0.	0.	1.00E*99
U*235	1.33E*01	8.54E*03	2.35E*00	7.04E*00	3.42E*02	1.32E*00	8.47E*02	8.54E*03
U*238	1.50E*01	8.94E*03	3.57E*01	1.07E*02	3.51E*02	2.94E*00	1.24E*01	8.94E*03
NP*237	3.87E*02	1.41E*03	1.83E*02	3.77E*00	5.35E*03	1.10E*00	2.74E*02	1.01E*03
PU*238	0.	0.	0.	0.	0.	0.	0.	1.00E*99
PU*239	2.96E*08	7.25E*06	5.30E*07	1.75E*11	7.00E*07	2.11E*09	8.59E*07	7.25E*06
PU*241	0.	0.	0.	0.	0.	0.	0.	1.00E*99
PU*242	3.07E*00	7.87E*02	5.52E*01	9.04E*02	7.30E*01	2.13E*01	8.80E*01	7.87E*02
AM*241	0.	0.	0.	0.	0.	0.	0.	1.00E*99
AM*243	6.40E*07	4.24E*06	1.23E*07	8.77E*09	8.67E*06	2.38E*09	3.96E*07	4.24E*06
CM*243	0.	0.	0.	0.	0.	0.	0.	1.00E*99
CM*244	0.	0.	0.	0.	0.	0.	0.	1.00E*99

FOR*ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H*3	1.66E*18	2.76E*25	1.66E*18	1.66E*18	1.66E*18	1.66E*18	1.66E*18	1.66E*18
C*14	3.03E*01	6.06E*02	3.03E*01	3.03E*01	3.03E*01	3.03E*01	3.03E*01	6.06E*02
FE*55	0.	0.	0.	0.	0.	0.	0.	1.00E*99
NI*59	3.32E*02	6.28E*01	1.74E*02	2.37E*03	2.37E*03	2.37E*03	6.59E*02	6.28E*01
CO*60	0.	0.	0.	0.	0.	0.	0.	1.00E*99

NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+00
NB-94	3.57E+25	3.87E+25	3.53E+25	3.62E+25	3.54E+25	3.42E+25	2.57E+23	2.57E+23
BK-97	0.	0.	0.	0.	0.	0.	0.	1.00E+00
TC-99	2.38E-01	3.03E-01	4.96E-02	5.25E+04	5.55E-03	4.19E-01	2.13E-03	2.13E-03
I-129	2.46E-03	6.02E-03	6.74E-03	3.82E-06	3.59E-03	2.96E-02	1.93E-02	3.42E-06
CS-135	5.62E-01	2.30E-01	2.49E-01	5.62E+07	6.59E-01	2.20E+00	1.07E+01	2.30E-01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+00
U-235	4.72E-01	3.02E-02	8.08E-06	8.06E+00	1.28E+01	4.74E+00	5.00E+01	5.06E-06
U-238	5.52E-01	3.16E-02	1.25E-02	1.28E-02	1.38E-01	1.07E+01	4.39E+01	3.10E-06
NP-237	1.34E-01	5.64E-03	6.41E-02	4.89E+00	1.87E-02	4.30E+00	9.59E-02	5.94E-03
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+00
PU-239	3.11E+17	7.42E+15	5.57E+16	6.55E+19	7.35E+16	2.36E+18	9.02E+16	7.56E+15
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+00
PU-242	5.72E+01	1.86E+00	1.03E+01	5.98E+03	1.38E+01	9.23E+02	1.64E+01	1.40E+00
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+00
AM-243	2.55E+17	1.54E+16	4.50E+16	1.77E+19	3.15E+16	1.44E+19	1.44E+17	1.54E+16
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+00
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+00

