



 **ENGINEERING CALCULATION**

RESRAD-Onsite Probabilistic Analysis - Industrial Use Scenario


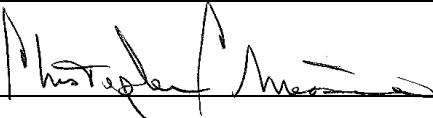
Oyster Creek Station

ENG-OCS-007

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1.0 PURPOSE

This calculation identifies sensitive input parameters (i.e., those input parameters that produce a significant change in the calculated dose with changes in their value) in the modeling of the Industrial Use scenario using the RESRAD-Onsite code (version 7.2). Identification of sensitive input parameters is a necessary process to account for uncertainty in input values. The uncertainty associated with sensitive input parameters is addressed in subsequent derived concentration guideline levels (DCGL) calculations by determining and assigning reasonably conservative input values based on the results of RESRAD-Onsite probabilistic analyses. Thus, the results of this calculation support the development of DCGL values (based on the Industrial Use scenario) for soil in open land areas at the Oyster Creek Station (OCS) site.

2.0 APPLICABILITY

This calculation addresses only the sensitivity analysis for input parameters for the Industrial Use scenario used to develop the DCGL values for soils at the OCS site.

3.0 REFERENCES

- 3.1 ENG-AP-02, *Verification of Software Operability*
- 3.2 ANL/EAD-4, User's Manual for RESRAD Version 6, U.S. Department of Energy – Argonne National Laboratory, July 2001
- 3.3 ANL/EVS/TM-18/1, *RESRAD-Onsite 7.2 User's Guide*, April 2018
- 3.4 NUREG/CR-7267, *Default Parameter Values and Distribution in RESRAD-ONSITE V7.2, RESRAD-BUILD V3.5, and RESRAD-OFFSITE V4.0 Computer Codes*, February 2020
- 3.5 NUREG/CR-5512, Volume 3, *Residual Radioactive Contamination from Decommissioning: Parameter Analysis, Draft Report for Comment*, October 1999
- 3.6 NUREG/CR-6697, *Development of Probabilistic RESRAD 6.0 and RESRAD-BUILD 3.0 Computer Codes*, Nov. 2000
- 3.7 *Radionuclide Selection for DCGL Development-Oyster Creek Station Site Characterization Project*, January 2022
- 3.8 *Oyster Creek Station Historical Site Assessment*, Rev. 2, November 2021
- 3.9 *Hydrogeologic Investigation Report*, GHD, January 2017
- 3.10 Health Physics, Vol. 39, *Regional and Site-Specific Absolute Humidity Data for Use in Tritium Dose Calculations*, 1980
- 3.11 Yu, C. et al., *Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil*, Argonne National Laboratory-Environmental Assessment and Information Sciences Division, April 1993
- 3.12 ANL/EVS/TM-14/4, *Data Collection Handbook to Support Modeling the Impacts of Radioactive Material in Soil and Building Structures*, Yu, C. et al., Argonne National Laboratory-Environmental Science Division, September 2015

4.0 METHOD OF CALCULATION

The operability of the RESRAD-Onsite 7.2 computer code was verified on each computer used for code executions in accordance with BHI Energy Engineering procedure ENG-AP-02, *Verification of Software Operability* [3.1]. The RESRAD code has undergone extensive review, benchmarking, verification, and validation [3.2]. The *RESRAD-Onsite 7.2 User's Guide* [3.3] was used as a reference for code use.

The RESidual RADioactivity (RESRAD) model and computer code was developed at Argonne National Laboratory as a multifunctional tool to assist in developing radiological criteria for assessing the dose associated with residual radioactive material. The RESRAD-Onsite computer code is a pathway analysis model designed to evaluate the potential radiological dose associated with residual radioactive material. RESRAD-Onsite input parameters allow site-specific modeling through entry of site data, such as contaminated zone area and depth, site soil hydrogeologic characteristics, and site soil strata information. Also, the user can evaluate radiation exposure under different exposure scenarios by selecting scenario-specific exposure pathways.

The RESRAD-Onsite code includes probabilistic modules that permit the user to perform a sensitivity analysis to identify parameters that have the greatest impact on dose. The probabilistic modules allow the evaluation of dose as a function of parameter distributions.

The approach taken in this calculation consists of two primary phases: the selection of input parameter values and performing RESRAD-Onsite code executions.

Input parameters were treated as either deterministic (a single value is assigned) or stochastic (a parameter distribution is assigned). Treatment depended on parameter type, availability of site-specific data, and the relevance of the parameter in the dose calculations. Behavioral and metabolic parameters were treated as deterministic and were assigned values from NUREG/CR-5512 [3.5], NUREG/CR-7267, or the RESRAD User Manual. Physical parameters for which site-specific data are unavailable were assigned parameter distributions from NUREG/CR-7267 or assigned a deterministic value from either NUREG/CR-5512 or the RESRAD User's Manual.

The RESRAD-Onsite Probabilistic Output Report provides regression and correlation coefficients for the average doses at the user defined evaluation times. The Partial Rank Correlation Coefficient (PRCC) has been used to identify sensitive parameters. NUREG/CR-7267 and NUREG/CR-6697 [3.6] recommend the use of the PRCC for cases where a non-linear relationship exists, such as in the case for the Industrial Use Scenario. PRCC values greater than zero (positive value) or less than zero (negative value) identify whether sensitive parameters are positively or negatively correlated to dose, respectively.

The criterion for sensitivity used in this calculation was a PRCC value with an absolute value greater than 0.25. To address the uncertainties associated with the input parameters identified as "sensitive," the 25th percentile value of the parameter's distribution was selected for sensitive parameters that had a negative PRCC value, and the 75th percentile value of the parameter's distribution was selected for sensitive parameters that had a positive PRCC value. The 75th percentile and 25th percentile values are recommended as reasonably conservative input values for calculations of DCGL values for open land areas at the OCS site. The approach of assigning 25th and 75th percentile values of a sensitive parameter's distribution to account for uncertainty in DCGL values has been accepted in past decommissioning projects (e.g., Yankee Rowe, Zion, Connecticut Yankee, Humboldt Bay, Fort Calhoun Station, and SMUD) by the U.S. Nuclear Regulatory Commission (NRC) and State regulators.

5.0 INPUT and CALCULATIONS

5.1 Radionuclide-of-concern (ROC)

5.1.1 A site-specific suite of ROCs has been identified for the OCS site [3.7]. OCS ROCs are listed in Table 1.

NOTE: RESRAD-Onsite 7.2 automatically accounts for progeny radionuclides with input for several of the OCS ROCs. Progeny radionuclides are also listed in Table 1).

Table 1: Radionuclides-of-Concern for input to RESRAD-Onsite:

ROC ^a	Progeny ^b	ROC ^a	Progeny ^b
Am-241	Np-237, Th-229, U-233	Nb-94	---
C-14	---	Ni-63	---
Cm-243	Ac-227, Am-243, Pa-231, Pu-239, U-235	Np-237	Th-229, U-233
Cm-244	Pu-240, Ra-228, Th-228, Th-232, U-236	Pu-238	Pb-210, Po-210, Ra-226, Th-230, U-234
Cs-137	---	Pu-239	Ac-227, Pa-231, U-235
Co-60	---	Pu-240	Ra-228, Th-228, Th-232, U-236
Eu-152	Gd-152	Pu-241	Am-241, Np-237, Th-229, U-233
Eu-154	---	Sb-125	Te-125m
Fe-55	---	Sr-90	---
H-3	---	Tc-99	---
Mn-54	---		

^a ROC = radionuclide-of-concern identified for the OCS site.

^b Included automatically with input of parent ROC.

- 5.2 Exposure Scenario: The exposure scenario modelled in the sensitivity analyses is an Industrial Use Scenario. The average member of the critical group is a hypothetical full-time industrial site worker assigned outdoor tasks and who also catches and consumes fish from the intake/discharge canal during off-hours. The pathways used to estimate human radiation exposure resulting from residual radioactivity in the soil for this scenario are:
- Direct external radiation exposure pathway
 - Inhalation exposure pathway
 - Ingestion exposure via aquatic food from the intake/discharge canal
 - Inadvertent ingestion of contaminated soil
- 5.3 Time fractions: The industrial worker is assumed to spend 7h per day on outdoor tasks and 1h per day for indoor work breaks (i.e., 15 min morning break, 30 min lunch, and 15 min afternoon break). Under this assumption, the worker spends 35h/week performing outdoor tasks and 5h/week indoors on work breaks. Over a 50-week occupational year (i.e., 50 weeks), the worker spends (35h/week * 50weeks =) 1750h outdoors at the industrial site and (5h/week * 50weeks =) 250 h indoors at the site. A calendar year has (24h/d * 365.25d =) 8766h.
- Fraction of calendar year off-site = (8766h - 2000h)/8766h = 0.77 (no exposure to radioactive material at the site during this time)
 - Fraction of calendar year outdoors at the site = 1750h/8766h = **0.20** (receives site radiation exposure)
 - Fraction of calendar year indoors at the site = 250h/8766h = **0.03** (receives site radiation exposure)
- 5.4 The industrial worker also fishes in the canal during off-hours. The dietary fraction of contaminated aquatic food is evaluated using a distribution from NUREG/CR-7267.
- 5.5 Contaminated zone (CZ): The OCS yard area within the perimeter fence, 124,400 m² (based on CAD drawing of OCS PA) is used as input for the area of the CZ.

5.5.1 Plant-related contamination has been reported at depth in OCS documents. Below are a few examples:

- *Soil samples collected between the MFOT and the RCA fence in late summer 1999 showed detectable radioactivity below the release criteria to a depth of 3 feet (HSA [3.8], section 7.2.1.5.4)*
- *The radionuclides cobalt-60 and cesium-137 were identified down to a depth of almost 13 feet (HSA, section 7.2.1.2.7)*
- *Highest levels of activity were found in the top meter of soil however activity was measured as far down as ~ 4 meters. (OC Contaminated Soil Volumes for Decommissioning Cost Estimates; RE: Old Radwaste Building – Waste Surge Tank Release)*

Using 13 feet as the maximum depth for subsurface plant-related contamination, the minimum thickness of the CZ is set to the scenario default value, 6-inches (0.1524m), and the maximum thickness is set to 3.96 meters, which supports a uniform distribution with the minimum value = 0.1524 m, a maximum value = 3.96 m, and a mean value = 2.06 m.

5.5.2 Soil type: Sand was selected as the appropriate soil type for the CZ based on information provided in the 2017 Hydrogeologic Investigation Report [3.9].

5.6 The parameter “length parallel to the aquifer flow” is defined as is the maximum horizontal distance measured in the CZ, from its up-gradient edge to the down-gradient edge, along the direction of the groundwater flow in the underlying aquifer. The area of the CZ was approximated by a circle with an area of 124,400 m² (the area of the OCS PA). The diameter of the circle with an area equal to 124,400 m² was used as input for the length parallel to the aquifer parameter: 398 m.

5.7 Unsaturated zone (UZ):

5.7.1 The depth to ground water at the OCS site ranges from 5 ft to 20 ft [3.9]. Using that information and the minimum thickness of the CZ from step 5.5.1, the maximum thickness of the UZ is set to 19.5 ft (5.94m), which represents the depth from 6 inches to 20 ft (the upper end of the groundwater depth range), and the minimum thickness is set to 4.5 ft (1.37 m), which represents the depth from 6 inches to 5 ft (the lower end of the groundwater depth range). This allows a uniform distribution with a minimum value = 1.37 m, a maximum value = 5.94 m, and a mean = 3.65 m as RESRAD input for thickness of the UZ.

5.7.2 Sand was selected as the appropriate soil type for the UZ based on information provided in the 2017 *Hydrogeologic Investigation Report*.

5.8 Saturated zone (SZ):

5.8.1 Sand was selected as the appropriate soil type for the SZ based on information provided in the 2017 *Hydrogeologic Investigation Report*.

5.8.2 Hydraulic gradient in portions of the site range from 0.01 to 0.04 ft/ft [3.9]. This information allows a uniform distribution with a minimum value = 0.01, a maximum value = 0.04, and a mean value = 0.025 as RESRAD-Onsite input.

- 5.9 The hydraulic conductivity for the site is reported as 24.62 ft/day [3.9]. Conversion to units required for RESRAD-Onsite input yields a hydraulic conductivity value = 2741 m/y.
- 5.10 The value assigned as input for effective porosity = 0.25 [3.9]
- 5.11 Input for the “watershed area for nearby stream or pond” parameter was determined by summing the areas of sub-watersheds within the Forked River/Oyster Creek Watershed (information taken from NJDEP BGIS, NJ GeoWeb site).

