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7. Checker	Sen-Sung Tsai	<i>Sen Sung Tsai</i>	2/17/00
8. Lead	Jeff Tappen	<i>Jeff Tappen</i>	2/23/00

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1. PURPOSE

The purpose of this calculation is to develop additional Biosphere Dose Conversion Factors (BDCFs) for a reasonably maximally exposed individual (RMEI) for the periods 10,000 years and 1,000,000 years after the repository closure. In addition, Biosphere Dose Conversion Factors for the average member of a critical group are calculated for those additional radionuclides postulated to reach the environment during the period after 10,000 years and up to 1,000,000 years.

After the permanent closure of the repository, the engineered systems within the repository will eventually lose their abilities to contain radionuclide inventory, and the radionuclides will migrate through the geosphere and eventually enter the local water table moving toward inhabited areas. The primary release scenario is a groundwater well used for drinking water supply and irrigation, and this calculation takes these postulated releases and follows them through various pathways until they result in a dose to either a member of critical group or a reasonably maximally exposed individual. The pathways considered in this calculation include inhalation, ingestion, and direct exposure.

This calculation is conducted in accordance with Office of Civilian Radioactive Waste Management (OCRWM) Procedure AP-3.12Q, Revision 0, ICN 0, *Calculations*, and approved development plan.

2. METHOD

The BDCFs for both the RMEI and the average member of a critical group will be developed using the GENII-S computer code (DIRS No. 2). GENII-S is a successor to the Pacific Northwest Laboratories code, GENII. GENII, which is available from the Radiation Safety Information Computational Center (RSICC) as code CCC_601, was developed to incorporate the internal dosimetry models recommended by the International Commission on Radiological Protection, Publications 26 and 30 (ICRP-26, -30) into the environmental pathway analysis models used at the Hanford Reservation. GENII is a coupled system of seven programs and the associated data libraries that comprise the Hanford Dosimetry System (Generation II) to estimate potential radiation doses to individuals or populations from both routine and accidental releases. The programs analyze environmental contamination resulting from both far-field and near-field scenarios and calculated radiation doses to humans. GENII can be used in prospective dose calculations for purposes such as siting facilities, environmental impact statements, and safety analysis reports. GENII-S is the GENII code implemented in a software shell, Sensitivity and UNcertainty analysis Shell (SUNS). GENII-S has the same core as GENII with additional capability to perform Monte Carlo simulation. This added feature is a useful tool for identifying important model input parameters and evaluation uncertainty of model output.

3. ASSUMPTIONS

No assumptions are made in this calculation.

4. USE OF COMPUTER SOFTWARE AND MODELS

As part of the calculation, the computer code GENII-S version 1.4.8.5 (DIRS No. 2) was used. GENII-S is a computer program used to calculate statistical and deterministic values of radiation doses to humans from exposure to radionuclides in the environment. GENII-S is qualified software (CSCI: 30034 V1.4.8.5) (DIRS No.1) consisting of executable programs and auxiliary files, all of which are appropriate for this application and was used within the range of validation as described in the software qualification report (DIRS No. 1) in accordance with AP-SI.1Q, *Software Management*.

GENII-S is controlled under the Configuration Management (CSCI: 30034 V1.4.8.5). The copy of GENII-S software used for this calculation was obtained from the Configuration Management and is installed on an IBM compatible PC (CPU # 113154). No models, software routines, or macros will be developed for this calculation.

5. CALCULATION

The BDCFs developed in this analysis will be used for calculating the potential radiation dose to an individual who lives in the vicinity of Yucca Mountain. The assessment scenario, for the RMEI calculation, is defined such that the calculated BDCFs reflect the characteristics of the critical group. A water consumption rate of 2 liters per day was used for all BDCF calculations. The RMEI BDCF calculation used food consumption rates corresponding to the 95th percentile values as shown in Table 1. 50th percentile values were used for food consumption rate for the BDCF calculations for the average member of the critical group. Table 1 contains the consumption parameters for locally produced food used in this calculation (DIRS No. 23).

Table 1. Consumption Parameters for Locally Produce Food for the Critical Group.

Food Type ¹	Mean	95 th Percentile	Maximum
Leafy Vegetables	15.14	45.68	59.68
Root Vegetables	7.81	25.01	29.86
Grains	0.48	0.00	12.33
Fruit	15.57	45.44	97.69
Poultry	0.80	7.00	10.50
Meat ²	2.93	11.87	53.11
Fish ³	0.47	1.51	8.79
Eggs	6.68	19.65	33.34
Milk	4.14	24.73	100.36
Tap Water ⁴	752.85	1487.45	1487.45

¹The values shown for food are in kilograms; for milk and tap water they are in liters. The values do not reflect weighting. The specific food types shown are those used in the biosphere analysis completed for Total System Performance Assessment/Viability Assessment.

²"Meat" is comprised of beef and pork.

³The only known source of "locally produced" fish in the Amargosa Valley area is the catfish farm. Thus, the values provided are specific to the consumption of fish from this location.

⁴This refers to water from a local ground source. It excludes any bottled water purchased from a commercial vendor.

An individual lives in the vicinity of Yucca Mountain and draws untreated ground water for drinking water supply. This individual also uses the ground water to irrigate crops and lawns and raise livestock. It is assumed that the groundwater is contaminated by various radionuclides, as specified in the following section. Consequently, this individual will be exposed to radiation

resulting from ingestion of contaminated water, as well as locally produced food; inhalation of resuspended dust; and direct external exposure to contaminated soil. The BDCF is the radiation dose to this individual due to unit radionuclide concentration in groundwater for a radionuclide of interest. The ground water concentration unit used for this analysis is pCi/L, and the dose to be calculated is the Total Effective Dose Equivalent, or TEDE (mrem/yr). The TEDE is defined as the sum of the deep-dose equivalent (for external exposures) and the 50-year committed effective dose equivalent (for internal exposures) (DIRS No. 11).

The radionuclides of interest are defined via an AP-3.14Q Input transmittal, *Status of radionuclide Screening for Total System Performance Assessment – Site Recommendation (TSPA-SR)* (R&E-PA-99217.Tc and R&E-PA-99217.Td) (DIRS No. 20 and No. 21). For the reasonably maximally exposed individual calculation, these radionuclides are C-14, Sr-90, Tc-99, I-129, Cs-137, AC-227, Th-229, U-232, U-233, U-234, U-236, U-238, Np-237, Pu-238, Pu-239, Pu-240, Am-241, and Am-243. For the average member of the critical group, these radionuclides are Pb-210, Ra-226, Pa-231, Th-230 and Pu-242. A BDCF will be generated for each of these radionuclides separately.

The prior irrigation periods are the number of years that the land has been irrigated before the intake occurs. Currently, there are six prior irrigation periods (PA-R&E-99251.R & PA-R&E-99251.Rb) (DIRS No. 18 and No. 19). The BDCFs in this calculation were calculated using all six periods for Sr-90 and Cs-137 and only period four for all other radionuclides (see Table 2). In the case where the half life of the radionuclide is shorter than that given for irrigation period number 4 specified in the original transmission for the element, then the periods of irrigation shall be determined by application of the following. The periods of irrigation used to generate BDCFs shall be determined by multiplying the half-life of the radionuclide for which the BDCFs are being generated by the sequence of factors, 0.000, 0.263, 0.585, 1.000, 1.585, and 2.585 (DIRS No. 22). The irrigation periods were determined by this method for the following five radionuclides: Ac-227, Am-241, Cs-137, Pb-210, and Pu-238.

Both the RMEI and the average member of the critical group calculations use the same scenario but different input data. The corresponding input data are incorporated into the GENII-S software, and stochastic runs are performed to propagate the uncertainties of input parameters into the output BDCFs. The number of realizations is set to 130, which is the maximum that the software can perform due to the computing limitation.

Because the software used in this analysis is qualified, the qualification status of the output BDCFs depends upon the qualification status of the input data. Before the input data are qualified, the BDCFs generated in this analysis have to be marked as To Be Verified (TBV).

Table 2. Prior Irrigation Time Periods

Radionuclide	Number of Years of Prior Irrigation					
	Period Number					
	1	2	3	4	5	6
C-14	0	752	1674	2864	4537	7401
Sr-90	0	5	12	21	33	53
Tc-99	0	1	2	3	4	5
I-129	0	1	2	3	4	5
Cs-137 ¹	0	8	18	30	48	78
Pb-210 ¹	0	6	12	21	33	54
Ra-226	0	135	300	513	814	1327
Ac-227 ¹	0	6	13	22	35	56
Pa-231	0	2	4	7	10	17
Th-229	0	860	1913	3270	5182	8452
Th-230	0	860	1913	3270	5182	8452
U-232	0	9	21	36	57	93
U-233	0	9	21	36	57	93
U-234	0	9	21	36	57	93
U-236	0	9	21	36	57	93
U-238	0	9	21	36	57	93
Np-237	0	1	3	5	8	14
Pu-238 ¹	0	23	50	86	136	222
Pu-239	0	148	329	563	893	1456
Pu-240	0	148	329	563	893	1456
Pu-242	0	148	329	563	893	1456
Am-241 ¹	0	120	268	458	726	1184
Am-243	0	512	1139	1947	3086	5033

¹Irrigation period based on half-life. Half-lives used: Cs-137 – 30 years, Pb-210 – 21 years, Ac-227 – 21.6 years, Pu-238 – 86 years, and Am-241 – 458 years (DIRS No. 24).

The BDCF's calculation relies on the outputs of seven other analyses. Each of these analyses provides a suite of related input data for the use of GENII-S input parameters. The outputs of these analyses are available in the Technical Data Management System (TDMS). The following is a list of these input data with Data Tracking Numbers (DTNs):

- MO9911RIB00064.000. Environmental Transport Parameter Values for Dose Assessment. Submittal date: 11/10/1999 (DIRS No. 15).
- MO9911RIB00065.000. Parameter Values for Transfer Coefficients. Submittal date: 11/10/1999 (DIRS No. 14).
- MO9901RIB00061.000. Input Parameter Values for External and Inhalation Radiation Exposure Analysis. Submittal date: 10/07/1999 (DIRS No. 13).
- MO9912RIB00066.000. Parameter Values for Internal and External Dose Conversion Factors. Submittal date: 11/12/1999 (DIRS No. 16).
- MO9912SPAING06.033. Ingestion Exposure Pathway Parameters. Submittal date: 12/22/1999 (DIRS No. 8).
- MO0001SPARB05.013. Recommended Distribution-based and Fixed (Mean) Consumption Parameters for Locally Produced Food by Type and Tap Water. Submittal date: 01/06/2000 (DIRS No. 23).
- SN9912T0512299.001. Leaching Coefficients for GENII-S Code. Submittal date: 12/06/1999 (DIRS No. 17).