LOWEXPENCOMBINATION VALUE

INT-ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.20E+00	2.01E+07	3.61E+00	7.23E+00	3.61E+00	3.61E+00	3.61E+00	1.20E+00
C-14	7.44E-01	1.87E-01	2.35E+00	4.71E+00	2.35E+00	2.35E+00	2.35E+00	1.57E-01
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+00
NI-59	2.69E+00	5.19E-01	4.28E+00	1.00E+02	5.00E+01	5.00E+01	1.56E+01	5.19E-01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+00
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+00
NB-94	2.02E+01	2.02E+01	6.05E+01	1.21E+02	6.05E+01	6.06E+01	1.32E+01	1.32E+01
BK-97	4.71E+05	1.16E+05	1.53E+09	3.06E+09	1.53E+09	1.53E+09	1.19E+07	1.10E+05
TC-99	6.94E-01	2.59E-01	5.21E-01	7.76E+05	4.14E-02	6.13E+00	1.80E-02	1.80E-02
I-129	5.25E-03	1.52E-02	5.15E-02	5.22E+05	2.74E-02	2.21E-01	1.45E-01	5.22E-05
CS-135	5.88E+00	2.41E+00	7.83E+00	8.41E+08	2.07E+01	6.91E+01	3.35E+02	2.41E+00
CS-137	7.96E+73	7.16E+73	1.59E+74	1.15E+76	4.84E+74	1.15E+75	3.41E+75	7.16E+73
U-235	1.19E+00	7.43E-02	6.29E+01	1.26E+02	9.49E-01	3.53E+01	2.27E+00	7.43E-02
U-238	1.54E+00	7.99E-02	9.56E+02	1.91E+03	1.05E+00	7.93E+01	3.33E+00	7.99E-02
NP-237	3.23E-01	1.34E-01	8.58E-01	6.28E+01	1.34E-01	2.76E+01	6.46E-01	1.34E-02
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+00
PU-239	6.45E+01	1.62E+00	3.55E+01	7.09E+04	4.70E+01	1.41E+03	5.77E+01	1.62E+00
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+00
PU-242	5.46E+00	1.43E+01	3.21E+00	3.50E+03	4.24E+00	1.24E+02	5.12E+00	1.53E-01
AM-241	1.99E+16	1.34E+15	1.13E+16	6.41E+18	4.08E+15	2.51E+18	4.41E+16	1.34E+15
AM-243	3.16E+00	2.09E-01	1.42E+00	8.66E+02	1.28E+00	3.53E+02	5.86E+00	2.09E-01
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+00
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+00

BIOD-ELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	1.53E+08	2.54E+15	1.53E+08	4.58E+08	1.53E+08	1.53E+08	1.53E+08	1.53E+08
C-14	2.71E+01	5.81E+02	2.71E+01	8.12E+01	2.71E+01	2.71E+01	2.71E+01	5.41E+02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+00
NI-59	8.87E+00	1.87E+00	8.60E+00	1.41E+02	9.38E+01	5.38E+01	1.68E+01	1.87E+00
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+00
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+00
NB-94	1.98E+12	1.98E+12	1.98E+12	5.93E+12	1.98E+12	1.98E+12	8.31E+11	8.31E+11
BK-97	3.46E+74	8.98E+73	3.96E+77	1.19E+78	3.96E+77	3.96E+77	3.09E+75	8.98E+73
TC-99	1.05E+01	5.81E+02	5.90E+02	8.71E+04	3.10E-03	4.59E+01	1.19E-03	1.19E-03
I-129	1.00E-03	3.81E-03	3.98E-03	5.88E-06	2.04E-03	1.65E-02	1.08E-02	5.54E-06

CS-135	1.55E+00	5.07E+01	5.92E+01	9.54E+07	1.57E+00	5.23E+00	2.53E+01	5.47E+01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	2.47E+01	1.71E+02	8.70E+00	1.41E+01	7.23E+02	2.43E+00	1.69E+01	1.71E+02
U-238	3.01E+01	1.79E+02	7.15E+01	2.14E+02	7.83E+02	5.92E+00	2.48E+01	1.79E+02
NP-237	7.74E+02	3.23E+03	3.67E+02	7.56E+00	1.07E+02	2.21E+00	5.69E+02	5.23E+03
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	5.92E+08	1.45E+07	1.06E+08	3.51E+11	1.40E+08	4.21E+09	1.72E+08	1.45E+07
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	6.15E+00	1.57E+01	1.10E+00	1.81E+03	1.06E+00	4.26E+01	1.76E+00	1.57E+01
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-243	1.28E+08	8.87E+06	2.46E+07	1.75E+10	1.73E+07	4.76E+09	7.91E+07	8.87E+06
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