Sub-watersheds within the Forked River/Oyster Creek watershed:

Forked River NB (above old RR grade)	5,520.85 acres
Forked River NB (below old RR grade)	4,629.91 acres
Forked River (below NB incl Mid/South Br)	6,459.25 acres
Oyster Creek (above Rt 532)	4,784.77 acres
Oyster Creek (below Rt 532)	<u>3,542.30 acres</u>
Total area:	24,937.1 acres = 1.01E+08 m ²

- 5.12 The ground surface of the OCS site is described as “relatively level” [3.9]. Based on that description, an erosion rate equal to 6.0x10⁻⁴ m/y was selected for the OCS site as suitable for the Industrial Use scenario. The erosion rate for a “relatively level” site would not be expected to exceed 6.0x10⁻⁴ m/y.
- 5.13 Input value for annual precipitation was derived from information for the period from 2015 through 2020 (data from Annual Report on the Meteorological Program at Oyster Creek Generating Station for 2015 – 2020).

year	Total Precipitation	
	in/y	m/y
2015	4.62E+01	1.17E+00
2016	2.79E+01	7.09E-01
2017	4.41E+01	1.12E+00
2018	7.63E+01	1.94E+00
2019	7.27E+01	1.85E+00
2020	6.33E+01	1.61E+00
Average	5.51E+01	1.40E+00

- 5.14 Figure 1 in *Regional and Site-Specific Absolute Humidity Data for Use in Tritium Dose Calculations* [3.10] provides mean absolute humidity by geographical regions within the U.S. The figure shows that the OCS site falls inside the area where the mean absolute humidity value is 6.6 g/m³. That value was selected for the RESRAD humidity parameter.
- 5.15 Field capacity defines the relationship of field capacity (residual water content) to effective porosity. The field capacity is the ratio of the volume of water retained in the soil sample, after all drainage has ceased, to the total volume of the soil sample. Equation 4.4 in NUREG/CR-7267 relates total and effective porosities to field capacity as follows:

$$\text{Effective Porosity} = \text{Total Porosity} - \text{Field Capacity}$$

Rearranging this equation: Field Capacity = Total Porosity - Effective Porosity

For the CZ, UZ, and SZ, the mean total porosity for sand is 0.43 [3.4] and the effective porosity is 0.25 [3.9]. Therefore, the field capacity for these zones is approximately:

$$\text{Field Capacity} = 0.43 - 0.25 = 0.18$$

- 5.16 Runoff Coefficient (Cr) was calculated based on information in Table 10.1 of 1993 *Data Collection Handbook* [3.11], which provides the equation for calculating Cr, and defines and provides values for the equation terms c_1 , c_2 , and c_3 . For the OCS site, $Cr = 0.2$.
- 5.17 Inhalation Rate: The distribution from NUREG/CR-7267 was selected as input for daily inhalation rate.
- 5.18 Soil Ingestion Rate: The distribution from NUREG/CR-7267 was selected as input for soil ingestion.
- 5.19 Wind speed for OGS is 7 mph (= 3.13 m/s) based on data from 7/2012 – 4/2018 (https://www.windfinder.com/windstatistics/oyster_creek_barnegat_bay)
- 5.20 Table 2 summarizes the input values/distribution and the reference source for each input parameter.

6.0 RESULTS

- 6.1 RESRAD-Onsite 7.2 was executed for each ROC using the input values provided in Table 2. An absolute PRCC value ≥ 0.25 was used as the criterion for identifying sensitive input parameters.
- 6.2 Table 3 summarizes the sensitive parameters for each ROC. Selected pages from the RESRAD-Onsite 7.2 Uncertainty Reports from each code execution are provided in Appendix A. RESRAD-Onsite parameters identified as sensitive are highlighted in yellow.
- 6.3 Table 4 summarizes the 25th and 75th percentile values for each identified sensitive input parameter for each ROC.

Note: For the sensitive parameters, the 75th percentile value of the distribution was selected when the absolute value of the PRCC was ≥ 0.25 and the PRCC had a positive value. The 25th percentile value was selected when the absolute value of the PRCC value was ≥ 0.25 but had a negative value.

7.0 CONCLUSIONS

- 7.1 Sensitive input parameters varied among the ROCs and included parameters such as
 - Inhalation rate
 - Mass loading for inhalation
 - Soil ingestion
 - Thickness of CZ
 - K_d in the CZ
 - K_d in the UZ
 - K_d in the SZ
 - External shielding factor
 - Evapotranspiration coefficient
 - Bioaccumulation for fish
 - Contaminated fraction of aquatic food
- 7.2 The 25th and 75th percentile values for sensitive input parameters (presented in Table 4) provide reasonably conservative input for DCGL development.

Table 2. Summary of Values for RESRAD Input Parameters

Values and Bases for RESRAD-Onsite Parameters for Probabilistic Analysis Industrial Use Scenario										
RESRAD Exposure Pathways										
External Gamma										Open
Inhalation										Open
Plant Ingestion										Close
Meat Ingestion										Close
Milk Ingestion										Close
Aquatic Foods										Open
Drinking Water										Close
Soil Ingestion										Open
Radon										Close
Parameter (unit)	Type ^a	Priority ^b	Treatment ^c	Value/Distribution	Basis	Distribution's Statistical Parameters ^d				Median/ Mean
						1	2	3	4	
Soil Concentrations										
Basic radiation dose limit (mrem/y)	P	3	D	25	10 CFR 20.1402	NR	NR	NR	NR	
Initial principal radionuclide (pCi/g)	P	2	D	1	Unit Value	NR	NR	NR	NR	
Distribution coefficients (sand soil type assigned to contaminated, unsaturated, and saturated zones) (cm ³ /g)										
Ac-227	P	1	S	Truncated lognormal-n	NUREG/CR-7267	7.44	1.1	0.001	0.999	1700
Am-241	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	6.91	1.95	0.001	0.999	1000
Am-243	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	6.91	1.95	0.001	0.999	1000
C-14	P	1	S	Truncated lognormal-n	NUREG/CR-7267	3.04	1.82	0.001	0.999	21
Cm-243	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	8.13	2.64	0.001	0.999	3400
Cm-244	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	8.13	2.64	0.001	0.999	3400
Co-60	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	5.56	2.89	0.001	0.999	260
Cs-137	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	6.27	1.79	0.001	0.999	530
Eu-152	P	1	S	Truncated lognormal-n	NUREG/CR-7267	6.86	4.01	0.001	0.999	955
Eu-154	P	1	S	Truncated lognormal-n	NUREG/CR-7267	6.86	4.01	0.001	0.999	955
Fe-55	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	5.77	0	0.001	0.999	320
Gd-152	P	1	S	Truncated lognormal-n	NUREG/CR-7267	1.61	3.22	0.001	0.999	5
H-3	P	1	S	Truncated lognormal-n	NUREG/CR-7267	-2.81	0.5	0.001	0.999	0.06
Mn-54	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	6.89	2.64	0.001	0.999	980
Nb-94	P	1	S	Truncated lognormal-n	NUREG/CR-7267	7.31	1.39	0.001	0.999	1500
Ni-63	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	4.87	2.3	0.001	0.999	130
Np-237	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	2.64	1.39	0.001	0.999	14
Pa-231	P	1	S	Truncated lognormal-n	NUREG/CR-7267	7.6	1.1	0.001	0.999	2000
Pb-210	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	5.39	1.39	0.001	0.999	220
Po-210	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	4.61	1.79	0.001	0.999	100
Pu-238	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	5.99	1.39	0.001	0.999	400
Pu-239	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	5.99	1.39	0.001	0.999	400
Pu-240	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	5.99	1.39	0.001	0.999	400
Pu-241	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	5.99	1.39	0.001	0.999	400
Ra-226	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	8.04	2.08	0.001	0.999	3100
Ra-228	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	8.04	2.08	0.001	0.999	3100
Sb-125	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	2.83	1.79	0.001	0.999	17

Values and Bases for RESRAD-Onsite Parameters for Probabilistic Analysis										
Industrial Use Scenario										
Sr-90	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	3.09	1.79	0.001	0.999	22
Tc-99	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	-3.22	1.1	0.001	0.999	0.04
Te-125m	P	1	S	Truncated lognormal-n	NUREG/CR-7267	6.31	3.22	0.001	0.999	550
Th-228	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	6.55	2.4	0.001	0.999	700
Th-229	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	6.55	2.4	0.001	0.999	700
Th-230	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	6.55	2.4	0.001	0.999	700
Th-232	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	6.55	2.4	0.001	0.999	700
U-233	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	4.7	2.48	0.001	0.999	110
U-234	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	4.7	2.48	0.001	0.999	110
U-235	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	4.7	2.48	0.001	0.999	110
U-236	P	1	S	Truncated lognormal-n	ANL/EVS/TM-14/4	4.7	2.48	0.001	0.999	110
Initial concentration of radionuclides present in groundwater (pCi/l)	P	3	D	0	Ground water uncontaminated	NR	NR	NR	NR	
Calculation Times										
Time since placement of material (y)	P	3	D	0		NR	NR	NR	NR	
Time for calculations (y)	P	3	D	1, 3, 10, 30, 100, 300, 1000	RESRAD Default	NR	NR	NR	NR	
Contaminated Zone										
Area of contaminated zone (m ²)	P	2	D	124,400	OCGS PA	NR	NR	NR	NR	
Thickness of contaminated zone (m)	P	2	S	Uniform	Minimum thickness assumed equal to depth of scenario-defined soil mixing layer (NUREG/CR-5512); maximum thickness based on subsurface soil data in OCGS HSA (section 7.2.1.2.7)	0.1524	3.96			2.06
Length parallel to aquifer flow (m)	P	2	D	398	Site-specific – assumed diameter of a circle with an area = OCGS contaminated zone, 124,400 m ²	NR	NR	NR	NR	
Cover and Contaminated Zone Hydrological Data										
Cover depth (m)	P	2	D	0	No cover	NR	NR	NR	NR	
Density of contaminated zone (g/cm ³)	P	1	S	Bounded Normal	NUREG/CR-7267 distribution for site soil type - sand.	1.5105	0.159	1.019	2.002	1.5105
Contaminated zone erosion rate (m/y)	P	2	D	6E-04	NUREG/CR-7267; assumed erosion rate for site with shallow slope	NR	NR	NR	NR	
Contaminated zone total porosity	P	2	S	Bounded Normal	NUREG/CR-7267 distribution for site soil type - sand	0.43	0.06	0.2446	0.6154	0.43
Contaminated zone field capacity	P	3	D	0.18	Value based on site-specific soil type (sand); calculated using equation in NUREG/CR-7267	NR	NR	NR	NR	
Contaminated zone hydraulic conductivity (m/y)	P	2	D	2741	2017 <i>Hydrogeologic Investigation Report</i>	NR	NR	NR	NR	
Contaminated zone b parameter	P	2	S	Bounded Log Normal n	NUREG/CR-7267 distribution for site soil type - sand	-0.0253	0.216	0.501	1.90	0.975

Values and Bases for RESRAD-Onsite Parameters for Probabilistic Analysis										
Industrial Use Scenario										
Humidity in air (g/m ³)	P	3	D	6.6	Figure 1 in <i>Regional and Site-Specific Absolute Humidity Data for Use in Tritium Dose Calculations</i>	NR	NR	NR	NR	
Evapotranspiration coefficient	P	2	S	Uniform	NUREG/CR-7267	0.5	0.75	NR	NR	0.625
Average annual wind speed (m/s)	P	2	D	3.13	Internet search: https://www.windfinder.com/windstatistics/oyster_creek_barnegat_bay	NR	NR	NR	NR	
Precipitation (m/y)	P	2	D	1.4	<i>Annual Report on the Meteorological Program at Oyster Creek Generating Station</i> – average annual precipitation for 2015 through 2020	NR	NR	NR	NR	
Irrigation (m/y)	B	3	D	0.2	RESRAD default	NR	NR	NR	NR	
Irrigation mode	B	3	D	Overhead	Overhead irrigation is common practice for crops in U.S.	NR	NR	NR	NR	
Runoff coefficient	P	2	D	0.2	Value determined using methodology described in <i>Data Collection Handbook</i> and NUREG/CR-7267	NR	NR	NR	NR	
Watershed area for nearby stream or pond (m ²)	P	3	D	1.01E+08	NJ-GeoWeb (NJDEP BGIS)	NR	NR	NR	NR	
Accuracy for water/soil computations	-	3	D	1.00E-03	RESRAD Default	NR	NR	NR	NR	
Saturated Zone Hydrological Data										
Density of saturated zone (g/cm ³)	P	1	S	Bounded Normal	NUREG/CR-7267 Table C-1, distribution for site soil type - sand	1.5105	0.159	1.019	2.002	1.5105
Saturated zone total porosity	P	1	S	Bounded Normal	NUREG/CR-7267 distribution for site soil type - sand	0.43	0.06	0.2446	0.6154	0.43
Saturated zone effective porosity	P	1	D	0.25	2017 <i>Hydrogeologic Investigation Report</i>	NR	NR	NR	NR	
Saturated zone field capacity	P	3	D	0.18	Value based on site-specific soil type (sand); calculated using equation in NUREG/CR-7267	NR	NR	NR	NR	
Saturated zone hydraulic conductivity (m/y)	P	1	D	2741	2017 <i>Hydrogeologic Investigation Report</i>	NR	NR	NR	NR	
Saturated zone hydraulic gradient	P	2	S	Uniform	2017 <i>Hydrogeologic Investigation Report</i> (section 5.1.4)	0.01	0.04			0.025
Saturated zone b parameter	P	2	S	Bounded Log Normal n	NUREG/CR-7267 distribution for site soil type - sand	- 0.0253	0.216	0.501	1.90	0.975
Water table drop rate (m/y)	P	3	D	1.00E-03	RESRAD Default	NR	NR	NR	NR	
Well pump intake depth (m below water table)	P	2	D	10	RESRAD Default	NR	NR	NR	NR	
Model: Nondispersion (ND) or Mass-Balance (MB)	P	3	D	ND	ND model recommended for contaminant areas >1,000 m ²	NR	NR	NR	NR	