Input data from these analyses are provided in two categories: the Reasonable Representation and the Safety Case. The Reasonable Representation data are more of realistic values, whereas the Safety Case data are conservative bounding values. Only the data sets for the Reasonable Representation will be used for calculating the BDCFs in this calculation.

Data can be entered into GENII-S software through a series of interactive data input screens and by modifying input data files located in GENII-S directory. Table 3 lists all the input data that must be entered into GENII-S through the data input screens. The table is constructed so that it closely represents the actual data input screens in the software.

Four Data files in GENII-S were modified to accommodate the results of site-specific studies on the GENII-S input parameters. The original names of these four files are BIOAC1.DAT, FTRANS.DAT, DEFAULT.IN, AND GRDF.DAT.

BIOAC1.DAT is a bioaccumulation library file. It contains the factors used to relate the concentrations of radionuclides in aquatic biota to the concentrations of radionuclides in water. Figure 1 lists the modified BIOAC1.DAT, which is renamed as BIOC_RR.TXT, for this calculation. The data that are relevant for this calculation are listed in the 6th column, fresh water fish, and are compiled from input data MO9911RIB00065.000 (DIRS No. 14).

FTRANS.DAT is the food transfer and soil leaching factor library. The food transfer factors relate concentrations of elements in soil to concentrations in farm products grown in that soil and concentrations in animal feed to concentrations in animal products. These data are compiled from input data MO9911RIB00065.000 (DIRS No. 14). The soil leaching factors, compiled from input data SN9912T0512299.001 (DIRS No. 17) are important parameters for determining radionuclide buildup in soil. Figure 2 lists the modified FTRANS.DAT, which is renamed as FTRANRR.TXT, for this calculation.

DEFAULT.IN is a file containing default values for various parameters needed in a GENII-S calculation. This file is always required to run GENII-S. The default values in this file can be changed by using an external text editor. Figure 3 lists the modified DEFAULT.IN, which is renamed as DEF_RR.TXT, for this calculation. The data that are relevant for this calculation are compiled from, input data MO9911RIB00064.000 (DIRS No. 15), input data MO9912RIB00066.000 (DIRS No. 16), and from input data MO9912SPAING06.033 (DIRS No. 8).

External dose conversion factors for air submersion, water surface, soil surface, deep soil, and buried waste for different radionuclides are given in GRDF.DAT. This file is replaced by GRDFNEW.DAT, which was primarily compiled from input data MO9912RIB00066.000 (DIRS No. 16). The default GENII-S values were used for a few radionuclides (DIRS NO. 2). The file GRDFNEW.DAT is listed in Figure 4.

For each set of input data, the files with extension ".flg", ".inp" “, ".pti", and ".vec" are used by the GENII-S code to store the input data, and they must be used together for computer runs. The input files with extensions ".flg", ".inp", ".pti", and ".vec" are used by the computer code to perform the calculations and are not easy to read by humans.

The output file has extension ".rst". The ".out" files contain no data for stochastic runs. A total of 40 BDCF data sets are generated as a result of this analysis, and summary results are provided in Section 6 of this document.

Table 3. GENII-S Input Parameters for BDCF Calculations

Parameter	Minimum Value	Best Estimate	Maximum Value	Distribution	Comments
Fixed Data Group 1: Population /Soil/Scenario Data					
Total Population (0=Use POP.IN)		1			
Population Scale Factor		1			
Dose Commitment Period (yr)		50			
Surface Soil Depth (cm)		15			Not used for stochastic runs
Surface Soil Density (kg/m ²)		225			Not used for stochastic runs
Deep Soil Density (kg/m ³)		1500			N/A
Roots in Upper Soil (Fraction)		1			Not used for stochastic runs
Roots in Deep Soil (Fraction)		0			Not used for stochastic runs
Air Rel. Time Before Intake (yr)		0			N/A
H ₂ O Rel. Time Before Intake (yr)		Varies			Varies for each run.
Fixed Data Group 2: Biotic Trans./Near Field Data					
					This data group N/A
Fixed Data Group 2: External /Inhalation Exposure					
Chronic Plume Exposure (hr)		0			N/A
Acute Plume Exposure (hr/phr)		0			N/A
Inhalation Exposure (hr/yr)		0			Not used for stochastic runs
Resuspension Model Flag (0-2)		1			1 = Mass Loading Method
Mass Load(g/m ³);Soil Depth (cm)		0			Not used for stochastic runs
Transit Time to Rec. Site (hr)		0			N/A
Swimming Exposure Time (hr)		0			N/A
Boating Exposure Time (hr)		0			N/A
Shoreline Exposure Time (hr)		0			N/A
Type of Shoreline Index (1-4)		1			N/A
H ₂ O/Sed. Transfer (l/m ² /yr)		0			N/A
Soil Exposure Time (hr)		0			Not used for stochastic runs
Home Irrigation Flag (0/1=N/Y)		1			
Irrigation Water Index (1-2)		1			1 = groundwater
Home Irrigation Rate (in/yr)		0			Not used for stochastic runs
Home Irrigation Duration (mo/yr)		12			Not used for stochastic runs
Fixed Data Group 4: Ingestion Exposure					
Food Production Option (0-3)		0			N/A
Food-Weighted Chi/Q (kg-s/m ³)		0			N/A
Crop Resuspension Factor (1/m)		0			Not used for stochastic runs
Crop Desposition Velocity (m/s)		0.001			Not used for stochastic runs
Crop Interception Fraction (-)		0			Not used for stochastic runs
Exported Food Dose (0/1=N/Y)		0			N/A
Soil Ingestion Rate (mg/day)		50			Not used for stochastic runs
Swim H ₂ O Ingestion Rate		0			N/A

Parameter	Minimum Value	Best Estimate	Maximum Value	Distribution	Comments
(l/hr)					
Population Ingesting Aquatic Food		1			
Bioaccumulation Flag (0/1=N/Y)		0			0 = fresh water
Population Drinking Contaminated Water		1			
Drink Water Source Index (0-3)		1			1 = groundwater
Drink Water Treated (0/1=N/Y)		0			
Drink Water Holdup Time (days)		0			
Drink Water Consumption (l/yr)		0			Not used for stochastic runs
Array Number 1: Aquatic Food Ingestion					
Fish Transit Time (hr)		0			N/A
Mollusc Transit Time(hr)		0			N/A
Crustacea Transit Time (hr)		0			N/A
Plants Transit Time(hr)		0			N/A
Fish Production (kg/yr)		0			N/A
Mollusc Production (kg/yr)		0			N/A
Crustacea Production (kg/yr)		0			N/A
Plants Production (kg/yr)		0			N/A
Fish Holdup (days)		0			N/A
Mollusc Holdup (days)		0			N/A
Crustacea Holdup (days)		0			N/A
Plants Holdup (days)		0			N/A
Fish Consumption (kg/yr)		0			Not used for stochastic runs
Mollusc Consumption (kg/yr)		0			N/A
Crustacea Consumption (kg/yr)		0			N/A
Plants Consumption (kg/yr)		0			N/A
Array Number 2: Terrestrial Food Ingestion					
Water Source (0-2)		1			1 = groundwater
Leaf Vegetable Grow Time (days)		0			Not used for stochastic runs
Root Vegetable Grow Time (days)		0			Not used for stochastic runs
Fruit Grow Time (days)		0			Not used for stochastic runs
Grain Grow Time (days)		0			Not used for stochastic runs
Leaf Vegetable Irrigation Rate (in/yr)		0			Not used for stochastic runs
Root Vegetable Irrigation Rate (in/yr)		0			Not used for stochastic runs
Fruit Irrigation Rate (in/yr)		0			Not used for stochastic runs
Grain Irrigation Rate (in/yr)		0			Not used for stochastic runs
Leaf Vegetable Irrigation Time (mo/yr)		0			Not used for stochastic runs
Root Vegetable Irrigation Time (mo/yr)		0			Not used for stochastic runs
Fruit Irrigation Time (mo/yr)		0			Not used for stochastic runs
Grain Irrigation Time (mo/yr)		0			Not used for stochastic runs
Leaf Vegetable Yield (kg/m ²)		0			Not used for stochastic runs
Root Vegetable Yield (kg/m ²)		0			Not used for stochastic runs
Fruit Yield (kg/m ²)		0			Not used for stochastic runs

Parameter	Minimum Value	Best Estimate	Maximum Value	Distribution	Comments
Grain Yield (kg/m ²)		0			Not used for stochastic runs
Leaf Vegetable Production (kg/yr)		0			N/A
Root Vegetable Production (kg/yr)		0			N/A
Fruit Production (kg/yr)		0			N/A
Grain Production (kg/yr)		0			N/A
Leaf Vegetable Holdup (days)		1			Not used for stochastic runs
Root Vegetable Holdup (days)		14			Not used for stochastic runs
Fruit Holdup (days)		14			Not used for stochastic runs
Grain Holdup (days)		14			Not used for stochastic runs
Leaf Vegetable Consumption (kg/yr)		0			Not used for stochastic runs
Root Vegetable Consumption (kg/yr)		0			Not used for stochastic runs
Fruit Consumption (kg/yr)		0			Not used for stochastic runs
Grain Consumption (kg/yr)		0			Not used for stochastic runs
Array Number 3: Animal Products (Stored Feed)					
Water Source (0-2)		1			1=groundwater
Beef Consumption Rate (kg/yr)		0			Not used for stochastic runs
Poultry Consumption Rate (kg/yr)		0			Not used for stochastic runs
Milk Consumption (l/yr)		0			Not used for stochastic runs
Eggs Consumption Rate (kg/yr)		0			Not used for stochastic runs
Beef Holdup (days)		20			Not used for stochastic runs
Poultry Holdup (days)		1			Not used for stochastic runs
Milk Holdup (days)		1			Not used for stochastic runs
Eggs Holdup (days)		1			Not used for stochastic runs
Beef Production (kg/yr)		0			N/A
Poultry Production (kg/yr)		0			N/A
Milk Production (kg/yr)		0			N/A
Eggs Production (kg/yr)		0			N/A
Beef-Water Fraction		1			100% Contaminated Water
Poultry-Water Fraction		1			100% Contaminated Water
Milk-Water Fraction		1			100% Contaminated Water
Eggs-Water Fraction		1			100% Contaminated Water
Beef-Diet Fraction		0			Not used for stochastic runs
Poultry-Diet Fraction		1			Not used for stochastic runs
Milk-Diet Fraction		0			Not used for stochastic runs
Eggs-Diet Fraction		1			Not used for stochastic runs
Beef-Grow Time (days)		0			N/A
Poultry-Grow Time (days)		75			Not used for stochastic runs
Milk-Grow Time (days)		0			N/A
Eggs-Grow Time (days)		75			Not used for stochastic runs
Beef-Irrigation Rate (in/yr)		0			N/A
Poultry-Irrigation Rate (in/yr)		80.37			Not used for stochastic runs
Milk-Irrigation Rate (in/yr)		0			N/A
Eggs-Irrigation Rate (in/yr)		80.37			Not used for stochastic runs
Beef-Irrigation Time (mo/yr)		0			N/A
Poultry-Irrigation Time (mo/yr)		4.9			Not used for stochastic runs
Milk-Irrigation Time (mo/yr)		0			N/A
Eggs-Irrigation Time (mo/yr)		4.9			Not used for stochastic runs
Beef-Feed Yield (kg/m ²)		0			N/A