POP-CELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	3.31E+18	5.52E+25	3.31E+18	3.31E+18	3.31E+18	3.31E+18	3.31E+18	3.31E+18
C-14	6.06E-01	1.21E-01	6.06E-01	6.06E-01	6.06E-01	6.06E-01	6.06E-01	1.21E-01
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	5.35E+02	1.01E+02	2.81E+02	3.42E+03	3.42E+03	3.42E+03	1.06E+03	1.01E+02
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	7.14E+25	6.95E+25	7.07E+25	7.23E+25	7.07E+25	7.23E+25	5.14E+25	5.14E+25
SR-90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC-99	5.15E-01	2.07E-01	1.39E-01	1.05E+05	1.11E-02	1.64E+00	4.26E-03	4.26E-03
I-129	4.92E-03	1.20E-02	1.36E-02	6.83E+06	7.19E-03	5.93E-02	3.87E-02	4.93E+06
CS-135	1.12E+00	4.60E+01	4.98E-01	1.16E+08	1.32E+00	4.40E+00	2.13E+01	4.60E+01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	9.44E+01	6.04E+02	1.49E+01	1.69E+01	2.46E+01	9.89E+00	6.00E+01	6.04E+02
U-238	1.06E+00	6.32E+02	2.57E+02	2.97E+02	2.77E+01	2.13E+01	8.78E+01	6.32E+02
NP-237	2.71E+01	1.13E+02	1.28E+01	9.79E+00	3.74E+02	4.40E+00	1.92E+01	1.13E+02
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	6.22E+17	1.52E+16	1.11E+17	1.31E+20	1.47E+17	4.72E+18	1.80E+17	1.52E+16
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	1.14E+02	2.93E+00	2.06E+01	1.20E+04	2.72E+01	8.46E+02	3.27E+01	2.93E+00
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-243	4.49E+17	3.08E+16	8.99E+16	3.54E+19	6.31E+16	2.49E+19	2.48E+17	3.08E+16
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

HIGHERPERCOLATION VALUE

INT-CELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	6.02E-01	1.00E+07	1.81E+00	3.61E+00	1.81E+00	1.81E+00	1.81E+00	6.02E-01
C-14	3.92E-01	7.84E-02	1.18E+00	2.35E+00	1.18E+00	1.18E+00	1.18E+00	7.84E-02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	1.67E+00	3.22E-01	2.66E+00	6.21E+01	3.10E+01	3.10E+01	9.69E+00	3.22E-01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	1.01E+01	1.01E+01	3.03E+01	6.06E+01	3.03E+01	3.03E+01	6.60E+00	6.60E+00
SR-90	2.35E+05	5.78E+04	7.44E+08	1.53E+09	7.44E+08	7.44E+08	5.96E+06	5.78E+04
TC-99	3.22E+01	1.29E+01	2.81E+01	3.88E+05	2.07E+02	3.07E+00	7.98E+03	7.98E+03
I-129	3.15E+03	7.62E+03	2.57E+02	2.61E+05	1.37E+02	1.10E+01	7.26E+02	2.61E+05
CS-135	2.94E+00	1.20E+00	3.91E+00	4.20E+08	1.03E+01	3.45E+01	1.67E+02	1.20E+00
CS-137	3.96E+73	3.58E+73	7.93E+73	5.74E+75	2.22E+74	5.77E+74	1.71E+75	3.58E+73
U-235	5.95E+01	3.82E+02	3.15E+01	6.29E+01	4.84E+01	1.76E+01	1.14E+00	3.82E+02
U-238	6.72E+01	3.99E+02	4.78E+02	9.56E+02	5.25E+01	3.97E+01	1.67E+00	3.99E+02
NP-237	1.61E+01	6.72E+03	2.29E+01	5.14E+01	6.68E+02	1.38E+01	3.43E+01	6.72E+03

PL-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PL-239	3.51E+01	2.11E+01	1.78E+01	3.42E+04	2.45E+01	7.07E+02	2.88E+01	8.11E+01
PL-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PL-242	2.58E+00	7.63E+02	1.61E+00	1.75E+03	2.12E+00	6.20E+01	2.56E+00	7.63E+02
AM-241	9.08E+15	8.70E+14	5.65E+15	3.20E+18	4.04E+15	1.25E+18	2.20E+16	8.70E+14
AM-243	1.58E+00	1.05E+01	9.12E+01	4.33E+02	8.42E+01	1.76E+02	2.43E+00	1.03E+01
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