Values and Bases for RESRAD-Onsite Parameters for Probabilistic Analysis										
Industrial Use Scenario										
Well pumping rate (m ³ /y)	P	2		N/A	Input not required – drinking water pathway inactive					
Unsaturated Zone Hydrological Data										
Number of unsaturated zone strata	P	3	D	1	2017 Hydrogeologic Investigation Report (Figures 5.7 & 5.8)	NR	NR	NR	NR	
Unsat. zone 1, thickness (m)	P	1	S	uniform	Distribution developed from depth range for site groundwater, 5 ft – 20 ft (2017 Hydrogeologic Investigation Report (section 2.4.3) and minimum thickness of CZ (0.5 ft)	1.37	5.94			3.65
Unsat. zone 1, soil density (g/cm ³)	P	2	S	Bounded Normal	NUREG/CR-7267 distribution for site soil type - sand	1.5105	0.159	1.019	2.002	1.5105
Unsat. zone 1, total porosity	P	2	S	Bounded Normal	NUREG/CR-7267 distribution for site soil type - sand	0.43	0.06	0.2446	0.6154	0.43
Unsat. zone 1, effective porosity	P	2	D	0.25	2017 Hydrogeologic Investigation Report	NR	NR	NR	NR	
Unsat. zone 1, field capacity	P	3	D	0.18	Value based on site-specific soil type (sand); calculated using equation in NUREG/CR-7267	NR	NR	NR	NR	
Unsat. zone 1, hydraulic conductivity (m/y)	P	2	D	2741	2017 Hydrogeologic Investigation Report	NR	NR	NR	NR	
Unsat. zone 1, soil-specific b parameter	P	2	S	Bounded Log Normal n	NUREG/CR-7267 distribution for site soil type - sand	- 0.0253	0.216	0.501	1.90	0.975
Occupancy										
Inhalation rate (m ³ /y)	B	3	S	Triangular	NUREG/CR-7267	4380	8400	13000		8593
Mass loading for inhalation (g/m ³)	P	2	S	Continuous linear	NUREG/CR-7267					2.3E-5
Exposure duration	B	3	D	30	RESRAD Default	NR	NR	NR	NR	
Indoor dust filtration factor	P	2	S	Uniform	NUREG/CR-7267	0.15	0.95			0.55
Shielding factor, external gamma	P	2	S	Bounded lognormal-n	NUREG/CR-7267	-1.3	0.59	0.044	1	0.2725
Fraction of time spent indoors	B	3	D	0.03	Fraction of calendar year assuming 1h/work day for daily work breaks during an occupational year	NR	NR	NR	NR	
Fraction of time spent outdoors	B	3	D	0.2	Fraction of calendar year assuming 7h/work day for outside tasks during an occupational year	NR	NR	NR	NR	
Shape factor flag, external gamma	P	3	D	Circular	RESRAD Default - Circular contaminated zone assumed	NR	NR	NR	NR	
Ingestion, Dietary										
Fruits, vegetables, grain consumption (kg/y)	B	2	D	N/A	Input not required - plant ingestion pathway inactive	NR	NR	NR	NR	
Leafy vegetable consumption (kg/y)	B	3	D	N/A	Input not required - plant ingestion pathway inactive	NR	NR	NR	NR	
Milk consumption (L/y)	B	2	D	N/A	Input not required - milk ingestion pathway inactive	NR	NR	NR	NR	

Values and Bases for RESRAD-Onsite Parameters for Probabilistic Analysis										
Industrial Use Scenario										
Meat and poultry consumption (kg/y)	B	3	D	N/A	Input not required - meat ingestion pathway inactive	NR	NR	NR	NR	
Fish consumption (kg/y)	B	3	D	20.6	NUREG/CR-5512, Vol. 3	NR	NR	NR	NR	
Other seafood consumption (kg/y)	B	3	D	0.9	RESRAD Default	NR	NR	NR	NR	
Soil & dust ingestion rate (g/yr)	B	2	S	Triangular	NUREG/CR-7267	0	18.3	36.5		18.3
Drinking water intake (L/y)	B	2		N/A	Input not required – drinking water pathway inactive					
Contamination fraction of drinking water	P	3		N/A	Input not required – drinking water pathway inactive					
Contamination fraction of household water	P	3		N/A	Input not required – water pathway inactive					
Contamination fraction of livestock water	P	3		N/A	Input not required – drinking water/ingestion pathways inactive					
Contamination fraction of irrigation water	P	3		N/A	Input not required – plant ingestion pathway inactive					
Contamination fraction of aquatic food	P	2	S	Triangular	NUREG/CR-7267	0	0.39	1		0.45
Contamination fraction of plant food	P	3		N/A	Input not required – plant ingestion pathway inactive					
Contamination fraction of meat	P	3		N/A	Input not required – meat ingestion pathway inactive					
Contamination fraction of milk	P	3		N/A	Input not required – milk ingestion pathway inactive					
Ingestion, Non-Dietary										
Livestock fodder intake for meat (kg/d)	M	3		N/A	Input not required – meat ingestion pathway inactive					
Livestock fodder intake for milk (kg/d)	M	3		N/A	Input not required – milk ingestion pathway inactive					
Livestock water intake for meat (L/d)	M	3		N/A	Input not required – water ingestion pathway inactive					
Livestock water intake for milk (L/d)	M	3		N/A	Input not required – milk ingestion pathway inactive					
Livestock soil intake (kg/d)	M	3		N/A	Input not required – meat ingestion pathway inactive					
Mass loading for foliar deposition (g/m ³)	P	3		N/A	Input not required – plant ingestion pathway inactive					
Depth of soil mixing layer (m)	P	2	D	0.15	RESRAD Default	NR	NR	NR	NR	
Depth of roots (m)	P	1		N/A	Input not required – plant ingestion pathway inactive					
Drinking water fraction from ground water	P	3		N/A	Input not required – drinking water ingestion pathway inactive					
Household water fraction from ground water (if used)	P	3		N/A	Input not required – drinking water pathway inactive					
Livestock water fraction from ground water	P	3		N/A	Input not required – drinking water/meat ingestion pathways inactive					

Values and Bases for RESRAD-Onsite Parameters for Probabilistic Analysis										
Industrial Use Scenario										
Irrigation fraction from ground water	P	3		N/A	Input not required – drinking water pathway inactive					
Wet weight crop yield for Non-Leafy (kg/m ²)	P	2		N/A	Input not required – plant ingestion pathway inactive					
Wet weight crop yield for Leafy (kg/m ²)	P	3		N/A	Input not required – plant ingestion pathway inactive					
Wet weight crop yield for Fodder (kg/m ²)	P	3		N/A	Input not required – meat ingestion pathway inactive					
Growing Season for Non-Leafy (y)	P	3		N/A	Input not required – plant ingestion pathway inactive					
Growing Season for Leafy (y)	P	3		N/A	Input not required – plant ingestion pathway inactive					
Growing Season for Fodder (y)	P	3		N/A	Input not required – meat ingestion pathway inactive					
Translocation Factor for Non-Leafy	P	3		N/A	Input not required – plant ingestion pathway inactive					
Translocation Factor for Leafy	P	3		N/A	Input not required – plant ingestion pathway inactive					
Translocation Factor for Fodder	P	3		N/A	Input not required – meat ingestion pathway inactive					
Weathering Removal Constant for Vegetation (1/y)	P	2		N/A	Input not required – plant ingestion pathway inactive					
Wet Foliar Interception Fraction for Non-Leafy	P	3		N/A	Input not required – plant ingestion pathway inactive					
Wet Foliar Interception Fraction for Leafy	P	2		N/A	Input not required – plant ingestion pathway inactive					
Wet Foliar Interception Fraction for Fodder	P	3		N/A	Input not required – meat ingestion pathway inactive					
Dry Foliar Interception Fraction for Non-Leafy	P	3		N/A	Input not required – plant ingestion pathway inactive					
Dry Foliar Interception Fraction for Leafy	P	3		N/A	Input not required – plant ingestion pathway inactive					
Dry Foliar Interception Fraction for Fodder	P	3		N/A	Input not required – meat ingestion pathway inactive					
Storage times of contaminated foodstuffs (days)										
Fruits, non-leafy vegetables, and grain	B	3		N/A	Input not required – plant ingestion pathway inactive					
Leafy vegetables	B	3		N/A	Input not required – plant ingestion pathway inactive					
Milk	B	3		N/A	Input not required – milk ingestion pathway inactive					
Meat and poultry	B	3		N/A	Input not required – meat ingestion pathway inactive					
Fish	B	3	D	7	RESRAD Default	NR	NR	NR	NR	
Crustacea and mollusks	B	3	D	7	RESRAD Default	NR	NR	NR	NR	
Well water	B	3		N/A	Input not required – drinking water pathway inactive					

Values and Bases for RESRAD-Onsite Parameters for Probabilistic Analysis										
Industrial Use Scenario										
Surface water	B	3		N/A	Input not required drinking water pathway inactive					
Livestock fodder	B	3		N/A	Input not required – meat ingestion pathway inactive					
Special Radionuclides (C-14)										
C-12 concentration in water (g/cm ³)	P	3	D	2.00E-05	RESRAD Default	NR	NR	NR	NR	
C-12 concentration in contaminated soil (g/g)	P	3	D	3.00E-02	RESRAD Default	NR	NR	NR	NR	
Fraction of vegetation carbon from soil	P	3	D	2.00E-02	RESRAD Default	NR	NR	NR	NR	
Fraction of vegetation carbon from air	P	3	D	9.80E-01	RESRAD Default	NR	NR	NR	NR	
C-14 evasion layer thickness in soil (m)	P	2	D	0.3	RESRAD Default	NR	NR	NR	NR	
C-14 evasion flux rate from soil (1/s)	P	3	D	7.00E-07	RESRAD Default	NR	NR	NR	NR	
C-12 evasion flux rate from soil (1/s)	P	3	D	1.00E-10	RESRAD Default	NR	NR	NR	NR	
Fraction of grain in beef cattle feed	B	3	D	0.8	RESRAD Default	NR	NR	NR	NR	
Fraction of grain in milk cow feed	B	3	D	0.2	RESRAD Default	NR	NR	NR	NR	
Inhalation Dose Conversion Factors (mrem/pCi inhaled) from FGR11 (contained in RESRAD Dose Conversion Library)										
Ingestion Dose Conversion Factors (mrem/pCi ingested) from FGR11 (contained in RESRAD Dose Conversion Library)										
Plant Transfer Factors (pCi/g plant)/(pCi/g soil) Note: Plant ingestion pathway closed – input for plant transfer factors not required for Industrial Use dose calculations.										
Meat Transfer Factors (pCi/kg)/(pCi/d) Note: Meat ingestion pathway closed – input for meat transfer factors not required for Industrial Use dose calculations.										
Milk Transfer Factors (pCi/L)/(pCi/d) Note: Milk ingestion pathway closed – input for milk transfer factors not required for Industrial Use dose calculations.										
Bioaccumulation Factors for Fish ((pCi/kg)/(pCi/L))										
Ac-227	P	2	S	Lognormal-n	NUREG/CR-7267	3.2	1.1			
Am-241	P	2	S	Lognormal-n	NUREG/CR-7267	5.5	1.1			
Am-243	P	2	S	Lognormal-n	NUREG/CR-7267	5.5	1.1			
C-14	P	2	S	Lognormal-n	NUREG/CR-7267	13.0	1.1			
Cm-243	P	2	S	Lognormal-n	NUREG/CR-7267	3.4	1.1			
Cm-244	P	2	S	Lognormal-n	NUREG/CR-7267	3.4	1.1			
Co-60	P	2	S	Lognormal-n	NUREG/CR-7267	4.3	0.9			7.4E+01
Cs-137	P	2	S	Lognormal-n	NUREG/CR-7267	7.8	0.9			2.4E+03
Eu-152	P	2	S	Lognormal-n	NUREG/CR-7267	4.9	1.6			1.3E+02
Eu-154	P	2	S	Lognormal-n	NUREG/CR-7267	4.9	1.6			1.3E+02
Fe-55	P	2	S	Lognormal-n	NUREG/CR-7267	5.1	1.9			1.6E+02
Gd-152	P	2	S	Lognormal-n	NUREG/CR-7267	3.4	1.1			3.0E+01
H-3	P	2	S	Lognormal-n	NUREG/CR-7267	0	0.1			1.0E+00
Mn-54	P	2	S	Lognormal-n	NUREG/CR-7267	5.5	1.9			2.4E+02
Nb-94	P	2	S	Lognormal-n	NUREG/CR-7267	5.7	1.1			3.0E+02
Ni-63	P	2	S	Lognormal-n	NUREG/CR-7267	3.0	0.6			2.0E+01
Np-237	P	2	S	Lognormal-n	NUREG/CR-7267	3.0	1.1			2.0E+01
Pa-231	P	2	S	Lognormal-n	NUREG/CR-7267	2.3	1.1			1.0E+01

Values and Bases for RESRAD-Onsite Parameters for Probabilistic Analysis										
Industrial Use Scenario										
Pb-210	P	2	S	Lognormal-n	NUREG/CR-7267	3.2	1.1			2.5E+02
Po-210	P	2	S	Lognormal-n	NUREG/CR-7267	3.6	1.5			3.7E+01
Pu-238	P	2	S	Lognormal-n	NUREG/CR-7267	10.0	1.0			2.2E+04
Pu-239	P	2	S	Lognormal-n	NUREG/CR-7267	10.0	1.0			2.2E+04
Pu-240	P	2	S	Lognormal-n	NUREG/CR-7267	10.0	1.0			2.2E+04
Pu-241	P	2	S	Lognormal-n	NUREG/CR-7267	10.0	1.0			2.2E+04
Ra-226	P	2	S	Lognormal-n	NUREG/CR-7267	1.4	1.9			4.1E+00
Ra-228	P	2	S	Lognormal-n	NUREG/CR-7267	1.4	1.9			4.1E+00
Sb-125	P	2	S	Lognormal-n	NUREG/CR-7267	3.6	1.5			3.7E+01
Sr-90	P	2	S	Lognormal-n	NUREG/CR-7267	1.1	1.4			3.0E+00
Tc-99	P	2	S	Lognormal-n	NUREG/CR-7267	3.0	1.1			2.0E+01
Te-125m	P	2	S	Lognormal-n	NUREG/CR-7267	5.0	0.4			1.5E+02
Th-228	P	2	S	Lognormal-n	NUREG/CR-7267	4.6	1.1			9.9E+01
Th-229	P	2	S	Lognormal-n	NUREG/CR-7267	4.6	1.1			9.9E+01
Th-230	P	2	S	Lognormal-n	NUREG/CR-7267	4.6	1.1			9.9E+01
Th-232	P	2	S	Lognormal-n	NUREG/CR-7267	4.6	1.1			9.9E+01
U-233	P	2	S	Lognormal-n	NUREG/CR-7267	0.0	2.5			1.0E+00
U-234	P	2	S	Lognormal-n	NUREG/CR-7267	0.0	2.5			1.0E+00
U-235	P	2	S	Lognormal-n	NUREG/CR-7267	0.0	2.5			1.0E+00
U-236	P	2	S	Lognormal-n	NUREG/CR-7267	0.0	2.5			1.0E+00
Bioaccumulation Factors for Crustacea/ Mollusks ((pCi/kg)/(pCi/L)) RESRAD default value for each radionuclide applied										
Graphics Parameters										
Number of points				32	RESRAD Default	NR	NR	NR	NR	
Spacing				log	RESRAD Default	NR	NR	NR	NR	
Time integration parameters										
Maximum number of points for dose				17	RESRAD Default	NR	NR	NR	NR	