Parameter	Minimum Value	Best Estimate	Maximum Value	Distribution	Comments
Poultry-Feed Yield (kg/m ²)		0			Not used for stochastic runs
Milk-Feed Yield (kg/m ²)		0			N/A
Eggs-Feed Yield (kg/m ²)		0			Not used for stochastic runs
Beef-Storage (days)		0			N/A
Poultry-Storage (days)		14			Not used for stochastic runs
Milk-Storage (days)		0			N/A
Eggs-Storage (days)		14			Not used for stochastic runs
Array Number 4: Animal Products (Fresh Forage)					
Water Source Flag (0-2)		1			1=groundwater
Beef-Diet Fraction		1			Not used for stochastic runs
Milk-Diet Fraction		1			Not used for stochastic runs
Beef-Grow Time (days)		0			Not used for stochastic runs
Milk-Grow Time (days)		0			Not used for stochastic runs
Beef-Irrigation Rate (in/yr)		94.66			Not used for stochastic runs
Milk-Irrigation Rate (in/yr)		94.66			Not used for stochastic runs
Beef-Irrigation Time (mo/yr)		12			Not used for stochastic runs
Milk-Irrigation Time (mo/yr)		12			Not used for stochastic runs
Beef-Feed Yield (kg/m ²)		0.93			Not used for stochastic runs
Milk-Feed Yield (kg/m ²)		0.93			Not used for stochastic runs
Beef-Feed Storage Time (days)		0			N/A
Milk-Feed Storage Time (days)		0			N/A
Array Number 5: Inventory-Basic Concentrations					
Radionuclides					Varies for each run
Air (/l)		0			N/A
Surface Soil (/unit)		0			N/A
Deep Soil (/unit)		0			N/A
Ground Water (/l)		1			Not used for stochastic runs
Surface Water (/l)		0			N/A
Variable Group 1: Population/Soil/Scenario Data					
Population Scale Factor		1			
Soil/Plant Transfer Scale Factor	2.75E-02		3.64E+01	Log Normal	MO9911RIB00065.000
Animal Uptake Scale Factor	1.17E-01		8.51E+00	Log Normal	MO9911RIB00065.000
Human Dose Factor Scale Factor		1		Fixed	
Surface Soil Depth (cm)		15		Fixed	MO9911RIB00064.000
Surface Soil Density (kg/m ²)		225		Fixed	MO9911RIB00064.000
Deep Soil Density (kg/m ³)		1500		Fixed	N/A
Roots in Upper Soil (Fraction)		1		Fixed	MO9911RIB00064.000
Roots in Deep Soil (Fraction)		0		Fixed	MO9911RIB00064.000
Variable Group 2: Biotic Trans./Near Field Data					
					The data group is N/A
Variable Group 3: External/Inhalation Exposure					
Chronic Plume Exposure (hr)		0			N/A
Acute Plume Exposure (hr/phr)		0			N/A
Inhalation Exposure (hr/yr)		3918.5		Fixed	MO9910RIB00061.000
Mass Load(g/m ³);Soil Depth (cm)	7.4E-07		6.4E-05	Log Normal	MO9910RIB00061.000
Transit Time to Rec. Site (hr)		0			N/A

Parameter	Minimum Value	Best Estimate	Maximum Value	Distribution	Comments
Swimming Exposure Time (hr)		0			N/A
Boating Exposure Time (hr)		0			N/A
Shoreline Exposure Time (hr)		0			N/A
Type of Shoreline Index (1-4)		1			N/A
H ₂ O/Sed. Transfer (l/m ² /yr)		0			N/A
Soil Exposure Time (hr)		827		Fixed	MO9910RIB00061.000
Home Irrigation Rate (in/yr)	52		87	Uniform	MO9910RIB00061.000
Home Irrigation Duration (mo/yr)		12		Fixed	MO9910RIB00061.000
Variable Group 4: Ingestion Exposure					
Food-Weighted Chi/Q (kg-s/m ³)		0			N/A
Crop Resuspension Factor (1/m)	9.6E-12		7.2E-10	LogNormal	MO9911RIB00064.000
Crop Desposition Velocity (m/s)		0.001		Fixed	MO9911RIB00064.000
Crop Interception Fraction (-)	0.044		0.474	Normal	MO9912SPAIN06.033
Soil Ingestion Rate (mg/day)		50		Fixed	MO9911RIB00064.000
Swim H ₂ O Ingestion Rate (l/hr)		0			N/A
Drink Water Holdup Time (days)		0			
Drink Water Consumption (l/yr)		752.85		Fixed	MO0001SPARDB05.013
Variable Group 5: Aquatic Food Ingestion					
Fish Transit Time (hr)		0			N/A
Mollusc Transit Time(hr)		0			N/A
Crustacea Transit Time (hr)		0			N/A
Plants Transit Time(hr)		0			N/A
Fish Production (kg/yr)		0			N/A
Mollusc Production (kg/yr)		0			N/A
Crustacea Production (kg/yr)		0			N/A
Plants Production (kg/yr)		0			N/A
Fish Holdup (days)		0			N/A
Mollusc Holdup (days)		0			N/A
Crustacea Holdup (days)		0			N/A
Plants Holdup (days)		0			N/A
Fish Consumption (kg/yr)		1.51/0.47		Fixed	95%/50% value MO0001SPARDB05.013
Mollusc Consumption (kg/yr)		0			N/A
Crustacea Consumption (kg/yr)		0			N/A
Plants Consumption (kg/yr)		0			N/A
Variable Group 6: Terrestrial Food Ingestion					
Leaf Vegetable Grow Time (days)	45	64.5	75	Triangular	MO9912SPAIN06.033
Root Vegetable Grow Time (days)	70		98	Uniform	MO9912SPAIN06.033
Fruit Grow Time (days)	88		184	Uniform	MO9912SPAIN06.033
Grain Grow Time (days)	75		244	Uniform	MO9912SPAIN06.033
Leaf Vegetable Irrigation Rate (in/yr)	28.17	42.11	80.37	Triangular	MO9912SPAIN06.033
Root Vegetable Irrigation Rate (in/yr)	47.34		51.58	Uniform	MO9912SPAIN06.033

Parameter	Minimum Value	Best Estimate	Maximum Value	Distribution	Comments
Fruit Irrigation Rate (in/yr)	30		45.37	Uniform	MO9912SPAIN06.033
Grain Irrigation Rate (in/yr)	55.85		80.37	Uniform	MO9912SPAIN06.033
Leaf Vegetable Irrigation Time (mo/yr)	2	3.2	4.9	Triangular	MO9912SPAIN06.033
Root Vegetable Irrigation Time (mo/yr)	3.2		4.6	Uniform	MO9912SPAIN06.033
Fruit Irrigation Time (mo/yr)	2.9		6.0	Uniform	MO9912SPAIN06.033
Grain Irrigation Time (mo/yr)	4.9		8.0	Uniform	MO9912SPAIN06.033
Leaf Vegetable Yield (kg/m ²)	0.59	1.82	4.11	Triangular	MO9912SPAIN06.033
Root Vegetable Yield (kg/m ²)	1.73	4.33	5.87	Triangular	MO9912SPAIN06.033
Fruit Yield (kg/m ²)	1.57		2.25	Uniform	MO9912SPAIN06.033
Grain Yield (kg/m ²)	0.33		0.78	Uniform	MO9912SPAIN06.033
Leaf Vegetable Production (kg/yr)		0			N/A
Root Vegetable Production (kg/yr)		0			N/A
Fruit Production (kg/yr)		0			N/A
Grain Production (kg/yr)		0			N/A
Leaf Vegetable Holdup (days)		1		Fixed	MO9912SPAIN06.033
Root Vegetable Holdup (days)		14		Fixed	MO9912SPAIN06.033
Fruit Holdup (days)		14		Fixed	MO9912SPAIN06.033
Grain Holdup (days)		14		Fixed	MO9912SPAIN06.033
Leaf Vegetable Consumption (kg/yr)		45.68/15.14		Fixed	95%/50% value MO0001SPARDB05.013
Root Vegetable Consumption (kg/yr)		25.01/7.81		Fixed	95%/50% value MO0001SPARDB05.013
Fruit Consumption (kg/yr)		45.44/15.57		Fixed	95%/50% value MO0001SPARDB05.013
Grain Consumption (kg/yr)		0.00/0.48		Fixed	95%/50% value MO0001SPARDB05.013
Variable Group 7: Animal Product Consumption					
Beef Consumption Rate (kg/yr)		11.87/2.93		Fixed	95%/50% value MO0001SPARDB05.013
Poultry Consumption Rate (kg/yr)		7.00/0.80		Fixed	95%/50% value MO0001SPARDB05.013
Milk Consumption (l/yr)		24.73/4.14		Fixed	95%/50% value MO0001SPARDB05.013
Eggs Consumption Rate (kg/yr)		19.65/6.68		Fixed	95%/50% value MO0001SPARDB05.013
Beef Holdup (days)		20		Fixed	MO9912SPAIN06.033
Poultry Holdup (days)		1		Fixed	MO9912SPAIN06.033
Milk Holdup (days)		1		Fixed	MO9912SPAIN06.033
Eggs Holdup (days)		1		Fixed	MO9912SPAIN06.033
Beef Production (kg/yr)		0			N/A
Poultry Production (kg/yr)		0			N/A
Milk Production (kg/yr)		0			N/A
Eggs Production (kg/yr)		0			N/A
Beef-Contaminated Water Fraction		1			100% contaminated water
Poultry Contaminated -Water Fraction		1			100% contaminated water
Milk- Contaminated Water Fraction		1			100% contaminated water
Eggs Contaminated -Water Fraction		1			100% contaminated water