BONE-CELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	3.42E+07	6.36E+14	3.42E+07	1.15E+08	3.42E+07	3.42E+07	3.42E+07	3.42E+07
C-14	6.77E+02	1.35E+02	6.77E+02	2.03E+01	6.77E+02	6.77E+02	6.77E+02	1.33E+02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	2.69E+00	5.19E+01	1.43E+00	5.01E+01	1.67E+01	1.67E+01	5.21E+00	5.19E+01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	4.94E+11	4.94E+11	4.94E+11	1.48E+12	4.94E+11	4.94E+11	1.08E+11	1.08E+11
SR-90	9.15E+73	2.25E+73	9.90E+76	2.97E+77	9.90E+76	9.90E+76	7.71E+74	2.25E+73
TC-99	3.61E+02	1.45E+02	9.75E+03	2.18E+04	7.75E+04	1.15E+01	2.94E+04	2.90E+04
I-129	3.50E+04	8.53E+04	9.60E+04	1.46E+06	5.10E+04	4.11E+03	2.71E+03	1.40E+06
CS-135	3.34E+01	1.37E+01	1.48E+01	2.39E+07	3.91E+01	1.31E+00	6.53E+00	1.37E+01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	6.66E+02	4.27E+03	1.17E+00	5.52E+00	1.81E+02	6.59E+01	8.24E+02	4.27E+03
U-238	7.52E+02	4.47E+03	1.78E+01	5.35E+01	1.96E+02	1.48E+00	6.21E+02	4.47E+03
NP-237	1.94E+02	8.07E+04	9.16E+03	1.88E+00	2.47E+03	5.52E+01	1.57E+02	8.07E+04
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	1.48E+08	3.63E+06	2.65E+07	8.77E+10	3.50E+07	1.05E+09	4.30E+07	3.63E+06
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	1.54E+00	3.93E+02	2.76E+01	4.52E+02	3.65E+01	1.07E+01	4.60E+01	3.93E+02
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-243	5.20E+07	2.12E+06	6.16E+06	4.38E+09	4.33E+06	1.19E+09	1.98E+07	2.12E+06
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

POP-CELL	BODY	BONE	LIVER	THYROID	KIDNEY	LUNG	GI-LLI	MINIMUM
H-3	8.29E+17	1.38E+25	8.29E+17	8.29E+17	8.29E+17	8.29E+17	8.29E+17	8.29E+17
C-14	1.51E+01	3.03E+02	1.51E+01	1.51E+01	1.51E+01	1.51E+01	1.51E+01	3.03E+02
FE-55	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-59	1.66E+02	3.14E+01	8.70E+01	1.18E+03	1.18E+03	1.18E+03	3.29E+02	3.14E+01
CO-60	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NI-63	0.	0.	0.	0.	0.	0.	0.	1.00E+99
NB-94	1.79E+25	1.74E+25	1.77E+25	1.81E+25	1.77E+25	1.81E+25	1.28E+25	1.28E+25
SR-90	0.	0.	0.	0.	0.	0.	0.	1.00E+99
TC-99	1.29E+01	5.17E+02	3.48E+02	2.62E+04	2.77E+03	4.09E+01	1.06E+03	1.06E+03
I-129	1.25E+03	3.01E+03	3.39E+03	1.71E+06	1.80E+03	1.48E+02	9.47E+03	1.71E+06
CS-135	2.81E+01	1.15E+01	1.25E+01	2.91E+07	3.29E+01	1.10E+00	5.33E+00	1.15E+01
CS-137	0.	0.	0.	0.	0.	0.	0.	1.00E+99
U-235	2.36E+01	1.51E+02	4.23E+00	4.23E+00	6.40E+02	2.37E+00	1.50E+01	1.51E+02
U-238	2.66E+01	1.58E+02	6.42E+01	6.42E+01	6.92E+02	5.33E+00	2.20E+01	1.58E+02
NP-237	6.78E+02	2.82E+03	3.20E+02	2.48E+00	8.74E+03	2.15E+00	8.80E+02	2.82E+03
PU-238	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-239	1.56E+17	3.81E+15	2.78E+16	3.28E+19	3.68E+16	1.18E+18	4.51E+16	3.81E+15
PU-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
PU-242	2.86E+01	7.32E+01	5.10E+00	2.99E+03	6.79E+00	2.12E+02	8.16E+00	7.32E+01
AM-241	0.	0.	0.	0.	0.	0.	0.	1.00E+99
AM-243	1.17E+17	7.70E+15	2.25E+16	8.86E+18	1.38E+16	7.22E+18	7.21E+16	7.70E+15
CM-243	0.	0.	0.	0.	0.	0.	0.	1.00E+99
CM-244	0.	0.	0.	0.	0.	0.	0.	1.00E+99

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

REQUEST FOR THE DEISCODES

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This document explains how to use the Impact Analysis Codes used in the Draft Environmental Impact Statement (DEIS) (NUREG-0782, Vol. 1-4) supporting 10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The mathematical development of the Impact Analysis Codes and other information necessary to understand the results of using the Codes is contained in the DEIS, and in a supporting document, "Data Base for Radioactive Waste Management" (NUREG/CR-1759, Vol. 1-3).

17. KEY WORDS AND DOCUMENT ANALYSIS

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