Table 2 Notes:

^a P = physical, B = behavioral, M = metabolic

^b 1 = high-priority parameter, 2 = medium-priority parameter, 3 = low-priority parameter

^c D = deterministic, S = stochastic

N/A = not applicable

^d Distributions Statistical Parameters:

Lognormal-n: 1= mean, 2 = standard deviation

Bounded lognormal-n: 1= mean, 2 = standard deviation, 3 = minimum, 4 = maximum

Truncated lognormal-n: 1= mean, 2 = standard deviation, 3 = lower quantile, 4 = upper quantile

Bounded normal: 1 = mean, 2 = standard deviation, 3 = minimum, 4 = maximum

Triangular: 1 = minimum, 2 = mode, 3 = maximum

Uniform: 1 = minimum, 2 = maximum

Table 3: Sensitive Input Parameter by Radionuclide

Radionuclide	Sensitive Parameter	PRCC Value
Am-241	Inhalation Rate	0.66
	Mass Loading for Inhalation	0.84
	Soil Ingestion	0.99
C-14	Thickness of CZ	0.26
	K_d in UZ	-0.51
Cm-243	Inhalation Rate	0.31
	Mass Loading for Inhalation	0.49
	External Shielding Factor	0.87
	Soil Ingestion	0.94
Cm-244	Inhalation Rate	0.63
	Mass Loading for Inhalation	0.82
	Soil Ingestion	0.99
Co-60	External Shielding Factor	0.88
	K_d in CZ	0.48
Cs-137	External Gamma Shielding Factor	0.96
Eu-152	External Shielding Factor	0.87
	K_d in CZ	0.48
Eu-154	External Shielding Factor	0.86
	K_d in CZ	0.48
Fe-55	Inhalation Rate	0.54
	Mass Loading for Inhalation	0.77
	Soil Ingestion	1.00
H-3	Thickness of CZ	0.71
	Evapotranspiration Coefficient	0.59
	Inhalation Rate	0.80
	K_d in CZ	-0.28
Mn-54	External Shielding Factor	0.94
	K_d in CZ	0.28
Nb-94	External Shielding Factor	0.96
Ni-63	Soil Ingestion	1.00
	K_d in CZ	0.36
Np-237	K_d in CZ	0.61
	Mass Loading for Inhalation	0.32
	External Shielding Factor	0.72
	Soil Ingestion	0.85
Pu-238	Inhalation Rate	0.62
	Mass Loading for Inhalation	0.84
	Soil Ingestion	0.99
Pu-239	Soil Ingestion	0.43
	K_d in CZ	0.57
	K_d in UZ	-0.34
Pu-240	Soil Ingestion	0.43
	K_d in CZ	0.54
	K_d in UZ	-0.29

Radionuclide	Sensitive Parameter	PRCC Value
Pu-241	K _d of Am-241 in CZ	0.44
	Mass Loading for Inhalation	0.47
	Soil Ingestion	0.93
	K _d in CZ	0.28
Sb-125	External Shielding Factor	0.85
	K _d in CZ	0.73
Sr-90	External Shielding Factor	0.66
	Soil Ingestion	0.89
	K _d in CZ	0.59
Tc-99	Contaminated Fraction for Aquatic Food	0.53
	K _d in UZ	-0.31
	Fish Transfer Factor	0.80

Table 4: RESRAD-Generated Percentile Values for Sensitive Input Parameters

Sensitive Input Parameter	Affected Nuclide	RESRAD Percentile Value	
		25 th	75 th
Inhalation Rate (m ³ /y)	Am-241		9.9E+03
	Cm-243		9.9E+03
	Cm-244		9.9E+03
	Fe-55		9.9E+03
	H-3		9.9E+03
	Pu-238		9.9E+03
	Mass Loading for Inhalation (g/m ³)	Am-241	
Cm-243			2.9E-05
Cm-244			2.9E-05
Fe-55			2.9E-05
Np-237			2.9E-05
Pu-238			2.9E-05
Pu-241			2.9E-05
Soil Ingestion (g/y)		Am-241	
	Cm-243		2.4E+01
	Cm-244		2.4E+01
	Fe-55		2.4E+01
	Ni-63		2.4E+01
	Np-237		2.4E+01
	Pu-238		2.4E+01
	Pu-239		2.4E+01
	Pu-240		2.4E+01
	Pu-241		2.4E+01
	Sr-90		2.4E+01
	Thickness of CZ (m)	C-14	
H-3			3.0E+00
K _d in CZ (cm ³ /g)	Am-241		3.7E+03
	Co-60		1.8E+03
	Eu-152		1.4E+04
	Eu-154		1.4E+04
	H-3	4.3E-02	
	Mn-54		5.8E+03
	Ni-63		6.1E+02
	Np-237		3.6E+01
	Pu-239		1.0E+03
	Pu-240		1.0E+03
	Pu-241		1.0E+03
	Sb-125		5.6E+01
Sr-90		7.3E+01	
K _d in UZ (cm ³ /g)	C-14	6.2E+00	
	Pu-239	1.6E+02	
	Pu-240	1.6E+02	
	Tc-99	1.9E-02	

Sensitive Input Parameter	Affected Nuclide	RESRAD Percentile Value	
		25 th	75 th
External Shielding Factor	Cm-243		4.0E-01
	Co-60		4.0E-01
	Cs-137		4.0E-01
	Eu-152		4.0E-01
	Eu-154		4.0E-01
	Mn-54		4.0E-01
	Nb-94		4.0E-01
	Np-237		4.0E-01
	Sb-125		4.0E-01
	Sr-90		4.0E-01
Evapotranspiration Coefficient	H-3		6.9E-01
Bioaccumultion Factor for Fish (pCi/kg)/(pCi/L)	Tc-99		4.2E+01
Contamination Fraction for Aquatic Food	Tc-99		6.1E-01

Appendix A

PRCC Values at Time of Peak of the Mean Dose

Am-241 Results:

RESRAD Regression and Correlation output 07/11/23 10:28 Page: Coef 1
 Title : OCNCS Industrial Use_Probabilistic Analysis_Am241
 Input File : OC_IU_SA_AM241.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Kd of Am-241 in Contaminated Zone	6	0.06	9	0.00	6	0.09	6	0.01	
Kd of Am-241 in Unsaturated Zone 1	32	0.00	32	0.00	18	0.02	22	0.00	
Kd of Am-241 in Saturated Zone	31	0.00	31	0.00	25	-0.01	29	0.00	
Kd of Np-237 in Contaminated Zone	13	-0.03	17	0.00	8	-0.04	11	0.00	
Kd of Np-237 in Unsaturated Zone 1	21	0.01	23	0.00	9	0.04	12	0.00	
Kd of Np-237 in Saturated Zone	22	0.01	24	0.00	13	-0.03	16	0.00	
Kd of Th-229 in Contaminated Zone	28	0.00	28	0.00	20	-0.02	23	0.00	
Kd of Th-229 in Unsaturated Zone 1	30	0.00	30	0.00	30	0.00	30	0.00	
Kd of Th-229 in Saturated Zone	16	0.02	20	0.00	10	-0.04	13	0.00	
Kd of U-233 in Contaminated Zone	8	0.05	12	0.00	32	0.00	32	0.00	
Kd of U-233 in Unsaturated Zone 1	23	-0.01	25	0.00	31	0.00	31	0.00	
Kd of U-233 in Saturated Zone	24	0.01	26	0.00	16	0.03	19	0.00	
Fish transfer factor for Am	20	-0.01	22	0.00	7	-0.04	10	-0.01	
Fish transfer factor for Np	7	-0.05	10	0.00	17	0.03	20	0.00	
Fish transfer factor for Th	19	0.01	21	0.00	34	0.00	35	0.00	
Fish transfer factor for U	34	0.00	34	0.00	33	0.00	34	0.00	
Thickness of contaminated zone	9	0.04	6	0.01	22	-0.02	9	-0.01	
Density of contaminated zone	26	0.01	19	0.00	29	0.00	28	0.00	
Contaminated zone total porosity	35	0.00	35	0.00	27	-0.01	25	0.00	
Contaminated zone b parameter	15	0.03	18	0.00	12	0.04	15	0.00	
Evapotranspiration coefficient	29	0.00	29	0.00	24	-0.01	27	0.00	
Density of saturated zone	14	0.03	8	0.01	35	0.00	33	0.00	
Saturated zone total porosity	11	0.03	7	0.01	26	0.01	21	0.00	
Saturated zone hydraulic gradient	10	-0.04	14	0.00	15	-0.03	18	0.00	
Saturated zone b parameter	12	0.03	16	0.00	14	0.03	17	0.00	
Thickness of Unsaturated zone 1	17	0.02	13	0.00	19	-0.02	7	-0.01	
Density of Unsaturated zone 1	25	-0.01	15	0.00	21	-0.02	8	-0.01	
Total Porosity of Unsaturated zone 1	18	-0.02	11	0.00	28	0.00	26	0.00	
b Parameter of Unsaturated zone 1	33	0.00	33	0.00	23	0.02	24	0.00	
Inhalation rate	3	0.91	3	0.12	3	0.66	3	0.11	
Mass loading for inhalation	2	0.97	2	0.23	2	0.84	2	0.19	
Indoor dust filtration factor	5	0.32	5	0.02	5	0.12	5	0.02	
External gamma shielding factor	4	0.57	4	0.04	4	0.21	4	0.03	
Soil ingestion	1	1.00	1	0.96	1	0.99	1	0.97	
Aquatic food	27	0.00	27	0.00	11	-0.04	14	0.00	

C-14 Results:

RESRAD Regression and Correlation output 07/12/23 09:20 Page: Coef 1
 Title : OCNCS Industrial Use_Probabilistic Analysis_C14
 Input File : OC_IU_SA_C-14.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Thickness of contaminated zone	19	0.01	11	0.03	2	0.26	1	0.54	
Density of contaminated zone	20	0.01	12	0.03	22	0.00	22	0.00	
Contaminated zone total porosity	17	0.01	8	0.04	20	0.01	15	0.02	
Contaminated zone b parameter	5	-0.03	10	-0.03	23	0.00	23	0.00	
Evapotranspiration coefficient	7	-0.03	13	-0.03	5	-0.05	8	-0.03	
Density of saturated zone	8	-0.02	3	-0.07	13	0.03	5	0.05	
Saturated zone total porosity	10	-0.02	5	-0.07	17	0.02	6	0.04	
Saturated zone hydraulic gradient	21	-0.01	22	-0.01	12	-0.03	14	-0.02	
Saturated zone b parameter	3	0.04	7	0.04	8	0.04	11	0.03	
Thickness of Unsaturated zone 1	23	-0.01	18	-0.02	4	-0.05	3	-0.11	
Density of Unsaturated zone 1	9	0.02	4	0.07	21	0.01	16	0.02	
Total Porosity of Unsaturated zone 1	6	0.03	2	0.08	11	0.03	4	0.06	
b Parameter of Unsaturated zone 1	18	-0.01	21	-0.01	16	-0.02	19	-0.01	
Inhalation rate	16	-0.01	20	-0.01	14	0.02	17	0.02	
Mass loading for inhalation	14	0.02	17	0.02	18	0.02	20	0.01	
Indoor dust filtration factor	22	-0.01	23	-0.01	6	0.05	9	0.03	
External gamma shielding factor	4	0.04	9	0.04	15	0.02	18	0.01	
Soil ingestion	15	-0.02	19	-0.02	7	-0.04	10	-0.03	
Aquatic food	2	0.05	6	0.05	10	0.03	13	0.02	
Kd of C-14 in Contaminated Zone	11	-0.02	14	-0.02	9	0.04	12	0.02	
Kd of C-14 in Unsaturated zone 1	12	-0.02	15	-0.02	1	-0.51	2	-0.39	
Kd of C-14 in Saturated Zone	13	-0.02	16	-0.02	3	-0.05	7	-0.04	
Fish transfer factor for c	1	0.11	1	0.11	19	0.02	21	0.01	

Cm-243 Results:

RESRAD Regression and Correlation output 07/12/23 09:45 Page: Coef 1
 Title : OCNCS Industrial Use_Probabilistic Analysis_Cm243
 Input File : OC_IU_SA_CM243.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Thickness of contaminated zone	7	0.04	6	0.02	10	0.03	5	0.03	
Density of contaminated zone	6	0.04	5	0.03	33	0.01	15	0.01	
Contaminated zone total porosity	9	0.03	7	0.02	37	0.00	25	0.00	
Contaminated zone b parameter	14	0.03	17	0.01	17	-0.02	21	0.00	