Parameter	Minimum Value	Best Estimate	Maximum Value	Distribution	Comments
Variable Group 8: Stored Feed Data					
Beef-Diet Fraction		0			N/A
Poultry-Diet Fraction		1		Fixed	MO9912SPAIN06.033
Milk-Diet Fraction		0			N/A
Eggs-Diet Fraction		1		Fixed	MO9912SPAIN06.033
Beef-Grow Time (days)		0			N/A
Poultry-Grow Time (days)		75		Fixed	MO9912SPAIN06.033
Milk-Grow Time (days)		0			N/A
Eggs-Grow Time (days)		75		Fixed	MO9912SPAIN06.033
Beef-Irrigation Rate (in/yr)		0			N/A
Poultry-Irrigation Rate (in/yr)		80.37		Fixed	MO9912SPAIN06.033
Milk-Irrigation Rate (in/yr)		0			N/A
Eggs-Irrigation Rate (in/yr)		80.37		Fixed	MO9912SPAIN06.033
Beef-Irrigation Time (mo/yr)		0			N/A
Poultry-Irrigation Time (mo/yr)		4.9		Fixed	MO9912SPAIN06.033
Milk-Irrigation Time (mo/yr)		0			N/A
Eggs-Irrigation Time (mo/yr)		4.9		Fixed	MO9912SPAIN06.033
Beef-Feed Yield (kg/m ²)		0			N/A
Poultry-Feed Yield (kg/m ²)	0.59		0.78	Uniform	MO9912SPAIN06.033
Milk-Feed Yield (kg/m ²)		0			N/A
Eggs-Feed Yield (kg/m ²)	0.59		0.78	Uniform	MO9912SPAIN06.033
Beef-Storage (days)		0			N/A
Poultry-Storage (days)		14		Fixed	MO9912SPAIN06.033
Milk-Storage (days)		0			N/A
Eggs-Storage (days)		14		Fixed	MO9912SPAIN06.033
Variable Group 9: Fresh Forage Data					
Beef-Diet Fraction		1		Fixed	MO9912SPAIN06.033
Milk-Diet Fraction		1		Fixed	MO9912SPAIN06.033
Beef-Grow Time (days)	46	47	135	Triangular	MO9912SPAIN06.033
Milk-Grow Time (days)	46	47	135	Triangular	MO9912SPAIN06.033
Beef-Irrigation Rate (in/yr)		94.66		Fixed	MO9912SPAIN06.033
Milk-Irrigation Rate (in/yr)		94.66		Fixed	MO9912SPAIN06.033
Beef-Irrigation Time (mo/yr)		12		Fixed	MO9912SPAIN06.033
Milk-Irrigation Time (mo/yr)		12		Fixed	MO9912SPAIN06.033
Beef-Feed Yield (kg/m ²)	0.25		1.15	Uniform	MO9912SPAIN06.033
Milk-Feed Yield (kg/m ²)	0.25		1.15	Uniform	MO9912SPAIN06.033
Beef-Feed Storage Time (days)		0			N/A
Milk-Feed Storage Time (days)		0			N/A
Variable Group 10 – 14: Basic Concentration					
Radionuclides					Varies for each run
Air (/l)		0			N/A
Surface Soil (/unit)		0			N/A
Deep Soil (/unit)		0			N/A
Ground Water (/l)		1		Fixed	1 pCi/L
Surface Water (/l)		0			N/A

Bioaccumulation Factor Library for Reasonable Representation - (30-Aug-99)

Salt:	Fish	Crustacea	Molluscs	Plants	Fr:Fish	Crustacea	Molluscs	Plants	Cleanup
AC	30.0	1000.0	1000.0	1000.0	25.0	1000.0	1000.0	10000.0	0.7
AM	2500.0	360.0	290.0	2900.0	30.0	100.0	100.0	3000.0	0.7
BI	15.0	1000.0	1000.0	10000.0	15.0	100000.0	100000.0	1500.0	0.9
C	20000.0	20000.0	20000.0	1800.0	50000.0	9000.0	9000.0	4500.0	1.0
CS	100.0	30.0	30.0	700.0	2000.0	500.0	500.0	1000.0	0.9
I	10.0	50.0	50.0	1500.0	40.0	100.0	100.0	300.0	0.8
MO	40.0	20.0	20.0	100.0	100.0	10.0	100.0	1000.0	0.9
NI	100.0	500.0	500.0	3000.0	100.0	500.0	500.0	500.0	0.2
NP	2500.0	10.0	150.0	6.0	30.0	30.0	30.0	300.0	0.7
PA	300.0	10.0	10.0	50.0	11.0	30.0	30.0	300.0	0.7
PB	200.0	1000.0	1000.0	50000.0	2000.0	500.0	500.0	2000.0	0.9
PO	2000.0	50000.0	10000.0	1000.0	50.0	20000.0	20000.0	2000.0	0.8
PU	1000.0	300.0	3000.0	3600.0	30.0	100.0	100.0	890.0	0.7
RA	950.0	100.0	100.0	1000.0	50.0	1000.0	1000.0	30000.0	0.7
SR	4.0	1.0	40.0	300.0	60.0	100.0	100.0	3000.0	0.2
TC	30.0	10.0	20.0	5000.0	20.0	100.0	100.0	5000.0	0.7
TH	600.0	1000.0	1000.0	2000.0	100.0	100.0	100.0	3000.0	0.7
U	50.0	10.0	30.0	1000.0	10.0	100.0	100.0	900.0	0.7
Y	20.0	1000.0	1000.0	300.0	30.0	1000.0	1000.0	5000.0	0.2

Figure 1. Listing of BIOAC_RR.TXT File

Food Transfer Factors for Reasonalb Representation (8/30/99)

Ele- men	Dep Vel m/sec	Leafy Veg	Root Veg	Fruit --	Grain --	Beef day/kg	Poultry day/kg	Milk day/L	Egg day/kg	Leaching Factor
AC	1.0E-3	3.5E-3	3.5E-4	3.5E-4	3.5E-4	2.5E-5	4.0E-3	2.0E-5	2.0E-3	1.5E-03
AM	1.0E-3	2.0E-3	4.7E-4	4.1E-4	9.0E-5	2.0E-5	6.0E-3	2.0E-6	4.0E-3	3.6E-04
BI	1.0E-3	6.0E-1	6.0E-1	6.0E-1	6.0E-1	1.7E-2	9.9E-4	5.0E-4	9.9E-4	2.7E-05
C	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	2.4E-04
CS	1.0E-3	1.3E-1	4.9E-2	2.2E-1	2.6E-2	5.0E-2	4.4E+0	8.0E-3	4.0E-1	2.4E-04
I	1.0E-2	3.4E-3	5.0E-2	5.0E-2	5.0E-2	7.0E-3	1.8E-2	1.0E-2	3.0E+0	5.9E-01
MO	1.0E-3	2.5E-1	6.0E-2	6.0E-2	6.0E-2	1.0E-3	1.9E-1	1.5E-3	9.0E-1	6.7E-02
NI	1.0E-3	2.8E-1	6.0E-2	6.0E-2	3.0E-2	5.0E-3	1.0E-3	1.6E-2	1.0E-1	1.7E-03
NP	1.0E-3	3.7E-2	1.7E-2	1.7E-2	2.7E-3	1.0E-3	4.0E-3	5.0E-6	2.0E-3	1.3E-01
PA	1.0E-3	2.5E-3	2.5E-4	2.5E-4	2.5E-4	5.0E-5	4.0E-3	5.0E-6	2.0E-3	1.1E-01
PB	1.0E-3	1.0E-1	1.0E-1	1.0E-1	1.0E-2	4.0E-4	9.9E-4	3.0E-5	9.9E-4	4.5E-04
PO	1.0E-3	1.0E-2	1.0E-2	1.0E-2	1.0E-3	4.5E-3	9.9E-4	1.2E-4	9.9E-4	2.7E-05
PU	1.0E-3	4.0E-4	2.0E-4	1.9E-4	2.6E-5	1.0E-5	3.0E-3	1.1E-6	8.0E-3	1.2E-03
RA	1.0E-3	8.0E-2	1.3E-2	6.1E-3	1.2E-3	9.0E-4	3.0E-2	1.3E-3	2.0E-5	1.4E-03
SR	1.0E-3	2.0E+0	1.2E+0	2.0E-1	2.0E-1	8.0E-3	8.0E-2	1.5E-3	3.0E-1	3.4E-02
TC	1.0E-3	4.0E+1	1.5E+0	1.5E+0	7.3E-1	1.0E-4	3.0E-2	1.0E-2	3.0E+0	2.8E+00
TH	1.0E-3	4.0E-3	3.0E-4	2.1E-4	3.4E-5	1.0E-4	4.0E-3	5.0E-6	2.0E-3	2.1E-04
U	1.0E-3	8.5E-3	1.4E-2	4.0E-3	1.3E-3	3.0E-4	1.2E+0	6.0E-4	1.0E+0	1.9E-02
Y	1.0E-3	1.5E-2	6.0E-3	6.0E-3	6.0E-3	1.0E-3	1.0E-2	2.0E-5	2.0E-3	4.0E-03

Figure 2. Listing of FTRANRR.TXT File

GENII Default Parameters for Reasonable Representation Cases (30-Aug-99)

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INVENTORY PARAMETERS-----
0.037, 3.7E4, 3.7E7, 3.7E10, 1.0      NVU      Source input conversion
1.0, 0.15, 225.0                      SVU      Soil source conversion
ENVIRONMENTAL PARAMETERS-----
0.008                                  ABSHUM   Absolute humidity (kg/m3)
2                                       PRCNTI   Air dispersion conserv. flag
0.001                                  DPVRES   Deposition vel./resuspension
8.3E-11                                 LEAFRS   Leaf resuspension factor
2.0,2.0,3.0,0.8,0.8,0.8,1.0,0.8,1.0,1.5 BIOMAS   BIOMA2 Biomass (kg/m2)
0.259                                  DEPF2    Interception frac./irrigate
15.0                                    SURCM    Depth of surface soil (cm)
225.0                                   SLDN     Surface soil density (kg/m2)
1.5E3                                   SSLDN    Soil density (kg/m3)
True                                     HARVST   Harvest removal considered?
50.0                                    SOLING   Soil ingested (mg/da)
14.0                                    WTIM     Weathering time (da)
1.0, 0.1, 0.1, 0.1                    TRANS    Translocation, plants
0.1, 0.1, 0.1, 0.1, 1.0, 1.0          TRANSA   Translocation, animal food
68.0, 0.12, 55.0, 0.12, 68.0, 55.0   CONSUM   Animal Consumption (kg/da)
50.0, 0.3, 60., 0.3                   DWATER   Animal drinking water (L/da)
0.0, 0.8, 1.0, 0.8                    FRACUT   Acute fresh forage by season
0.2, 0.3, 0.5, 1.0                   SHORWI   Shore width factors
0.02                                    INGWAT   Swim water ingested (L/hr)
25295.0                                 TCWS     H2O/sed. transfer (L/m2/yr)
0.4, 5.0, 4.0                          YELDBT   BIOT: Veg. prod. (kg/m2/yr)
9.41E-4, 2*7.48E-4                     TOTEXC   BIOT: Excavation (m2/m3-yr)
1.0, 0.81, 0.19, 0.02, 0.008, 0.002,   EXCAV    BIOT: Frac. soil brought to
1.0, 0.9, 0.096, 0.006, 0.0005, 0.0005, surface from within the
1.0, 0.9, 0.096, 0.006, 0.0005, 0.0005 waste by animal excavation
266.2                                    RINH     Chronic breathing (cm3/sec)
330.0                                    RINHA    Acute breathing (cm3/sec)
10                                       NDIST    Number of distances
805.0, 2414.0, 4023.0, 5632.0, 7241.0,
12068.0, 24135.0, 40255.0, 56315.0,
72405.0                                  X         JF/chi/Q/pop grid dist. (m)
0.1, 0.25, 0.18, 0.91, 0.18, 0.91, 0.18,
0.91, 2*0.2                             DRYFAC, DRYFA2 dry/wet ratio
METABOLIC PARAMETERS-----
0.5, 50.0, 500.0                        XDIV
0.5, 0.5, 0.95, 0.05, 0.8, 0.0, 0.0, 0.2, 0.0, ADJ
0.1, 0.9, 0.5, 0.5, 0.15, 0.4, 0.4, 0.05, 0.0,
0.01, 0.99, 0.01, 0.99, 0.05, 0.4, 0.4, 0.135, 0.015
DOSE PARAMETERS-----
0.25, 0.15, 0.12, 0.12, 0.03, 0.03, 5*0.06 WT      Weighting factors
2.0                                       SI2I     Semi-infinite/inf

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Figure 3. Listing of DEF_RR.TXT File

FGR12 air,water,soil(15 CM) DCFs (Sv/yr per Bq/n) (25 Jul 99 MAW)						
	Air	Water	Soil	Buried	Buried	Buried
	Submersion	Surface	15 cm	0.15 m	0.5 m	1.0m
n	m3	L	"m3"	m3	m3	m3
C 14	7.06E-12	0.00E+00	2.27E-15	0.00E+00	0.00E+00	0.00E+00
NI63	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SR90	2.37E-10	0.00E+00	1.17E-13	0.00E+00	0.00E+00	0.00E+00
Y 90	5.99E-09	0.00E+00	3.78E-12	0.00E+00	0.00E+00	0.00E+00
MO93	7.95E-10	0.00E+00	9.97E-14	0.00E+00	0.00E+00	0.00E+00
NB93M	1.40E-10	0.00E+00	1.76E-14	0.00E+00	0.00E+00	0.00E+00
TC99	5.11E-11	0.00E+00	2.11E-14	0.00E+00	0.00E+00	0.00E+00
I 129	1.20E-08	0.00E+00	2.19E-12	0.00E+00	0.00E+00	0.00E+00
CS137	9.08E-07	0.00E+00	5.39E-10	0.00E+00	0.00E+00	0.00E+00
TH230	5.11E-10	7.22E-10	1.22E-13	1.43E-16	1.76E-20	1.12E-26
RA226	6.55E-09	8.94E-09	2.72E-12	2.44E-15	6.04E-18	1.65E-21
RN222	3.28E-06	4.23E-06	1.75E-09	8.60E-13	8.70E-12	1.11E-13
PB210	2.16E-09	3.08E-09	3.10E-13	4.81E-16	1.12E-35	0.00E+00
BI210	2.13E-09	2.95E-09	8.49E-13	6.89E-16	1.21E-16	9.31E-20
PO210	1.55E-11	1.93E-11	8.31E-15	4.32E-18	1.05E-17	1.89E-20
U 232	4.48E-10	0.00E+00	1.50E-13	0.00E+00	0.00E+00	0.00E+00
TH232	3.49E-10	4.97E-10	6.35E-14	1.12E-16	1.07E-20	6.84E-27
RA228	5.40E-14	7.92E-14	3.23E-18	7.98E-17	0.00E+00	0.00E+00
AC228	1.70E-06	2.13E-06	9.50E-10	6.50E-21	2.84E-12	1.58E-14
TH228	2.90E-09	0.00E+00	1.32E-12	0.00E+00	0.00E+00	0.00E+00
RA224	1.55E-08	0.00E+00	8.62E-12	0.00E+00	0.00E+00	0.00E+00
PB212	2.17E-07	0.00E+00	1.14E-10	0.00E+00	0.00E+00	0.00E+00
BI212	2.30E-06	0.00E+00	1.27E-09	0.00E+00	0.00E+00	0.00E+00
U 234	2.41E-10	0.00E+00	6.75E-14	0.00E+00	0.00E+00	0.00E+00
U 236	1.58E-10	0.00E+00	3.60E-14	0.00E+00	0.00E+00	0.00E+00
PA231	5.42E-08	0.00E+00	3.03E-11	0.00E+00	0.00E+00	0.00E+00
AC227	1.84E-10	0.00E+00	8.26E-14	0.00E+00	0.00E+00	0.00E+00
TH227	1.54E-07	0.00E+00	8.36E-11	0.00E+00	0.00E+00	0.00E+00
FR223	7.22E-08	0.00E+00	3.19E-11	0.00E+00	0.00E+00	0.00E+00
RA223	4.30E-07	0.00E+00	2.36E-10	0.00E+00	0.00E+00	0.00E+00
NP237	3.25E-08	0.00E+00	1.31E-11	0.00E+00	0.00E+00	0.00E+00
PA233	2.95E-07	0.00E+00	1.63E-10	0.00E+00	0.00E+00	0.00E+00
U 233	5.14E-10	0.00E+00	2.28E-13	0.00E+00	0.00E+00	0.00E+00
TH229	1.21E-07	0.00E+00	5.36E-11	0.00E+00	0.00E+00	0.00E+00
RA225	8.80E-09	0.00E+00	1.86E-12	0.00E+00	0.00E+00	0.00E+00
AC225	3.40E-07	0.00E+00	1.94E-10	0.00E+00	0.00E+00	0.00E+00
U 238	1.08E-10	0.00E+00	1.74E-14	0.00E+00	0.00E+00	0.00E+00
TH234	3.33E-08	0.00E+00	1.73E-11	0.00E+00	0.00E+00	0.00E+00
PA234	2.95E-06	0.00E+00	1.70E-09	0.00E+00	0.00E+00	0.00E+00
PU237	6.98E-08	9.55E-08	2.85E-11	9.75E-13	7.94E-18	4.95E-24
PU242	2.18E-10	3.18E-10	1.55E-14	3.02E-17	2.14E-30	0.00E+00
NP238	9.55E-07	1.15E-06	5.52E-10	2.64E-13	1.67E-12	7.04E-15
PU238	1.54E-10	0.00E+00	2.54E-14	0.00E+00	0.00E+00	0.00E+00
PU240	1.50E-10	0.00E+00	2.47E-14	0.00E+00	0.00E+00	0.00E+00
AM241	2.58E-08	0.00E+00	7.38E-12	0.00E+00	0.00E+00	0.00E+00
AM243	6.87E-08	0.00E+00	2.40E-11	0.00E+00	0.00E+00	0.00E+00
NP239	2.43E-07	0.00E+00	1.23E-10	0.00E+00	0.00E+00	0.00E+00
PU239	1.34E-10	0.00E+00	4.79E-14	0.00E+00	0.00E+00	0.00E+00

Figure 4. Listing of GRDFNEW.DAT File

6. RESULTS

This document may be affected by technical product input information that requires confirmation. Any changes to the document that may occur as a result of completing the confirmation activities will be reflected in subsequent revisions. The status of the input information quality may be confirmed by review of the Document Input Reference System database. The results of this calculation include computer input and output files. The BDCF generated in this calculation are summarized in Table 4 and Table 5.

Table 4. Summary of BDCFs for Reasonably Maximally Exposed Individual

Radionuclide	Source File	TEDE	Standard Deviation
		mrem/yr per pCi/L ¹	
C-14	1AC14.RST	9.81E-03	7.46E-04
Tc-99	1ATC99.RST	1.05E-02	7.24E-03
I-129	1AI129.RST	7.76E-01	2.42E-01
Sr-90	1ASR90.RST	7.99E-01	6.93E-01
Cs-137	1ACS137.RST	3.29E-01	1.58E-01
Pb-210	1APB210.RST	1.46E+01	4.38E+00
Ra-226	1ARA226.RST	4.19E+01	5.08E+01
Ac-227	1AAC227.RST	3.32E+01	9.17E+00
Th-229	1ATH229.RST	1.73E+01	6.99E+00
Th-230	1ATH230.RST	6.06E+01	7.57E+01
Pa-231	1APA231.RST	2.50E+01	6.93E+00
U-232	1AU232.RST	3.39E+00	8.86E-01
U-233	1AU233.RST	7.18E-01	1.95E-01
U-234	1AU234.RST	7.05E-01	1.91E-01
U-236	1AU236.RST	6.68E-01	1.81E-01
U-238	1AU238.RST	6.50E-01	1.77E-01
Np-237	1ANP237.RST	1.26E+01	3.45E+00
Pu-238	1APU238.RST	7.56E+00	2.08E+00
Pu-239	1APU239.RST	8.68E+00	2.33E+00
Pu-240	1APU240.RST	8.66E+00	2.32E+00
Pu-242	1APU242.RST	8.07E+00	2.16E+00
Am-241	1AAM241.RST	9.12E+00	2.43E+00
Am-243	1AAM243.RST	1.09E+01	2.65E+00