Evapotranspiration coefficient	42	0.00	42	0.00	29	-0.01	34	0.00
Density of saturated zone	18	-0.02	9	-0.01	18	-0.02	8	-0.01
Saturated zone total porosity	28	-0.01	12	-0.01	41	0.00	32	0.00
Saturated zone hydraulic gradient	12	0.03	15	0.01	15	0.02	19	0.01
Saturated zone b parameter	19	-0.02	21	0.00	11	0.03	12	0.01
Thickness of Unsaturated zone 1	27	-0.01	10	-0.01	31	0.01	13	0.01
Density of Unsaturated zone 1	41	0.00	36	0.00	43	0.00	39	0.00
Total Porosity of Unsaturated zone 1	40	0.00	35	0.00	34	-0.01	17	-0.01
b Parameter of Unsaturated zone 1	35	0.01	38	0.00	8	0.03	10	0.01
Inhalation rate	4	0.42	4	0.09	4	0.31	4	0.09
Mass loading for inhalation	3	0.68	3	0.19	3	0.49	3	0.16
Indoor dust filtration factor	5	0.09	8	0.02	5	0.08	6	0.02
External gamma shielding factor	2	0.94	2	0.55	2	0.87	2	0.50
Soil ingestion	1	0.97	1	0.78	1	0.94	1	0.79
Aquatic food	10	-0.03	13	-0.01	19	0.02	22	0.00
Kd of Ac-227 in Contaminated Zone	20	0.02	22	0.00	28	0.01	33	0.00
Kd of Ac-227 in Unsaturated Zone 1	11	-0.03	14	-0.01	35	-0.01	37	0.00
Kd of Ac-227 in Saturated Zone	16	-0.02	19	0.00	25	-0.01	29	0.00
Kd of Am-243 in Contaminated Zone	22	0.02	24	0.00	7	-0.04	9	-0.01
Kd of Am-243 in Unsaturated Zone 1	21	0.02	23	0.00	40	0.00	42	0.00
Kd of Am-243 in Saturated Zone	30	0.01	30	0.00	21	-0.01	24	0.00
Kd of Cm-243 in Contaminated Zone	13	0.03	16	0.01	6	0.07	7	0.02
Kd of Cm-243 in Unsaturated Zone 1	25	0.01	27	0.00	39	0.00	41	0.00
Kd of Cm-243 in Saturated Zone	33	0.01	33	0.00	16	-0.02	20	-0.01
Kd of Pa-231 in Contaminated Zone	43	0.00	43	0.00	14	0.02	18	0.01
Kd of Pa-231 in Unsaturated Zone 1	29	0.01	29	0.00	9	0.03	11	0.01
Kd of Pa-231 in Saturated Zone	37	0.00	40	0.00	26	0.01	30	0.00
Kd of Pu-239 in Contaminated Zone	23	0.01	25	0.00	13	0.02	16	0.01
Kd of Pu-239 in Unsaturated Zone 1	15	0.02	18	0.00	38	0.00	40	0.00
Kd of Pu-239 in Saturated Zone	38	0.00	39	0.00	22	-0.01	26	0.00
Kd of U-235 in Contaminated Zone	36	0.01	37	0.00	42	0.00	43	0.00
Kd of U-235 in Unsaturated Zone 1	26	-0.01	28	0.00	36	0.01	38	0.00
Kd of U-235 in Saturated Zone	39	0.00	41	0.00	12	0.02	14	0.01
Fish transfer factor for Ac	34	0.01	34	0.00	30	-0.01	35	0.00
Fish transfer factor for Am	17	0.02	20	0.00	27	-0.01	31	0.00
Fish transfer factor for Cm	31	0.01	31	0.00	24	-0.01	28	0.00
Fish transfer factor for Pu	24	0.01	26	0.00	23	-0.01	27	0.00
Fish transfer factor for U	32	0.01	32	0.00	20	0.01	23	0.00
Fish transfer factor for Pa	8	-0.04	11	-0.01	32	0.01	36	0.00

Cm-244 Results:

RESRAD Regression and Correlation output 07/12/23 10:02 Page: Coef 1
Title : OCS Industrial Use_Probabilistic Analysis_Cm244
Input File : OC_IU_SA_CM244.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Thickness of contaminated zone	32	-0.01	21	0.00	30	0.01	14	0.00	
Density of contaminated zone	9	-0.03	5	-0.01	24	-0.01	11	0.00	
Contaminated zone total porosity	10	-0.03	6	-0.01	12	-0.02	7	-0.01	
Contaminated zone b parameter	38	0.00	38	0.00	27	-0.01	29	0.00	
Evapotranspiration coefficient	5	0.06	8	0.00	16	0.02	19	0.00	
Density of saturated zone	28	-0.01	16	0.00	36	0.00	35	0.00	
Saturated zone total porosity	29	-0.01	17	0.00	29	-0.01	13	0.00	
Saturated zone hydraulic gradient	24	-0.01	27	0.00	17	-0.02	20	0.00	
Saturated zone b parameter	6	0.05	10	0.00	20	0.01	23	0.00	
Thickness of Unsaturated zone 1	12	-0.03	7	-0.01	37	0.00	36	0.00	
Density of Unsaturated zone 1	17	0.02	9	0.00	6	0.05	4	0.02	
Total Porosity of Unsaturated zone 1	20	0.01	12	0.00	7	0.05	5	0.02	
b Parameter of Unsaturated zone 1	23	-0.01	26	0.00	25	-0.01	27	0.00	
Inhalation rate	3	0.89	3	0.12	3	0.63	3	0.11	
Mass loading for inhalation	2	0.97	2	0.24	2	0.82	2	0.20	
Indoor dust filtration factor	4	0.30	4	0.02	4	0.12	6	0.02	
External gamma shielding factor	30	0.01	31	0.00	23	0.01	26	0.00	
Soil ingestion	1	1.00	1	0.96	1	0.99	1	0.96	
Aquatic food	11	0.03	14	0.00	15	-0.02	18	0.00	
Kd of Cm-244 in Contaminated Zone	13	0.03	15	0.00	5	0.06	8	0.01	
Kd of Cm-244 in Unsaturated Zone 1	33	-0.01	34	0.00	18	0.02	21	0.00	
Kd of Cm-244 in Saturated Zone	42	0.00	42	0.00	8	-0.04	9	-0.01	
Kd of Pu-240 in Contaminated Zone	39	0.00	39	0.00	41	0.00	41	0.00	
Kd of Pu-240 in Unsaturated Zone 1	37	0.00	37	0.00	42	0.00	42	0.00	
Kd of Pu-240 in Saturated Zone	18	-0.01	22	0.00	38	0.00	38	0.00	
Kd of Ra-228 in Contaminated Zone	21	0.01	24	0.00	35	0.00	37	0.00	
Kd of Ra-228 in Unsaturated Zone 1	16	-0.02	20	0.00	10	-0.03	12	0.00	
Kd of Ra-228 in Saturated Zone	22	0.01	25	0.00	32	0.01	32	0.00	
Kd of Th-228 in Contaminated Zone	31	0.01	32	0.00	31	0.01	31	0.00	
Kd of Th-228 in Unsaturated Zone 1	40	0.00	40	0.00	22	0.01	25	0.00	
Kd of Th-228 in Saturated Zone	35	0.00	35	0.00	14	-0.02	17	0.00	
Kd of Th-232 in Contaminated Zone	15	0.02	19	0.00	19	0.01	22	0.00	
Kd of Th-232 in Unsaturated Zone 1	34	-0.01	33	0.00	34	0.01	34	0.00	
Kd of Th-232 in Saturated Zone	25	-0.01	28	0.00	28	-0.01	30	0.00	
Kd of U-236 in Contaminated Zone	27	-0.01	30	0.00	40	0.00	40	0.00	
Kd of U-236 in Unsaturated Zone 1	36	0.00	36	0.00	13	0.02	16	0.00	
Kd of U-236 in Saturated Zone	19	-0.01	23	0.00	26	-0.01	28	0.00	
Fish transfer factor for Cm	7	-0.04	11	0.00	9	-0.04	10	-0.01	
Fish transfer factor for Pu	8	-0.03	13	0.00	21	-0.01	24	0.00	
Fish transfer factor for Ra	26	0.01	29	0.00	11	0.02	15	0.00	
Fish transfer factor for Th	14	0.02	18	0.00	39	0.00	39	0.00	
Fish transfer factor for U	41	0.00	41	0.00	33	0.01	33	0.00	

Co-60 Results:

RESRAD Regression and Correlation output 07/12/23 10:11 Page: coef 1
Title : Co60
Input File : OC_IU_SA_CO60.RAD

Coefficients for peak of mean dose time Dose

Coefficient = Repetition =	PCC 1		SRC 1		PRCC 1		SRRC 1	
	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Description of Probabilistic Variable								
Thickness of contaminated zone	2	0.07	2	0.17	3	0.08	3	0.11
Density of contaminated zone	12	0.01	6	0.04	4	0.04	4	0.06
Contaminated zone total porosity	21	0.00	19	-0.01	12	0.02	7	0.03
Contaminated zone b parameter	9	-0.02	12	-0.01	16	-0.02	16	-0.01
Evapotranspiration coefficient	7	0.02	11	0.02	13	0.02	14	0.01
Density of saturated zone	16	0.01	9	0.03	21	0.00	19	0.00
Saturated zone total porosity	22	0.00	22	0.00	23	0.00	22	0.00
Saturated zone hydraulic gradient	13	0.01	14	0.01	9	-0.03	12	-0.01
Saturated zone b parameter	14	-0.01	15	-0.01	11	-0.02	13	-0.01
Thickness of Unsaturated zone 1	10	-0.02	5	-0.04	6	-0.04	5	-0.06
Density of Unsaturated zone 1	5	0.03	3	0.08	10	0.03	6	0.04
Total Porosity of Unsaturated zone 1	8	0.02	4	0.05	14	0.02	8	0.03
b Parameter of Unsaturated zone 1	17	0.01	17	0.01	8	0.03	11	0.01
Inhalation rate	15	0.01	16	0.01	20	0.01	21	0.00
Mass loading for inhalation	11	-0.02	13	-0.01	22	0.00	23	0.00
Indoor dust filtration factor	3	-0.04	7	-0.04	19	-0.01	20	0.00
External gamma shielding factor	1	0.52	1	0.51	1	0.88	1	0.84
Soil ingestion	18	0.01	18	0.01	7	0.03	10	0.02
Aquatic food	23	0.00	23	0.00	17	-0.01	17	0.00
Kd of Co-60 in Contaminated Zone	4	0.04	8	0.03	2	0.48	2	0.25
Kd of Co-60 in Unsaturated zone 1	20	-0.01	21	-0.01	15	0.02	15	0.01
Kd of Co-60 in Saturated Zone	6	0.03	10	0.02	5	0.04	9	0.02
Fish transfer factor for Co	19	-0.01	20	-0.01	18	0.01	18	0.00

Cs-137 Results:

RESRAD Regression and Correlation output 07/12/23 10:19 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Cs137
Input File : OC_IU_SA_CS137.RAD

Coefficients for peak of mean dose time Dose Coefficient = Repetition =	PCC 1		SRC 1		PRCC 1		SRRC 1	
	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Description of Probabilistic Variable								
Thickness of contaminated zone	2	0.07	2	0.08	3	0.08	2	0.07
Density of contaminated zone	20	0.01	14	0.01	14	0.02	8	0.02
Contaminated zone total porosity	12	-0.02	8	-0.03	18	-0.01	12	-0.01
Contaminated zone b parameter	18	0.01	19	0.00	15	0.02	17	0.00
Evapotranspiration coefficient	15	0.02	16	0.01	9	0.03	13	0.01
Density of saturated zone	11	0.02	7	0.03	8	0.03	6	0.03
Saturated zone total porosity	10	0.03	6	0.03	7	0.03	5	0.03
Saturated zone hydraulic gradient	7	0.03	11	0.01	4	0.04	10	0.01
Saturated zone b parameter	21	0.00	21	0.00	19	-0.01	19	0.00
Thickness of Unsaturated zone 1	4	-0.04	4	-0.04	5	-0.04	4	-0.03
Density of Unsaturated zone 1	3	-0.04	3	-0.05	13	-0.02	7	-0.02
Total Porosity of Unsaturated zone 1	8	-0.03	5	-0.04	17	-0.02	9	-0.01
b Parameter of Unsaturated zone 1	6	0.04	10	0.01	6	0.04	11	0.01
Inhalation rate	9	0.03	12	0.01	10	0.03	14	0.01
Mass loading for inhalation	16	0.02	17	0.01	21	0.00	21	0.00
Indoor dust filtration factor	14	0.02	15	0.01	11	0.03	15	0.01
External gamma shielding factor	1	0.93	1	0.93	1	0.96	1	0.95
Soil ingestion	19	-0.01	20	0.00	20	0.01	20	0.00
Aquatic food	13	0.02	13	0.01	16	0.02	18	0.00
Kd of Cs-137 in Contaminated Zone	5	0.04	9	0.01	2	0.18	3	0.05
Kd of Cs-137 in Unsaturated Zone 1	22	0.00	22	0.00	12	0.03	16	0.01
Kd of Cs-137 in Saturated Zone	17	0.02	18	0.01	22	0.00	22	0.00

Eu-152 Results:

RESRAD Regression and Correlation output 07/12/23 10:26 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Eu152
Input File : OC_IU_SA_EU152.RAD

Coefficients for peak of mean dose time Dose Coefficient = Repetition =	PCC 1		SRC 1		PRCC 1		SRRC 1	
	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Description of Probabilistic Variable								
Thickness of contaminated zone	3	0.06	2	0.17	3	0.10	3	0.15
Density of contaminated zone	5	0.03	3	0.09	14	0.02	7	0.03
Contaminated zone total porosity	13	0.02	7	0.04	25	0.00	24	0.00
Contaminated zone b parameter	9	0.02	12	0.02	20	-0.02	21	-0.01
Evapotranspiration coefficient	2	0.06	4	0.06	4	0.08	6	0.04
Density of saturated zone	25	0.00	20	-0.01	22	0.01	10	0.02
Saturated zone total porosity	26	0.00	24	0.01	19	0.02	8	0.03
Saturated zone hydraulic gradient	19	0.01	21	0.01	18	0.02	20	0.01
Saturated zone b parameter	17	0.01	17	0.01	26	0.00	27	0.00
Thickness of Unsaturated zone 1	24	0.00	19	-0.01	27	0.00	26	0.00
Density of Unsaturated zone 1	11	0.02	6	0.05	11	0.03	5	0.04
Total Porosity of Unsaturated zone 1	15	0.01	8	0.03	6	0.03	4	0.05
b Parameter of Unsaturated zone 1	12	0.02	14	0.01	5	0.05	9	0.02
Inhalation rate	23	0.00	26	0.00	9	0.03	13	0.01
Mass loading for inhalation	27	0.00	27	0.00	13	-0.02	16	-0.01
Indoor dust filtration factor	18	-0.01	18	-0.01	21	0.01	22	0.01
External gamma shielding factor	1	0.37	1	0.36	1	0.87	1	0.83
Soil ingestion	20	0.01	22	0.01	10	0.03	14	0.01
Aquatic food	22	-0.01	25	-0.01	7	0.03	11	0.02
Kd of Eu-152 in Contaminated Zone	7	0.02	10	0.02	2	0.48	2	0.26
Kd of Eu-152 in Unsaturated zone 1	14	0.01	15	0.01	23	-0.01	23	0.00
Kd of Eu-152 in Saturated Zone	10	-0.02	13	-0.02	17	0.02	19	0.01
Kd of Gd-152 in Contaminated Zone	4	-0.06	5	-0.05	12	-0.02	15	-0.01
Kd of Gd-152 in Unsaturated zone 1	21	0.01	23	0.01	24	0.00	25	0.00
Kd of Gd-152 in Saturated Zone	16	-0.01	16	-0.01	15	-0.02	17	-0.01
Fish transfer factor for Eu	6	-0.03	9	-0.02	16	0.02	18	0.01
Fish transfer factor for Gd	8	-0.02	11	-0.02	8	-0.03	12	-0.02

Eu-154 Results:

RESRAD Regression and Correlation output 07/12/23 10:32 Page: Coef 1
 Title : OCNCS Industrial Use_Probabilistic Analysis_Eu152
 Input File : OC_IU_SA_EU154.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Thickness of contaminated zone	2	0.04	2	0.12	3	0.06	3	0.08	
Density of contaminated zone	18	0.01	9	0.02	5	0.04	4	0.05	
Contaminated zone total porosity	19	-0.01	12	-0.02	12	0.02	7	0.03	
Contaminated zone b parameter	8	-0.01	13	-0.01	13	-0.02	14	-0.01	
Evapotranspiration coefficient	10	0.01	14	0.01	14	0.02	15	0.01	
Density of saturated zone	14	0.01	6	0.03	22	0.00	19	0.00	
Saturated zone total porosity	23	0.00	22	0.00	23	0.00	23	0.00	
Saturated zone hydraulic gradient	20	0.01	20	0.00	9	-0.03	12	-0.01	
Saturated zone b parameter	17	-0.01	19	-0.01	10	-0.03	13	-0.01	
Thickness of Unsaturated zone 1	9	-0.01	5	-0.04	6	-0.03	5	-0.05	
Density of Unsaturated zone 1	4	0.02	3	0.07	11	0.02	6	0.03	
Total Porosity of Unsaturated zone 1	11	0.01	4	0.04	15	0.02	9	0.02	
b Parameter of Unsaturated zone 1	16	0.01	18	0.01	8	0.03	11	0.02	
Inhalation rate	13	0.01	16	0.01	17	0.01	17	0.01	
Mass loading for inhalation	12	-0.01	15	-0.01	21	-0.01	22	0.00	
Indoor dust filtration factor	3	-0.03	7	-0.03	18	-0.01	18	-0.01	
External gamma shielding factor	1	0.39	1	0.39	1	0.86	1	0.82	
Soil ingestion	15	0.01	17	0.01	7	0.03	10	0.02	
Aquatic food	22	0.00	23	0.00	20	-0.01	21	0.00	
Kd of Eu-154 in Contaminated Zone	5	0.02	8	0.02	2	0.48	2	0.26	
Kd of Eu-154 in Unsaturated Zone 1	21	0.01	21	0.00	16	0.01	16	0.01	
Kd of Eu-154 in Saturated Zone	6	0.02	10	0.02	4	0.05	8	0.02	
Fish transfer factor for Eu	7	-0.02	11	-0.02	19	0.01	20	0.00	

Fe-55 Results:

RESRAD Regression and Correlation output 07/12/23 10:39 Page: Coef 1
 Title : OCNCS Industrial Use_Probabilistic Analysis_Fe55
 Input File : OC_IU_SA_FE55.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Thickness of contaminated zone	5	0.13	4	0.00	5	0.07	4	0.00	
Density of contaminated zone	7	0.04	6	0.00	6	0.05	5	0.00	
Contaminated zone total porosity	11	0.03	7	0.00	7	0.04	6	0.00	
Contaminated zone b parameter	19	-0.01	19	0.00	8	0.04	10	0.00	
Evapotranspiration coefficient	6	0.05	11	0.00	14	0.02	16	0.00	
Density of saturated zone	18	-0.02	13	0.00	11	-0.03	9	0.00	
Saturated zone total porosity	16	-0.02	10	0.00	10	-0.03	8	0.00	
Saturated zone hydraulic gradient	22	-0.01	22	0.00	17	0.01	20	0.00	
Saturated zone b parameter	21	0.01	21	0.00	20	-0.01	21	0.00	
Thickness of Unsaturated zone 1	12	-0.03	8	0.00	19	0.01	15	0.00	
Density of Unsaturated zone 1	15	-0.02	9	0.00	18	0.01	12	0.00	
Total Porosity of Unsaturated zone 1	17	-0.02	12	0.00	22	0.00	18	0.00	
b Parameter of Unsaturated zone 1	9	0.04	15	0.00	12	0.03	13	0.00	
Inhalation rate	3	0.91	3	0.00	3	0.54	3	0.00	
Mass loading for inhalation	2	0.97	2	0.01	2	0.77	2	0.01	
Indoor dust filtration factor	4	0.29	5	0.00	4	0.10	7	0.00	
External gamma shielding factor	8	0.04	14	0.00	16	-0.01	19	0.00	
Soil ingestion	1	1.00	1	1.00	1	1.00	1	1.00	
Aquatic food	13	-0.02	17	0.00	21	0.01	22	0.00	
Kd of Fe-55 in Contaminated Zone	10	-0.03	16	0.00	13	-0.03	14	0.00	
Kd of Fe-55 in Unsaturated Zone 1	20	0.01	20	0.00	9	-0.03	11	0.00	
Kd of Fe-55 in Saturated Zone	23	0.00	23	0.00	23	0.00	23	0.00	
Fish transfer factor for Fe	14	-0.02	18	0.00	15	-0.02	17	0.00	

H-3 Results:

RESRAD Regression and Correlation output 07/12/23 10:48 Page: Coef 1
 Title : OCNCS Industrial Use_Probabilistic Analysis_H3
 Input File : OC_IU_SA_H3.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Thickness of contaminated zone	2	0.71	1	0.83	2	0.71	1	0.84	
Density of contaminated zone	5	0.19	4	0.17	5	0.15	4	0.13	
Contaminated zone total porosity	22	0.00	20	0.00	11	-0.04	7	-0.03	
Contaminated zone b parameter	16	0.01	18	0.00	16	0.02	18	0.00	
Evapotranspiration coefficient	3	0.63	3	0.22	3	0.59	3	0.20	
Density of saturated zone	10	-0.03	6	-0.02	15	-0.02	9	-0.02	
Saturated zone total porosity	13	-0.02	7	-0.02	22	-0.01	17	0.00	
Saturated zone hydraulic gradient	8	0.03	10	0.01	21	0.01	22	0.00	
Saturated zone b parameter	18	-0.01	19	0.00	8	-0.04	12	-0.01	
Thickness of Unsaturated zone 1	23	0.00	21	0.00	19	-0.01	13	-0.01	
Density of Unsaturated zone 1	19	0.01	15	0.01	10	0.04	6	0.03	
Total Porosity of Unsaturated zone 1	17	0.01	12	0.01	12	0.03	8	0.02	
b Parameter of Unsaturated zone 1	11	0.02	13	0.01	17	0.02	19	0.00	
Inhalation rate	1	0.81	2	0.38	1	0.80	2	0.36	
Mass loading for inhalation	6	0.05	8	0.01	7	0.05	11	0.01	
Indoor dust filtration factor	15	-0.01	17	0.00	18	-0.01	20	0.00	

External gamma shielding factor	21	0.00	23	0.00	13	0.02	15	0.01
Soil ingestion	9	-0.03	11	-0.01	14	-0.02	16	-0.01
Aquatic food	14	0.02	16	0.00	20	-0.01	21	0.00
Kd of H-3 in Contaminated Zone	4	-0.33	5	-0.10	4	-0.28	5	-0.08
Kd of H-3 in Unsaturated Zone 1	7	0.04	9	0.01	9	0.04	14	0.01
Kd of H-3 in Saturated Zone	12	0.02	14	0.01	6	0.06	10	0.02
Fish transfer factor for H	20	0.00	22	0.00	23	0.00	23	0.00

Mn-54 Results:

RESRAD Regression and Correlation output 07/12/23 10:58 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Mn54
Input File : OC_IU_SA_MN54.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	
Thickness of contaminated zone	2	0.07	2	0.12	3	0.08	3	0.08	
Density of contaminated zone	6	0.03	4	0.05	9	0.03	5	0.03	
Contaminated zone total porosity	21	0.01	17	0.01	21	0.00	15	0.00	
Contaminated zone b parameter	11	-0.02	14	-0.01	6	-0.04	10	-0.01	
Evapotranspiration coefficient	18	0.01	21	0.01	18	0.01	20	0.00	
Density of saturated zone	19	0.01	8	0.02	22	0.00	18	0.00	
Saturated zone total porosity	22	0.00	19	0.01	16	-0.01	12	-0.01	
Saturated zone hydraulic gradient	17	0.01	20	0.01	17	-0.01	19	0.00	
Saturated zone b parameter	10	-0.02	13	-0.01	19	-0.01	21	0.00	
Thickness of Unsaturated zone 1	14	-0.02	7	-0.03	7	-0.03	4	-0.03	
Density of Unsaturated zone 1	4	0.03	3	0.05	10	0.03	6	0.03	
Total Porosity of Unsaturated zone 1	12	0.02	5	0.03	12	0.03	7	0.03	
b Parameter of Unsaturated zone 1	7	0.03	10	0.01	8	0.03	11	0.01	
Inhalation rate	15	0.02	16	0.01	20	0.00	22	0.00	
Mass loading for inhalation	13	-0.02	15	-0.01	14	-0.01	16	0.00	
Indoor dust filtration factor	3	-0.06	6	-0.03	15	-0.01	17	0.00	
External gamma shielding factor	1	0.84	1	0.83	1	0.94	1	0.93	
Soil ingestion	16	0.01	18	0.01	11	0.03	13	0.01	
Aquatic food	20	-0.01	22	0.00	23	0.00	23	0.00	
Kd of Mn-54 in Contaminated Zone	5	0.03	9	0.02	2	0.28	2	0.10	
Kd of Mn-54 in Unsaturated Zone 1	9	-0.02	12	-0.01	4	0.04	8	0.01	
Kd of Mn-54 in Saturated Zone	8	0.02	11	0.01	5	0.04	9	0.01	
Fish transfer factor for Mn	23	0.00	23	0.00	13	0.02	14	0.01	

Nb-94 Results:

RESRAD Regression and Correlation output 07/10/23 16:01 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Nb94
Input File : OC_IU_SA_NB94.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	
Thickness of contaminated zone	2	0.07	2	0.08	3	0.08	2	0.07	
Density of contaminated zone	5	0.04	3	0.05	5	0.03	3	0.03	
Contaminated zone total porosity	18	0.01	12	0.01	23	0.00	23	0.00	
Contaminated zone b parameter	7	-0.03	9	-0.01	11	-0.02	13	-0.01	
Evapotranspiration coefficient	21	0.00	21	0.00	22	-0.01	22	0.00	
Density of saturated zone	14	0.01	7	0.01	18	-0.01	9	-0.01	
Saturated zone total porosity	16	0.01	8	0.01	17	-0.01	8	-0.01	
Saturated zone hydraulic gradient	10	-0.03	13	-0.01	16	-0.02	18	0.00	
Saturated zone b parameter	9	-0.03	11	-0.01	12	-0.02	14	-0.01	
Thickness of Unsaturated zone 1	6	-0.03	4	-0.04	6	-0.03	5	-0.02	
Density of Unsaturated zone 1	20	0.01	18	0.01	9	0.03	7	0.02	
Total Porosity of Unsaturated zone 1	19	0.01	17	0.01	8	0.03	6	0.02	
b Parameter of Unsaturated zone 1	4	0.04	6	0.02	4	0.04	10	0.01	
Inhalation rate	17	0.01	20	0.00	21	-0.01	21	0.00	
Mass loading for inhalation	15	-0.01	19	0.00	19	-0.01	19	0.00	
Indoor dust filtration factor	3	-0.06	5	-0.02	7	-0.03	11	-0.01	
External gamma shielding factor	1	0.93	1	0.92	1	0.96	1	0.96	
Soil ingestion	8	0.03	10	0.01	15	0.02	17	0.00	
Aquatic food	22	0.00	22	0.00	20	-0.01	20	0.00	
Fish transfer factor for Nb	23	0.00	23	0.00	14	0.02	16	0.00	
Kd of Nb-94 in Contaminated Zone	11	-0.02	14	-0.01	2	0.10	4	0.03	
Kd of Nb-94 in Unsaturated Zone 1	12	0.02	15	0.01	3	0.02	15	0.00	
Kd of Nb-94 in Saturated Zone	13	0.02	16	0.01	10	0.03	12	0.01	

Ni-63 Results:

RESRAD Regression and Correlation output 07/10/23 16:11 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Ni63
Input File : OC_IU_SA_NI63.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coef	Sig	Coef	Sig	Coef	Sig	Coef	
Thickness of contaminated zone	5	0.06	3	0.01	5	0.07	3	0.02	
Density of contaminated zone	19	0.00	13	0.00	15	0.01	8	0.00	
Contaminated zone total porosity	9	-0.02	9	0.00	16	0.01	9	0.00	
Contaminated zone b parameter	14	0.01	17	0.00	14	0.01	17	0.00	
Evapotranspiration coefficient	10	-0.02	14	0.00	19	-0.01	20	0.00	
Density of saturated zone	8	-0.04	6	-0.01	7	-0.04	6	-0.01	
Saturated zone total porosity	7	-0.04	5	-0.01	6	-0.04	5	-0.01	
Saturated zone hydraulic gradient	12	0.01	15	0.00	8	0.02	10	0.00	