1. Computer outputs are in rem/yr per pCi/L.

Table 5. Summary of BDCFs for Average Member of Critical Group

Radionuclide	Source File	TEDE	Standard Deviation
		mrem/yr per pCi/L ¹	
Sr-90	1B1SR90.RST	1.82E-01	3.57E-02
	1B2SR90.RST	2.26E-01	8.80E-02
	1B3SR90.RST	2.71E-01	1.50E-01
	1BSR90.RST	3.06E-01	2.02E-01
	1B5SR90.RST	3.33E-01	2.40E-01
	1B6SR90.RST	3.51E-01	2.67E-01
Cs-137	1B1CS137.RST	8.77E-02	2.36E-02
	1B2CS137.RST	1.09E-01	2.72E-02
	1B3CS137.RST	1.31E-01	3.35E-02
	1BCS137.RST	1.52E-01	4.05E-02
	1B5CS137.RST	1.73E-01	4.86E-02
	1B6CS137.RST	1.94E-01	5.69E-02
Pb-210	1BPB210.RST	7.55E+00	1.44E+00
Ra-226	1BRA226.RST	1.61E+01	1.67E+01
Th-230	1BTH230.RST	2.32E+01	2.49E+01
Pa-231	1BPA231.RST	1.37E+01	2.32E+00
Pu-242	1BPU242.RST	4.50E+00	7.22E-01

1. Computer outputs are in rem/yr per pCi/L.

7. ATTACHMENTS

Attachment I Document Input Reference Sheets
Attachment II List of Files

ATTACHMENT I. DOCUMENT INPUT REFERENCE SHEETS

**OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
DOCUMENT INPUT REFERENCE SYSTEM**

1. Document Identifier No./Rev.: CAL-MGR-MD-000002 Rev. 00		Change:		Title: BIOSPHERE DOSE CONVERSION FACTORS FOR REASONABLY MAXIMALLY EXPOSED INDIVIDUAL AND AVERAGE MEMBER OF CRITICAL GROUP						
Input Document			4. Input Status	5. Section Used in	6. Input Description	7. TBV/TBD Priority	8. TBV/Due To			
2a.	2. Technical Product Input Source Title and Identifier(s) with Version	3. Section					Unqual.	From Uncontrolled Source	Un-Confirmed	
1	CRWMS M&O 1998. <i>Software Qualification Report (SQR) GENII-S 1.485 Environmental Radiation Dosimetry Software System Version 1.485</i> . CSCI: 30034 V1.4.8.5. DI: 30034-2003, Rev. 0. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19980715.0029.	Entire	N/A - Qualified/Confirmed/Controlled	4	Documents use of qualified software	N/A	N/A	N/A	N/A	
2	Leigh, C.D.; Thompson, B.M.; Campbell, J.E.; Longsine, D.E.; Kennedy, R.A.; and Napier, B.A. 1993. <i>User's Guide for GENII-S: A Code for Statistical and Deterministic Simulations of Radiation Doses to Humans from Radionuclides in the Environment</i> . SAND91-0561. Albuquerque, New Mexico: Sandia National Laboratories. TIC: 231133.	Entire	N/A - Reference Only	4	Provides general information on software use in calculation	N/A	N/A	N/A	N/A	
8	MO9912SPAIN06.033. Ingestion Exposure Pathway Parameters. Submittal date: 12/22/1999.	Entire	TBV-3958	Section 5, Table 3	CROP INTERCEPTION FRACTION; PLANT GROWING TIMES; HOLDUP TIMES FOR PLANT AND ANIMAL FOOD PRODUCTS.	1	X	N/A	X	

11	10 CFR 20. 1998. Energy: Standards for Protection Against Radiation. Readily Available	20.1003	N/A - NRC Guidance/Codes & Standards	5	Provides definition of TEDE	N/A	N/A	N/A	N/A
13	MO9910RIB00061.000. Input Parameter Values for External and Inhalation Radiation Exposure Analysis. Submittal date: 10/07/99.	Entire	N/A - Qualified/Confirmed/Controlled	5	Mass Loading (Grams/m3), Inhalation Exposure Time (hours/year), Chronic Breathing Rate (m3/day), Soil Exposure time (hours/year), Home Irrigation Rate (inches/year), Duration of Home Irrigation (months/year)	N/A	N/A	N/A	N/A
14	MO9911RIB00065.000. Parameter Values for Transfer Coefficients. Submittal date: 11/10/1999.	Entire	N/A - Qualified/Confirmed/Controlled	5	Transfer parameter values in input data file FTRANS.DAT, Soil-to-plant transfer scale factor, Animal uptake scale factor	N/A	N/A	N/A	N/A
15	MO9911RIB00064.000. Environmental Transport Parameter Values for Dose Assessment. Submittal date: 11/10/1999.	Entire	N/A - Qualified/Confirmed/Controlled	5	Values for input file DEFAULT.IN, Deposition velocity (m/sec), Resuspension factor (1/m), Fraction of plant roots in surface soil, fraction of plant roots in deep soil, Surface soil density (kg/m2), Deep soil density (kg/m3), Soil ingestion rate (mg/day)	N/A	N/A	N/A	N/A

16	MO9912RIB00066.000. Parameter Values for Internal and External Dose Conversion Factors. Submittal date: 11/12/99.	Entire	N/A - Qualified/Confirmed/Controlled	5	External dose conversion factors data file, DOSINC.DAT, Internal dose conversion factors data file, DOSINC.DAT	N/A	N/A	N/A	N/A
17	SN9912T0512299.001. Leaching Coefficients for GENII-S Code. Submittal date: 12/06/1999.	Entire	TBV-3958	5	CROP INTERCEPTION FRACTION; PLANT GROWING TIMES; HOLDUP TIMES FOR PLANT AND ANIMAL FOOD PRODUCTS.	1	X	N/A	X
18	CRWMS M&O 1999. <i>Input Request for Biosphere Dose Conversion Factors (BDCFs) to be used in the Total System Performance Assessment for Site Recommendation.</i> PA-R&E-99251.R. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19990819.0070.	Entire	TBV-4126	5	PRIOR IRRIGATION PERIODS	1	N/A	N/A	N/A
19	CRWMS M&O 2000. <i>Input Request for Biosphere Dose Conversion Factors (BDCFs) to be used in the Total System Performance Assessment for Site Recommendation.</i> PA-R&E-99251.Rb. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.20000118.0094.	Entire	TBV-4127	5	PRIOR IRRIGATION PERIODS FOR ADDITIONAL RADIONUCLIDES	1	N/A	N/A	N/A
21	CRWMS M&O 1999. <i>Status of Radionuclide Screening for Total Systems Performance Assessment - Site Recommendation (TSPA-SR).</i> Input Transmittal R&E-PA-99217.Td. Las Vegas, Nevada: CRWMS M&O. ACC:	entire	TBV-4128	5	RADIONUCLIDES TO USE FOR 10,000 TO 1,000,000 YEARS	1	N/A	N/A	N/A

	MOL.19991117.0104.								
22	CRWMS M&O 1999. <i>Biosphere Dose Conversion Factors (BDCFs) to be used in the Total System Performance Assessment for Site Recommendation</i> . Input Request PA-R&E-99251.Ra. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19991122.0205.	Section 10	TBV-4129	5	INFORMATION DEFINING THE PREVIOUS PERIODS OF IRRIGATION	1	N/A	N/A	N/A
23	MO0001SPARDB05.013. Recommended Distribution-Based and Fixed (Mean) Consumption Rates for Locally Produced Food by Type and Tap Water. Submittal date: 1/06/2000.	Entire	N/A - Qualified/Confirmed/Controlled	5	Includes Mean, Minimum, Maximum, and 95th Percentile Annual Consumption Rates	N/A	N/A	N/A	N/A
24	U.S. Department of Health, Education and Welfare 1970. <i>Radiological Health Handbook</i> . PB-230-846. Washington, DC: Public Health Service. TIC: 214902.	entire	N/A - Accepted Data (Fact)	5	Radionuclide half-lives	N/A	N/A	N/A	N/A
25	CRWMS M&O 1999. <i>Status of Radionuclide Screening for Total System Performance Assessment - Site Recommendation (TSPA-SR)</i> . Input Transmittal R&E-PA-99217.Tc. Las Vegas, Nevada: CRWMS M&O. ACC: MOL.19991115.0133.	Entire	TBV-4130	5	RADIONUCLIDES FOR UP TO 10,000 YEARS	1	N/A	N/A	N/A

ATTACHMENT II. LIST OF FILES

1AAC227	BAK	15,453	01-09-00	12:10p	1AAC227.BAK
1AAC227	FLG	712	01-30-00	6:33p	1AAC227.FLG
1AAC227	INP	15,451	01-30-00	6:33p	1AAC227.INP
1AAC227	OUT	832	01-09-00	12:13p	1AAC227.OUT
1AAC227	PTI	8,173	01-09-00	12:13p	1AAC227.PTI
1AAC227	RST	112,188	01-30-00	6:34p	1AAC227.RST
1AAC227	VEC	38,112	01-09-00	12:13p	1AAC227.VEC
1AAM241	BAK	15,453	01-13-00	4:36p	1AAM241.BAK
1AAM241	FLG	712	01-30-00	7:06p	1AAM241.FLG
1AAM241	INP	15,452	01-30-00	7:06p	1AAM241.INP
1AAM241	OUT	888	01-13-00	4:37p	1AAM241.OUT
1AAM241	PTI	8,173	01-13-00	4:37p	1AAM241.PTI
1AAM241	RST	112,188	01-30-00	7:07p	1AAM241.RST
1AAM241	VEC	38,112	01-13-00	4:37p	1AAM241.VEC
1AAM243	BAK	15,453	01-09-00	1:07p	1AAM243.BAK
1AAM243	FLG	712	01-30-00	7:07p	1AAM243.FLG
1AAM243	INP	15,453	01-30-00	7:07p	1AAM243.INP
1AAM243	OUT	832	01-09-00	1:09p	1AAM243.OUT
1AAM243	PTI	8,173	01-09-00	1:09p	1AAM243.PTI
1AAM243	RST	112,188	01-30-00	7:07p	1AAM243.RST
1AAM243	VEC	38,112	01-09-00	1:09p	1AAM243.VEC
1AC14	BAK	15,453	01-09-00	12:02p	1AC14.BAK
1AC14	FLG	710	01-30-00	6:51p	1AC14.FLG
1AC14	INP	15,453	01-30-00	6:51p	1AC14.INP
1AC14	OUT	832	01-09-00	12:03p	1AC14.OUT
1AC14	PTI	8,173	01-09-00	12:03p	1AC14.PTI
1AC14	RST	112,186	01-30-00	6:52p	1AC14.RST
1AC14	VEC	38,112	01-09-00	12:03p	1AC14.VEC
1ACS137	BAK	15,453	01-13-00	4:22p	1ACS137.BAK
1ACS137	FLG	712	01-30-00	6:54p	1ACS137.FLG
1ACS137	INP	15,451	01-30-00	6:54p	1ACS137.INP
1ACS137	OUT	832	01-13-00	4:23p	1ACS137.OUT
1ACS137	PTI	8,173	01-13-00	4:23p	1ACS137.PTI
1ACS137	RST	112,188	01-30-00	6:55p	1ACS137.RST
1ACS137	VEC	38,112	01-13-00	4:23p	1ACS137.VEC
1AI129	BAK	15,450	01-07-00	1:33p	1AI129.BAK
1AI129	FLG	712	01-30-00	6:53p	1AI129.FLG
1AI129	INP	15,450	01-30-00	6:53p	1AI129.INP
1AI129	OUT	832	01-07-00	1:36p	1AI129.OUT
1AI129	PTI	8,173	01-07-00	1:36p	1AI129.PTI
1AI129	RST	112,187	01-30-00	6:54p	1AI129.RST
1AI129	VEC	38,112	01-07-00	1:36p	1AI129.VEC
1ANP237	BAK	15,453	01-09-00	12:51p	1ANP237.BAK
1ANP237	FLG	712	01-30-00	7:03p	1ANP237.FLG
1ANP237	INP	15,450	01-30-00	7:03p	1ANP237.INP
1ANP237	OUT	832	01-09-00	12:52p	1ANP237.OUT
1ANP237	PTI	8,173	01-09-00	12:52p	1ANP237.PTI
1ANP237	RST	112,188	01-30-00	7:03p	1ANP237.RST
1ANP237	VEC	38,112	01-09-00	12:52p	1ANP237.VEC
1APA231	BAK	15,450	01-30-00	7:31p	1APA231.BAK
1APA231	FLG	712	01-30-00	7:31p	1APA231.FLG
1APA231	INP	15,450	01-30-00	7:31p	1APA231.INP
1APA231	OUT	832	01-30-00	7:32p	1APA231.OUT
1APA231	PTI	8,173	01-30-00	7:32p	1APA231.PTI
1APA231	RST	112,188	01-30-00	7:32p	1APA231.RST
1APA231	VEC	38,112	01-30-00	7:32p	1APA231.VEC
1APB210	BAK	15,452	01-13-00	4:38p	1APB210.BAK