Saturated zone b parameter	13	0.01	16	0.00	10	0.02	13	0.00
Thickness of Unsaturated zone 1	15	-0.01	12	0.00	21	0.00	18	0.00
Density of Unsaturated zone 1	11	0.01	10	0.00	18	0.01	11	0.00
Total Porosity of Unsaturated zone 1	16	0.01	11	0.00	23	0.00	22	0.00
b Parameter of Unsaturated zone 1	22	0.00	22	0.00	11	0.02	14	0.00
Inhalation rate	3	0.13	4	0.01	4	0.11	7	0.01
Mass loading for inhalation	2	0.23	2	0.02	3	0.21	4	0.02
Indoor dust filtration factor	20	0.00	20	0.00	13	-0.01	16	0.00
External gamma shielding factor	17	-0.01	18	0.00	22	0.00	23	0.00
Soil ingestion	1	1.00	1	1.00	1	1.00	1	1.00
Aquatic food	21	0.00	21	0.00	20	0.00	21	0.00
Fish transfer factor for Ni	18	-0.01	19	0.00	12	-0.02	15	0.00
Kd of Ni-63 in Contaminated Zone	6	0.06	8	0.00	2	0.36	2	0.03
Kd of Ni-63 in Unsaturated Zone 1	23	0.00	23	0.00	9	-0.02	12	0.00
Kd of Ni-63 in Saturated Zone	4	-0.08	7	-0.01	17	-0.01	19	0.00

Np-237 Results:

RESRAD Regression and Correlation output 07/10/23 16:23 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Np237
Input File : OC_IU_SA_NP237.RAD

Description of Probabilistic variable	PCC		SRC		PRCC		SRRC	
	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Kd of Np-237 in Contaminated Zone	3	0.20	4	0.14	3	0.61	3	0.32
Kd of Np-237 in Unsaturated Zone 1	8	0.04	11	0.03	13	0.03	17	0.01
Kd of Np-237 in Saturated Zone	16	-0.01	18	-0.01	24	0.01	26	0.01
Thickness of contaminated zone	5	0.12	3	0.26	6	0.15	4	0.19
Density of contaminated zone	11	0.03	8	0.06	30	0.00	29	0.00
Contaminated zone total porosity	27	0.01	16	0.01	16	-0.03	10	-0.04
Contaminated zone b parameter	15	0.02	17	0.01	20	-0.02	23	-0.01
Evapotranspiration coefficient	6	0.11	6	0.08	7	0.14	7	0.06
Density of saturated zone	14	-0.02	10	-0.04	11	-0.04	8	-0.05
Saturated zone total porosity	12	-0.03	9	-0.06	15	-0.03	9	-0.04
Saturated zone hydraulic gradient	13	0.02	14	0.02	9	0.04	13	0.02
Saturated zone b parameter	23	-0.01	26	-0.01	14	0.03	18	0.01
Thickness of Unsaturated zone 1	30	0.00	20	-0.01	22	-0.01	12	-0.02
Density of Unsaturated zone 1	24	0.01	15	0.02	28	0.01	21	0.01
Total Porosity of Unsaturated zone 1	31	0.00	27	0.01	25	-0.01	15	-0.01
b Parameter of Unsaturated zone 1	22	-0.01	25	-0.01	29	0.00	30	0.00
Inhalation rate	7	0.10	7	0.07	5	0.19	6	0.08
Mass loading for inhalation	4	0.18	5	0.13	4	0.32	5	0.14
Indoor dust filtration factor	9	0.04	12	0.03	10	0.04	14	0.02
External gamma shielding factor	2	0.47	2	0.37	2	0.72	2	0.44
Soil ingestion	1	0.59	1	0.51	1	0.85	1	0.67
Aquatic food	29	0.00	31	0.00	21	-0.01	24	-0.01
Fish transfer factor for Np	17	-0.01	19	-0.01	27	-0.01	28	0.00
Kd of Th-229 in Contaminated Zone	18	0.01	21	0.01	17	0.02	19	0.01
Kd of Th-229 in Unsaturated Zone 1	26	-0.01	29	0.00	12	-0.03	16	-0.01
Kd of Th-229 in Saturated Zone	25	0.01	28	0.00	26	0.01	27	0.00
Fish transfer factor for Th	10	0.03	13	0.02	8	0.04	11	0.02
Fish transfer factor for U	21	0.01	24	0.01	18	0.02	20	0.01
Kd of U-233 in Contaminated Zone	28	0.00	30	0.00	23	0.01	25	0.01
Kd of U-233 in Unsaturated Zone 1	19	0.01	23	0.01	19	-0.02	22	-0.01
Kd of U-233 in Saturated Zone	20	-0.01	22	-0.01	31	0.00	31	0.00

Pu-238 Results:

1 RESRAD Regression and Correlation output 07/10/23 16:42 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Pu238
Input File : OC_IU_SA_PU238.RAD

Description of Probabilistic variable	PCC		SRC		PRCC		SRRC	
	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Thickness of contaminated zone	17	-0.02	7	0.00	24	-0.01	14	-0.01
Density of contaminated zone	21	0.02	10	0.00	37	0.00	29	0.00
Contaminated zone total porosity	19	0.02	9	0.00	40	0.00	38	0.00
Contaminated zone b parameter	29	0.01	30	0.00	7	-0.05	9	-0.01
Evapotranspiration coefficient	6	0.06	8	0.00	16	0.02	19	0.00
Density of saturated zone	36	-0.01	22	0.00	13	0.03	6	0.01
Saturated zone total porosity	40	0.00	38	0.00	11	0.03	5	0.01
Saturated zone hydraulic gradient	33	-0.01	34	0.00	26	0.01	27	0.00
Saturated zone b parameter	23	-0.01	24	0.00	29	0.01	31	0.00
Thickness of Unsaturated zone 1	15	-0.03	5	0.00	18	-0.02	12	-0.01
Density of Unsaturated zone 1	39	0.00	36	0.00	21	0.01	13	0.01
Total Porosity of Unsaturated zone 1	42	0.00	41	0.00	35	0.00	23	0.00
b Parameter of Unsaturated zone 1	28	-0.01	29	0.00	8	0.05	10	0.01
Inhalation rate	3	0.93	3	0.11	3	0.62	3	0.10
Mass loading for inhalation	2	0.98	2	0.23	2	0.84	2	0.20
Indoor dust filtration factor	4	0.34	4	0.02	4	0.12	4	0.02
External gamma shielding factor	20	0.02	21	0.00	23	-0.01	25	0.00
Soil ingestion	1	1.00	1	0.96	1	0.99	1	0.96
Aquatic food	12	-0.03	16	0.00	33	-0.01	35	0.00
Kd of Pu-238 in Contaminated Zone	18	0.02	20	0.00	10	0.04	15	0.01
Kd of Pu-238 in Unsaturated Zone 1	35	0.01	37	0.00	15	0.02	18	0.00
Kd of Pu-238 in Saturated Zone	43	0.00	43	0.00	17	0.02	20	0.00
Kd of Pb-210 in Contaminated Zone	27	0.01	28	0.00	14	-0.03	17	0.00
Kd of Pb-210 in Unsaturated Zone 1	34	-0.01	35	0.00	12	-0.03	16	0.00
Kd of Pb-210 in Saturated Zone	13	0.03	17	0.00	22	-0.01	24	0.00
Kd of Po-210 in Unsaturated Zone 1	38	0.00	40	0.00	43	0.00	43	0.00
Kd of Po-210 in Saturated Zone	31	0.01	32	0.00	28	-0.01	30	0.00
Kd of Ra-226 in Contaminated Zone	11	-0.03	15	0.00	39	0.00	40	0.00
Kd of Ra-226 in Unsaturated Zone 1	10	-0.04	14	0.00	36	0.00	37	0.00
Kd of Ra-226 in Saturated Zone	7	-0.05	11	0.00	41	0.00	41	0.00
Kd of Th-230 in Contaminated Zone	14	0.03	18	0.00	5	0.06	7	0.01
Kd of Th-230 in Unsaturated Zone 1	25	0.01	26	0.00	34	-0.01	36	0.00

Kd of Th-230 in Saturated Zone	16	0.02	19	0.00	38	0.00	39	0.00
Kd of U-234 in Contaminated Zone	8	-0.04	12	0.00	42	0.00	42	0.00
Kd of U-234 in Unsaturated Zone 1	9	0.04	13	0.00	9	0.05	11	0.01
Kd of U-234 in Saturated Zone	5	-0.07	6	0.00	20	0.02	22	0.00
Fish transfer factor for Pu	30	-0.01	31	0.00	31	0.01	33	0.00
Fish transfer factor for Pb	22	-0.01	23	0.00	25	0.01	26	0.00
Fish transfer factor for Po	24	-0.01	25	0.00	32	0.01	34	0.00
Fish transfer factor for Ra	26	-0.01	27	0.00	30	0.01	32	0.00
Fish transfer factor for Th	32	0.01	33	0.00	6	-0.06	8	-0.01
Fish transfer factor for U	41	0.00	42	0.00	27	0.01	28	0.00
Kd of Po-210 in Contaminated Zone	37	0.00	39	0.00	19	-0.02	21	0.00

Pu-239 Results:

RESRAD Regression and Correlation output 07/10/23 16:51 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Pu239
Input File : OC_IU_SA_PU239.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Thickness of contaminated zone	17	0.02	9	0.05	4	0.23	1	0.46	
Density of contaminated zone	10	-0.03	4	-0.10	26	0.01	13	0.02	
Contaminated zone total porosity	15	-0.02	6	-0.08	30	-0.01	23	-0.01	
Contaminated zone b parameter	18	-0.02	20	-0.02	27	-0.01	31	0.00	
Evapotranspiration coefficient	9	-0.03	13	-0.03	35	0.00	35	0.00	
Density of saturated zone	7	0.04	3	0.12	32	-0.01	24	-0.01	
Saturated zone total porosity	6	0.04	2	0.14	23	0.01	12	0.02	
Saturated zone hydraulic gradient	34	0.00	34	0.00	17	-0.02	20	-0.01	
Saturated zone b parameter	32	0.00	32	0.00	16	-0.02	19	-0.01	
Thickness of Unsaturated zone 1	28	-0.01	19	-0.02	28	-0.01	16	-0.01	
Density of Unsaturated zone 1	29	0.00	24	-0.01	13	-0.02	8	-0.05	
Total Porosity of Unsaturated zone 1	21	0.02	10	0.05	34	0.00	30	0.00	
b Parameter of Unsaturated zone 1	19	0.02	21	0.02	14	0.02	17	0.01	
Inhalation rate	20	-0.02	22	-0.02	19	0.02	22	0.01	
Mass loading for inhalation	35	0.00	35	0.00	6	0.14	6	0.09	
Indoor dust filtration factor	8	0.03	12	0.03	22	0.01	27	0.01	
External gamma shielding factor	13	-0.03	16	-0.02	21	0.01	26	0.01	
Soil ingestion	24	-0.01	26	-0.01	2	0.43	3	0.30	
Aquatic food	5	0.05	11	0.05	10	0.05	11	0.03	
Kd of Pu-239 in Contaminated Zone	4	-0.06	8	-0.06	1	0.57	2	0.44	
Kd of Pu-239 in Unsaturated Zone 1	2	-0.08	5	-0.08	3	-0.34	4	-0.23	
Kd of Pu-239 in Saturated Zone	3	-0.08	7	-0.08	5	-0.21	5	-0.14	
Kd of Ac-227 in Contaminated Zone	12	-0.03	15	-0.03	25	-0.01	29	-0.01	
Kd of Ac-227 in Unsaturated Zone 1	11	0.03	14	0.03	24	-0.01	28	-0.01	
Kd of Ac-227 in Saturated Zone	26	-0.01	28	-0.01	11	0.03	14	0.02	
Kd of Pa-231 in Contaminated Zone	14	-0.03	17	-0.02	31	-0.01	33	0.00	
Kd of Pa-231 in Unsaturated Zone 1	31	0.00	31	0.00	7	0.09	7	0.06	
Kd of Pa-231 in Saturated Zone	22	-0.01	23	-0.01	12	-0.02	15	-0.02	
Kd of U-235 in Contaminated Zone	16	-0.02	18	-0.02	9	-0.05	10	-0.03	
Kd of U-235 in Unsaturated Zone 1	23	0.01	25	0.01	15	-0.02	18	-0.01	
Kd of U-235 in Saturated Zone	33	0.00	33	0.00	20	0.02	25	0.01	
Fish transfer factor for Pu	1	0.15	1	0.14	8	0.05	9	0.03	
Fish transfer factor for Ac	25	0.01	27	0.01	29	0.01	32	0.00	
Fish transfer factor for Pa	27	-0.01	29	-0.01	18	-0.02	21	-0.01	
Fish transfer factor for U	30	0.00	30	0.00	33	0.00	34	0.00	

Pu-240 Results:

RESRAD Regression and Correlation output 07/10/23 17:01 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Pu240
Input File : OC_IU_SA_PU240.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =		1		1		1		1	
Repetition =									
Description of Probabilistic Variable	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff	
Thickness of contaminated zone	17	0.01	7	0.04	5	0.20	2	0.41	
Density of contaminated zone	25	0.01	10	0.02	24	0.01	10	0.03	
Contaminated zone total porosity	10	0.02	4	0.06	35	0.00	29	0.01	
Contaminated zone b parameter	8	0.02	11	0.02	15	0.03	19	0.02	
Evapotranspiration coefficient	9	-0.02	13	-0.02	9	0.04	13	0.02	
density of saturated zone	7	0.02	3	0.07	28	-0.01	14	-0.02	
Saturated zone total porosity	6	0.03	2	0.10	27	-0.01	12	-0.03	
Saturated zone hydraulic gradient	13	-0.02	17	-0.02	37	0.00	37	0.00	
Saturated zone b parameter	16	0.01	20	0.01	14	0.03	18	0.02	
Thickness of Unsaturated zone 1	37	0.00	36	0.00	12	-0.03	6	-0.06	
Density of Unsaturated zone 1	31	-0.01	16	-0.02	36	0.00	30	-0.01	
Total Porosity of Unsaturated zone 1	27	0.01	12	0.02	26	0.01	11	0.03	
b Parameter of Unsaturated zone 1	12	-0.02	15	-0.02	13	0.03	17	0.02	
Inhalation rate	20	0.01	23	0.01	8	0.05	9	0.03	
Mass loading for inhalation	35	0.00	35	0.00	6	0.07	7	0.04	
Indoor dust filtration factor	5	-0.03	9	-0.03	22	0.02	26	0.01	
External gamma shielding factor	36	0.00	37	0.00	20	-0.02	24	-0.01	
Soil ingestion	19	-0.01	22	-0.01	2	0.43	3	0.31	
Aquatic food	18	0.01	21	0.01	7	-0.05	8	-0.03	
Kd of Pu-240 in Contaminated Zone	4	-0.04	8	-0.04	1	0.54	1	0.42	
Kd of Pu-240 in Unsaturated Zone 1	3	-0.05	6	-0.05	3	-0.29	4	-0.20	
Kd of Pu-240 in Saturated Zone	2	-0.05	5	-0.05	4	-0.22	5	-0.14	
Kd of Ra-228 in Contaminated Zone	21	-0.01	24	-0.01	11	0.04	16	0.02	
Kd of Ra-228 in Unsaturated Zone 1	15	-0.01	19	-0.01	30	-0.01	32	-0.01	
Kd of Ra-228 in Saturated Zone	32	0.01	32	0.01	23	0.01	27	0.01	
Kd of Th-228 in Contaminated Zone	23	-0.01	26	-0.01	29	-0.01	31	-0.01	
Kd of Th-228 in Unsaturated Zone 1	30	0.01	31	0.01	10	-0.04	15	-0.02	
Kd of Th-228 in Saturated Zone	11	-0.02	14	-0.02	25	0.01	28	0.01	
Kd of Th-232 in Contaminated Zone	29	-0.01	29	-0.01	18	0.02	22	0.01	
Kd of Th-232 in Unsaturated Zone 1	26	-0.01	28	-0.01	31	-0.01	33	-0.01	