1APB210	FLG	712	01-30-00	6:56p	1APB210.FLG
1APB210	INP	15,451	01-30-00	6:56p	1APB210.INP
1APB210	OUT	832	01-13-00	4:39p	1APB210.OUT
1APB210	PTI	8,173	01-13-00	4:39p	1APB210.PTI
1APB210	RST	112,188	01-30-00	6:56p	1APB210.RST
1APB210	VEC	38,112	01-13-00	4:39p	1APB210.VEC
1APU238	BAK	15,452	01-13-00	4:34p	1APU238.BAK
1APU238	FLG	712	01-30-00	7:04p	1APU238.FLG
1APU238	INP	15,451	01-30-00	7:04p	1APU238.INP
1APU238	OUT	832	01-13-00	4:35p	1APU238.OUT
1APU238	PTI	8,173	01-13-00	4:35p	1APU238.PTI
1APU238	RST	112,188	01-30-00	7:04p	1APU238.RST
1APU238	VEC	38,112	01-13-00	4:35p	1APU238.VEC
1APU239	BAK	15,452	01-09-00	12:56p	1APU239.BAK
1APU239	FLG	712	01-30-00	7:05p	1APU239.FLG
1APU239	INP	15,452	01-30-00	7:05p	1APU239.INP
1APU239	OUT	832	01-09-00	12:57p	1APU239.OUT
1APU239	PTI	8,173	01-09-00	12:57p	1APU239.PTI
1APU239	RST	112,188	01-30-00	7:05p	1APU239.RST
1APU239	VEC	38,112	01-09-00	12:57p	1APU239.VEC
1APU240	BAK	15,452	01-09-00	12:58p	1APU240.BAK
1APU240	FLG	712	01-30-00	7:05p	1APU240.FLG
1APU240	INP	15,452	01-30-00	7:05p	1APU240.INP
1APU240	OUT	832	01-09-00	12:59p	1APU240.OUT
1APU240	PTI	8,173	01-09-00	12:59p	1APU240.PTI
1APU240	RST	112,188	01-30-00	7:06p	1APU240.RST
1APU240	VEC	38,112	01-09-00	12:59p	1APU240.VEC
1APU242	BAK	15,452	01-09-00	1:57p	1APU242.BAK
1APU242	FLG	712	01-30-00	7:06p	1APU242.FLG
1APU242	INP	15,452	01-30-00	7:06p	1APU242.INP
1APU242	OUT	832	01-09-00	1:58p	1APU242.OUT
1APU242	PTI	8,173	01-09-00	1:58p	1APU242.PTI
1APU242	RST	112,188	01-30-00	7:06p	1APU242.RST
1APU242	VEC	38,112	01-09-00	1:58p	1APU242.VEC
1ARA226	BAK	15,452	01-09-00	1:31p	1ARA226.BAK
1ARA226	FLG	712	01-30-00	6:57p	1ARA226.FLG
1ARA226	INP	15,452	01-30-00	6:57p	1ARA226.INP
1ARA226	OUT	832	01-09-00	1:33p	1ARA226.OUT
1ARA226	PTI	8,173	01-09-00	1:33p	1ARA226.PTI
1ARA226	RST	112,188	01-30-00	6:57p	1ARA226.RST
1ARA226	VEC	38,112	01-09-00	1:33p	1ARA226.VEC
1ASR90	BAK	15,451	01-07-00	1:53p	1ASR90.BAK
1ASR90	FLG	711	01-07-00	1:53p	1ASR90.FLG
1ASR90	INP	15,451	01-07-00	1:54p	1ASR90.INP
1ASR90	OUT	832	01-07-00	1:54p	1ASR90.OUT
1ASR90	PTI	8,173	01-07-00	1:54p	1ASR90.PTI
1ASR90	RST	112,187	01-30-00	7:33p	1ASR90.RST
1ASR90	VEC	38,112	01-07-00	1:54p	1ASR90.VEC
1ATC99	BAK	15,450	01-07-00	1:42p	1ATC99.BAK
1ATC99	FLG	711	01-30-00	6:52p	1ATC99.FLG
1ATC99	INP	15,450	01-30-00	6:52p	1ATC99.INP
1ATC99	OUT	832	01-07-00	1:42p	1ATC99.OUT
1ATC99	PTI	8,173	01-07-00	1:42p	1ATC99.PTI
1ATC99	RST	112,187	01-30-00	6:53p	1ATC99.RST
1ATC99	VEC	38,112	01-07-00	1:42p	1ATC99.VEC
1ATH229	BAK	15,453	01-30-00	6:35p	1ATH229.BAK
1ATH229	FLG	712	01-30-00	6:35p	1ATH229.FLG

1ATH229	INP	15,453	01-30-00	6:35p	1ATH229.INP
1ATH229	OUT	832	01-30-00	6:38p	1ATH229.OUT
1ATH229	PTI	8,173	01-30-00	6:38p	1ATH229.PTI
1ATH229	RST	112,188	01-30-00	6:39p	1ATH229.RST
1ATH229	VEC	38,112	01-30-00	6:38p	1ATH229.VEC
1ATH230	BAK	15,453	01-30-00	6:40p	1ATH230.BAK
1ATH230	FLG	712	01-30-00	6:40p	1ATH230.FLG
1ATH230	INP	15,453	01-30-00	6:42p	1ATH230.INP
1ATH230	OUT	832	01-30-00	6:49p	1ATH230.OUT
1ATH230	PTI	8,173	01-30-00	6:49p	1ATH230.PTI
1ATH230	RST	112,188	01-30-00	6:51p	1ATH230.RST
1ATH230	VEC	38,112	01-30-00	6:49p	1ATH230.VEC
1AU232	BAK	15,451	01-09-00	1:55p	1AU232.BAK
1AU232	FLG	712	01-30-00	7:00p	1AU232.FLG
1AU232	INP	15,451	01-30-00	7:00p	1AU232.INP
1AU232	OUT	832	01-09-00	1:56p	1AU232.OUT
1AU232	PTI	8,173	01-09-00	1:56p	1AU232.PTI
1AU232	RST	112,187	01-30-00	7:00p	1AU232.RST
1AU232	VEC	38,112	01-09-00	1:56p	1AU232.VEC
1AU233	BAK	15,451	01-09-00	12:43p	1AU233.BAK
1AU233	FLG	712	01-30-00	7:01p	1AU233.FLG
1AU233	INP	15,451	01-30-00	7:01p	1AU233.INP
1AU233	OUT	832	01-09-00	12:44p	1AU233.OUT
1AU233	PTI	8,173	01-09-00	12:44p	1AU233.PTI
1AU233	RST	112,187	01-30-00	7:01p	1AU233.RST
1AU233	VEC	38,112	01-09-00	12:44p	1AU233.VEC
1AU234	BAK	15,451	01-09-00	12:45p	1AU234.BAK
1AU234	FLG	712	01-30-00	7:01p	1AU234.FLG
1AU234	INP	15,451	01-30-00	7:01p	1AU234.INP
1AU234	OUT	832	01-09-00	12:46p	1AU234.OUT
1AU234	PTI	8,173	01-09-00	12:46p	1AU234.PTI
1AU234	RST	112,187	01-30-00	7:02p	1AU234.RST
1AU234	VEC	38,112	01-09-00	12:46p	1AU234.VEC
1AU236	BAK	15,451	01-09-00	12:47p	1AU236.BAK
1AU236	FLG	712	01-30-00	7:02p	1AU236.FLG
1AU236	INP	15,451	01-30-00	7:02p	1AU236.INP
1AU236	OUT	832	01-09-00	12:47p	1AU236.OUT
1AU236	PTI	8,173	01-09-00	12:47p	1AU236.PTI
1AU236	RST	112,187	01-30-00	7:02p	1AU236.RST
1AU236	VEC	38,112	01-09-00	12:47p	1AU236.VEC
1AU238	BAK	15,451	01-09-00	12:49p	1AU238.BAK
1AU238	FLG	712	01-30-00	7:03p	1AU238.FLG
1AU238	INP	15,451	01-30-00	7:03p	1AU238.INP
1AU238	OUT	832	01-09-00	12:50p	1AU238.OUT
1AU238	PTI	8,173	01-09-00	12:50p	1AU238.PTI
1AU238	RST	112,187	01-30-00	7:03p	1AU238.RST
1AU238	VEC	38,112	01-09-00	12:50p	1AU238.VEC
1B1CS137	BAK	15,448	01-28-00	10:35a	1B1CS137.BAK
1B1CS137	FLG	712	01-28-00	10:35a	1B1CS137.FLG
1B1CS137	INP	15,448	01-28-00	10:39a	1B1CS137.INP
1B1CS137	OUT	832	01-28-00	10:39a	1B1CS137.OUT
1B1CS137	PTI	8,173	01-28-00	10:39a	1B1CS137.PTI
1B1CS137	RST	112,189	01-28-00	10:40a	1B1CS137.RST
1B1CS137	VEC	38,112	01-28-00	10:39a	1B1CS137.VEC
1B1SR90	BAK	15,449	01-11-00	9:43a	1B1SR90.BAK
1B1SR90	FLG	711	01-28-00	10:44a	1B1SR90.FLG
1B1SR90	INP	15,448	01-28-00	10:44a	1B1SR90.INP

1B1SR90	OUT	832	01-11-00	9:46a	1B1SR90.OUT
1B1SR90	PTI	8,173	01-11-00	9:46a	1B1SR90.PTI
1B1SR90	RST	112,188	01-28-00	10:44a	1B1SR90.RST
1B1SR90	VEC	38,112	01-11-00	9:46a	1B1SR90.VEC
1B2CS137	BAK	15,448	01-28-00	10:41a	1B2CS137.BAK
1B2CS137	FLG	712	01-28-00	10:41a	1B2CS137.FLG
1B2CS137	INP	15,448	01-28-00	10:43a	1B2CS137.INP
1B2CS137	OUT	832	01-28-00	10:43a	1B2CS137.OUT
1B2CS137	PTI	8,173	01-28-00	10:43a	1B2CS137.PTI
1B2CS137	RST	112,189	01-28-00	10:44a	1B2CS137.RST
1B2CS137	VEC	38,112	01-28-00	10:43a	1B2CS137.VEC
1B2SR90	BAK	15,448	01-11-00	9:47a	1B2SR90.BAK
1B2SR90	FLG	711	01-28-00	10:55a	1B2SR90.FLG
1B2SR90	INP	15,448	01-28-00	10:55a	1B2SR90.INP
1B2SR90	OUT	832	01-11-00	9:48a	1B2SR90.OUT
1B2SR90	PTI	8,173	01-11-00	9:48a	1B2SR90.PTI
1B2SR90	RST	112,188	01-28-00	10:56a	1B2SR90.RST
1B2SR90	VEC	38,112	01-11-00	9:48a	1B2SR90.VEC
1B3CS137	BAK	15,451	01-13-00	4:27p	1B3CS137.BAK
1B3CS137	FLG	712	01-28-00	10:45a	1B3CS137.FLG
1B3CS137	INP	15,449	01-28-00	10:45a	1B3CS137.INP
1B3CS137	OUT	832	01-13-00	4:27p	1B3CS137.OUT
1B3CS137	PTI	8,173	01-13-00	4:27p	1B3CS137.PTI
1B3CS137	RST	112,189	01-28-00	10:45a	1B3CS137.RST
1B3CS137	VEC	38,112	01-13-00	4:27p	1B3CS137.VEC
1B3SR90	BAK	15,448	01-11-00	9:49a	1B3SR90.BAK
1B3SR90	FLG	711	01-28-00	10:56a	1B3SR90.FLG
1B3SR90	INP	15,449	01-28-00	10:56a	1B3SR90.INP
1B3SR90	OUT	832	01-11-00	9:50a	1B3SR90.OUT
1B3SR90	PTI	8,173	01-11-00	9:50a	1B3SR90.PTI
1B3SR90	RST	112,188	01-28-00	10:56a	1B3SR90.RST
1B3SR90	VEC	38,112	01-11-00	9:50a	1B3SR90.VEC
1B5CS137	BAK	15,451	01-13-00	4:30p	1B5CS137.BAK
1B5CS137	FLG	712	01-28-00	10:46a	1B5CS137.FLG
1B5CS137	INP	15,449	01-28-00	10:46a	1B5CS137.INP
1B5CS137	OUT	832	01-13-00	4:30p	1B5CS137.OUT
1B5CS137	PTI	8,173	01-13-00	4:30p	1B5CS137.PTI
1B5CS137	RST	112,189	01-28-00	10:46a	1B5CS137.RST
1B5CS137	VEC	38,112	01-13-00	4:30p	1B5CS137.VEC
1B5SR90	BAK	15,449	01-11-00	9:51a	1B5SR90.BAK
1B5SR90	FLG	711	01-28-00	10:56a	1B5SR90.FLG
1B5SR90	INP	15,449	01-28-00	10:56a	1B5SR90.INP
1B5SR90	OUT	832	01-11-00	9:52a	1B5SR90.OUT
1B5SR90	PTI	8,173	01-11-00	9:52a	1B5SR90.PTI
1B5SR90	RST	112,188	01-28-00	10:57a	1B5SR90.RST
1B5SR90	VEC	38,112	01-11-00	9:52a	1B5SR90.VEC
1B6CS137	BAK	15,451	01-13-00	4:31p	1B6CS137.BAK
1B6CS137	FLG	712	01-28-00	10:46a	1B6CS137.FLG
1B6CS137	INP	15,449	01-28-00	10:46a	1B6CS137.INP
1B6CS137	OUT	832	01-13-00	4:31p	1B6CS137.OUT
1B6CS137	PTI	8,173	01-13-00	4:31p	1B6CS137.PTI
1B6CS137	RST	112,189	01-28-00	10:46a	1B6CS137.RST
1B6CS137	VEC	38,112	01-13-00	4:31p	1B6CS137.VEC
1B6SR90	BAK	15,449	01-11-00	9:53a	1B6SR90.BAK
1B6SR90	FLG	711	01-28-00	10:57a	1B6SR90.FLG
1B6SR90	INP	15,449	01-28-00	10:57a	1B6SR90.INP
1B6SR90	OUT	832	01-11-00	9:55a	1B6SR90.OUT

1B6SR90	PTI	8,173	01-11-00	9:55a	1B6SR90.PTI
1B6SR90	RST	112,188	01-28-00	10:57a	1B6SR90.RST
1B6SR90	VEC	38,112	01-11-00	9:55a	1B6SR90.VEC
1BCS137	BAK	15,451	01-13-00	4:32p	1BCS137.BAK
1BCS137	FLG	712	01-28-00	10:47a	1BCS137.FLG
1BCS137	INP	15,449	01-28-00	10:47a	1BCS137.INP
1BCS137	OUT	832	01-13-00	4:33p	1BCS137.OUT
1BCS137	PTI	8,173	01-13-00	4:33p	1BCS137.PTI
1BCS137	RST	112,188	01-28-00	10:47a	1BCS137.RST
1BCS137	VEC	38,112	01-13-00	4:33p	1BCS137.VEC
1BPA231	BAK	15,451	01-09-00	12:36p	1BPA231.BAK
1BPA231	FLG	712	01-30-00	6:32p	1BPA231.FLG
1BPA231	INP	15,448	01-30-00	6:32p	1BPA231.INP
1BPA231	OUT	832	01-09-00	12:38p	1BPA231.OUT
1BPA231	PTI	8,173	01-09-00	12:38p	1BPA231.PTI
1BPA231	RST	112,188	01-30-00	6:32p	1BPA231.RST
1BPA231	VEC	38,112	01-09-00	12:38p	1BPA231.VEC
1BPB210	BAK	15,450	01-13-00	4:40p	1BPB210.BAK
1BPB210	FLG	712	01-30-00	6:19p	1BPB210.FLG
1BPB210	INP	15,449	01-30-00	6:19p	1BPB210.INP
1BPB210	OUT	832	01-13-00	4:41p	1BPB210.OUT
1BPB210	PTI	8,173	01-13-00	4:41p	1BPB210.PTI
1BPB210	RST	112,188	01-30-00	6:20p	1BPB210.RST
1BPB210	VEC	38,112	01-13-00	4:41p	1BPB210.VEC
1BPU242	BAK	15,451	01-09-00	2:01p	1BPU242.BAK
1BPU242	FLG	712	01-30-00	6:32p	1BPU242.FLG
1BPU242	INP	15,450	01-30-00	6:32p	1BPU242.INP
1BPU242	OUT	832	01-09-00	2:03p	1BPU242.OUT
1BPU242	PTI	8,173	01-09-00	2:03p	1BPU242.PTI
1BPU242	RST	112,188	01-30-00	6:33p	1BPU242.RST
1BPU242	VEC	38,112	01-09-00	2:03p	1BPU242.VEC
1BRA226	BAK	15,450	01-09-00	1:34p	1BRA226.BAK
1BRA226	FLG	712	01-30-00	6:20p	1BRA226.FLG
1BRA226	INP	15,450	01-30-00	6:20p	1BRA226.INP
1BRA226	OUT	832	01-09-00	1:35p	1BRA226.OUT
1BRA226	PTI	8,173	01-09-00	1:35p	1BRA226.PTI
1BRA226	RST	112,188	01-30-00	6:21p	1BRA226.RST
1BRA226	VEC	38,112	01-09-00	1:35p	1BRA226.VEC
1BSR90	BAK	15,451	01-07-00	1:47p	1BSR90.BAK
1BSR90	FLG	711	01-28-00	10:58a	1BSR90.FLG
1BSR90	INP	15,449	01-28-00	10:58a	1BSR90.INP
1BSR90	OUT	832	01-07-00	1:52p	1BSR90.OUT
1BSR90	PTI	8,173	01-07-00	1:52p	1BSR90.PTI
1BSR90	RST	112,187	01-28-00	10:58a	1BSR90.RST
1BSR90	VEC	38,112	01-07-00	1:52p	1BSR90.VEC
1BTH230	BAK	15,451	01-30-00	6:21p	1BTH230.BAK
1BTH230	FLG	712	01-30-00	6:21p	1BTH230.FLG
1BTH230	INP	15,451	01-30-00	6:22p	1BTH230.INP
1BTH230	OUT	832	01-30-00	6:30p	1BTH230.OUT
1BTH230	PTI	8,173	01-30-00	6:30p	1BTH230.PTI
1BTH230	RST	112,188	01-30-00	6:31p	1BTH230.RST
1BTH230	VEC	38,112	01-30-00	6:30p	1BTH230.VEC
BIOAC_RR	txt	1,718	01-05-00	12:11p	BIOAC_RR.txt
Def_RR	txt	3,782	09-13-99	2:27p	Def_RR.txt
FtranRR	txt	1,847	01-05-00	12:31p	FtranRR.txt
Grdfnew	dat	3,528	01-09-00	2:20p	Grdfnew.dat
285 file(s)		7,647,648 bytes			