Kd of Th-232 in Saturated Zone	14	-0.01	18	-0.01	19	-0.02	23	-0.01
Kd of U-236 in Contaminated Zone	28	-0.01	30	-0.01	38	0.00	38	0.00
Kd of U-236 in Unsaturated Zone 1	38	0.00	38	0.00	32	0.01	34	0.00
Kd of U-236 in Saturated Zone	34	0.00	34	0.00	21	-0.02	25	-0.01
Fish transfer factor for Pu	1	0.12	1	0.12	16	0.02	20	0.02
Fish transfer factor for Ra	24	-0.01	27	-0.01	17	0.02	21	0.02
Fish transfer factor for Th	33	0.00	33	0.00	33	-0.01	35	0.00
Fish transfer factor for U	22	-0.01	25	-0.01	34	-0.01	36	0.00

Pu-241 Results:

RESRAD Regression and Correlation output 07/10/23 18:02 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Pu241
Input File : OC_IU_SA_PU241.RAD

Description of Probabilistic variable	PCC		SRC		PRCC		SRRC	
	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Kd of Am-241 in Contaminated Zone	4	0.12	7	0.05	3	0.44	3	0.17
Kd of Am-241 in Unsaturated Zone 1	18	-0.02	21	-0.01	20	0.02	22	0.01
Kd of Am-241 in Saturated Zone	33	0.00	33	0.00	34	-0.01	35	0.00
Kd of Np-237 in Contaminated Zone	15	-0.02	19	-0.01	14	0.03	18	0.01
Kd of Np-237 in Unsaturated Zone 1	19	0.02	22	0.01	25	0.01	26	0.00
Kd of Np-237 in Saturated Zone	39	0.00	39	0.00	23	0.02	24	0.01
Kd of Th-229 in Contaminated Zone	11	0.04	15	0.02	13	0.04	17	0.01
Kd of Th-229 in Unsaturated Zone 1	14	-0.03	18	-0.01	15	-0.03	19	-0.01
Kd of Th-229 in Saturated Zone	35	0.00	35	0.00	36	0.00	37	0.00
Kd of U-233 in Contaminated Zone	23	-0.01	25	-0.01	29	0.01	29	0.00
Kd of U-233 in Unsaturated Zone 1	29	-0.01	29	0.00	17	-0.02	20	-0.01
Kd of U-233 in Saturated Zone	27	-0.01	28	0.00	28	0.01	28	0.00
Fish transfer factor for Am	26	0.01	27	0.00	18	-0.02	21	-0.01
Fish transfer factor for Np	32	0.00	32	0.00	35	0.00	36	0.00
Fish transfer factor for Th	24	0.01	26	0.00	30	-0.01	30	0.00
Fish transfer factor for U	38	0.00	38	0.00	24	0.01	25	0.00
Thickness of contaminated zone	6	0.11	3	0.14	7	0.13	4	0.14
Density of contaminated zone	21	0.02	13	0.03	16	0.03	11	0.03
Contaminated zone total porosity	28	-0.01	20	-0.01	38	0.00	32	0.00
Contaminated zone b parameter	37	0.00	37	0.00	27	-0.01	27	0.00
Evapotranspiration coefficient	5	0.11	8	0.05	6	0.13	9	0.05
Density of saturated zone	10	-0.04	5	-0.06	12	-0.05	8	-0.05
Saturated zone total porosity	12	-0.04	6	-0.06	10	-0.05	7	-0.06
Saturated zone hydraulic gradient	36	0.00	36	0.00	21	-0.02	23	-0.01
Saturated zone b parameter	31	0.01	31	0.00	39	0.00	39	0.00
Thickness of Unsaturated zone 1	17	-0.02	11	-0.03	22	-0.02	14	-0.02
Density of Unsaturated zone 1	25	0.01	17	0.02	26	0.01	16	0.01
Total Porosity of Unsaturated zone 1	16	0.02	10	0.03	19	0.02	13	0.02
b Parameter of Unsaturated zone 1	20	-0.02	23	-0.01	37	0.00	38	0.00
Inhalation rate	3	0.19	4	0.08	5	0.22	6	0.08
Mass loading for inhalation	2	0.43	2	0.21	2	0.47	2	0.19
Indoor dust filtration factor	9	0.06	14	0.02	9	0.07	12	0.03
External gamma shielding factor	8	0.06	12	0.03	8	0.09	10	0.03
Soil ingestion	1	0.89	1	0.85	1	0.93	1	0.88
Aquatic food	30	0.01	30	0.00	32	0.01	33	0.00
Kd of Pu-241 in Contaminated Zone	7	0.09	9	0.04	4	0.28	5	0.10
Kd of Pu-241 in Unsaturated Zone 1	13	-0.04	16	-0.02	11	-0.02	15	-0.02
Kd of Pu-241 in Saturated Zone	22	-0.02	24	-0.01	33	-0.01	34	0.00
Fish transfer factor for Pu	34	0.00	34	0.00	31	0.01	31	0.00

Sb-125 Results:

RESRAD Regression and Correlation output 07/10/23 17:11 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Sb-125
Input File : OC_IU_SA_SBI25.RAD

Description of Probabilistic variable	PCC		SRC		PRCC		SRRC	
	Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Thickness of contaminated zone	3	0.10	2	0.27	3	0.16	3	0.23
Density of contaminated zone	7	0.02	5	0.06	9	0.04	8	0.05
Contaminated zone total porosity	26	0.00	21	0.01	20	0.01	12	0.02
Contaminated zone b parameter	20	0.01	22	0.01	12	-0.03	14	-0.01
Evapotranspiration coefficient	4	0.10	4	0.08	4	0.16	4	0.07
Density of saturated zone	19	-0.01	11	-0.02	11	0.03	9	0.05
Saturated zone total porosity	25	0.00	16	-0.01	7	0.04	6	0.06
Saturated zone hydraulic gradient	14	-0.01	17	-0.01	16	-0.02	17	-0.01
Saturated zone b parameter	8	0.02	12	0.02	26	0.00	26	0.00
Thickness of Unsaturated zone 1	18	-0.01	9	-0.02	15	-0.02	10	-0.03
Density of Unsaturated zone 1	9	0.02	6	0.05	6	0.04	5	0.06
Total Porosity of Unsaturated zone 1	13	0.02	8	0.04	8	0.04	7	0.06
b Parameter of Unsaturated zone 1	11	0.02	14	0.02	18	0.01	19	0.01
Inhalation rate	21	0.01	23	0.01	19	0.01	20	0.01
Mass loading for inhalation	16	0.01	19	0.01	27	0.00	27	0.00
Indoor dust filtration factor	23	-0.01	25	0.00	13	0.02	15	0.01
External gamma shielding factor	1	0.41	1	0.39	1	0.85	1	0.72
Soil ingestion	22	0.01	24	0.01	22	0.01	22	0.00
Aquatic food	6	-0.03	10	-0.02	25	0.00	25	0.00
Kd of Sb-125 in Contaminated Zone	2	0.13	3	0.11	2	0.73	2	0.47
Kd of Sb-125 in Unsaturated zone 1	15	0.01	18	0.01	23	0.01	23	0.00
Kd of Sb-125 in Saturated zone	17	-0.01	20	-0.01	24	0.01	24	0.00
Kd of Te-125m in Contaminated Zone	5	-0.06	7	-0.05	21	-0.01	21	0.00
Kd of Te-125m in Unsaturated Zone 1	24	0.00	26	0.00	17	0.02	18	0.01
Kd of Te-125m in Saturated Zone	27	0.00	27	0.00	14	-0.02	16	-0.01
Fish transfer factor for Sb	12	-0.02	15	-0.01	10	0.03	13	0.02
Fish transfer factor for Te	10	-0.02	13	-0.02	5	-0.05	11	-0.02

Sr-90 Results:

RESRAD Regression and Correlation output 07/10/23 17:17 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Sr-90
Input File : OC_IU_SA_SR90.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =	Repetition =	1	1	1	1	1	1	1	1
Description of Probabilistic Variable		Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Thickness of contaminated zone		4	0.08	3	0.17	4	0.12	4	0.14
Density of contaminated zone		14	0.02	9	0.03	7	0.04	5	0.05
Contaminated zone total porosity		21	0.00	19	0.00	13	0.02	9	0.03
Contaminated zone b parameter		18	-0.01	18	0.00	18	-0.01	20	0.00
Evapotranspiration coefficient		5	0.05	10	0.03	5	0.07	7	0.03
Density of saturated zone		11	0.02	6	0.04	9	0.03	6	0.04
Saturated zone total porosity		17	0.01	14	0.02	14	0.02	10	0.03
Saturated zone hydraulic gradient		16	0.01	17	0.01	16	-0.02	16	-0.01
Saturated zone b parameter		19	0.00	20	0.00	20	0.00	21	0.00
Thickness of Unsaturated zone 1		13	-0.02	8	-0.03	19	0.00	17	-0.01
Density of Unsaturated zone 1		9	0.03	5	0.06	23	0.00	23	0.00
Total Porosity of Unsaturated zone 1		12	0.02	7	0.04	22	0.00	19	0.00
b Parameter of Unsaturated zone 1		20	0.00	21	0.00	10	0.03	12	0.01
Inhalation rate		10	0.02	15	0.01	12	0.02	14	0.01
Mass loading for inhalation		22	0.00	22	0.00	11	0.03	13	0.01
Indoor dust filtration factor		6	-0.05	11	-0.03	8	-0.04	11	-0.01
External gamma shielding factor		2	0.42	2	0.31	2	0.66	2	0.35
Soil ingestion		1	0.68	1	0.63	1	0.89	1	0.78
Aquatic food		23	0.00	23	0.00	15	-0.02	15	-0.01
Kd of Sr-90 in Contaminated Zone		3	0.14	4	0.09	3	0.59	3	0.29
Kd of Sr-90 in Unsaturated Zone 1		15	-0.01	16	-0.01	17	0.01	18	0.00
Kd of Sr-90 in Saturated Zone		7	0.04	12	0.03	6	0.07	8	0.03
Fish transfer factor for Sr		8	-0.03	13	-0.02	21	0.00	22	0.00

Tc-99 Results:

RESRAD Regression and Correlation output 07/10/23 17:24 Page: Coef 1
Title : OCNCS Industrial Use_Probabilistic Analysis_Tc-99
Input File : OC_IU_SA_TC99.RAD

Coefficients for peak of mean dose time Dose		PCC		SRC		PRCC		SRRC	
Coefficient =	Repetition =	1	1	1	1	1	1	1	1
Description of Probabilistic Variable		Sig	Coeff	Sig	Coeff	Sig	Coeff	Sig	Coeff
Thickness of contaminated zone		5	0.10	3	0.20	4	0.19	3	0.29
Density of contaminated zone		22	0.00	19	0.00	10	0.04	8	0.06
Contaminated zone total porosity		14	-0.02	10	-0.05	19	-0.01	14	-0.01
Contaminated zone b parameter		10	-0.04	13	-0.02	18	0.01	21	0.00
Evapotranspiration coefficient		7	0.09	9	0.06	9	0.06	10	0.03
Density of saturated zone		20	0.00	18	0.00	21	0.00	19	-0.01
Saturated zone total porosity		23	0.00	21	0.00	15	-0.01	12	-0.02
Saturated zone hydraulic gradient		4	0.11	6	0.07	5	0.17	6	0.08
Saturated zone b parameter		18	0.00	20	0.00	16	-0.01	18	-0.01
Thickness of Unsaturated zone 1		13	-0.02	12	-0.04	8	-0.08	5	-0.12
Density of Unsaturated zone 1		11	0.03	8	0.06	14	-0.02	11	-0.02
Total Porosity of Unsaturated zone 1		9	0.04	4	0.08	20	0.01	15	0.01
b Parameter of Unsaturated zone 1		16	0.01	16	0.01	11	0.03	13	0.01
Inhalation rate		15	0.02	15	0.01	12	-0.02	16	-0.01
Mass loading for inhalation		21	0.00	23	0.00	17	0.01	20	0.00
Indoor dust filtration factor		17	0.01	17	0.01	13	-0.02	17	-0.01
External gamma shielding factor		19	0.00	22	0.00	23	0.00	23	0.00
Soil ingestion		12	0.03	14	0.02	22	0.00	22	0.00
Aquatic food		2	0.34	2	0.23	2	0.53	2	0.31
Kd of Tc-99 in Contaminated Zone		6	-0.09	7	-0.06	6	-0.12	7	-0.06
Kd of Tc-99 in Unsaturated Zone 1		3	-0.11	5	-0.07	3	-0.31	4	-0.16
Kd of Tc-99 in Saturated Zone		8	-0.07	11	-0.04	7	-0.10	9	-0.05
Fish transfer factor for Tc		1	0.71	1	0.66	1	0.80	1	0.67