Radionuclide [a]	Units	EPA CERCLA Methodology – Site Specific	EPA CWA Methodology - Defaults
		Site-Specific Instream Ambient Water Quality Criteria (AWQC) Equivalent (assumes 15 fish meals/year)	CWA Guidance Defaults Instream AWQC (assumes 34 fish meals/year)
Cs-137 [c]	pCi/L	1.2	0.19
Sr-90	pCi/L	385	42.8
Tc-99	pCi/L	1,883	297
U-238	pCi/L	972	159
C-14	pCi/L	0.141	0.0231
Co-60	pCi/L	66.6	10.9
Eu-154	pCi/L	61.1	9.98
Pu-238	pCi/L	0.0317	0.00511
Pu-239/240	pCi/L	0.0308	0.00496

a - Most mobile and commonly detected radionuclides at Oak Ridge Reservation.

b - These are example calculations only since actual radionuclide discharge limits will be a function of the

c - For comparison purposes, the drinking water standard (i.e., MCL) for Cs-137 is 200 pCi/L.

d - Samples for Gamma Spectroscopy can be reused for other analyses.

Bold value - Reporting limit exceeds all instream water quality criteria

Variable	DOE Methodology		
	Value	Source	Value
TR (target cancer risk), unitless	1×10^{-5}	Default	1×10^{-5}
EFf (exposure frequency), days/year	1	DOE proposed, no data to support	365
EDf (exposure duration), years	30	No longer used CERCLA Default	70
IRFa (fish consumption rate), grams/year	170 (6-ounce meal; 170 grams/meal)	Assumes a single 6-ounce meal at 170 grams/meal	7,700 (8-ounce meal; 22 grams/day)

Table 1. Comparison of Instream Water Quality Criteria for Bear Cree

Example End of Pipe Effluent Rad Discharge Limit (assuming assimilative capacity of 3) [b]
3.6
1,155
5,649
2,916
0.424
200
183
0.0952
0.0924

e implemented engineering controls (size of pipe, water flow rate at end of pipe, flow rate of rec

Table 2. Comparison of Exposure Assumptions based on DO

EPA CWA Methodology
Source
CWA Default
CWA Default
CWA Default
CWA Default

ek based on EPA CERCLA, EPA CWA and DOE Proposal

Example End of Pipe Effluent Rad Discharge Limit (assuming assimilative capacity of 16) [b]
19.2
6160
30128
15552
2.26
1070
978
0.508
0.493

eiving body, etc.).

E, EPA CWA and EPA CERCLA Methodologies

EPA CERCLA Methodology
Value
1×10^{-5}
274
26
3,405 (8-ounce meal; 227 grams/meal)

Current Average Discharge Measurements at EMWMF (existing landfill)	Requested Reporting Limit [d]	DOE Proposal	Risk Associated with 25% DCS
		25% DCS Value	
5.05	0.1	750	6.25E-03
3.41	0.5	275	7.14E-06
171	0.5	11,000	5.84E-05
1.66	0.1	188	1.93E-06
--	3	15500	1.10E+00
3.46	0.1	1800	2.70E-04
8.65	0.5	3750	6.14E-04
--	0.01	37.5	1.18E-02
0.276	0.01	35	1.14E-02

Source
within SF's acceptable range
site specific based on local creel survey (i.e., TDEC's roving creel survey for Melton Hill, TN)
SF default
SF default

Rad Discharge Limits Calculation

(Based on 1E-5 Target Risk)

Fish tissue concentrations are net values for EFK 0.0

15 Fish Meals

Radionuclide	Food Ingestion Slope Factor (risk/pCi)	Ingestion Rate (g/meal) [8-oz fish meal]	Fish Meals per year	Ingestion rate (g/yr)	Years of Exposure
H-3	1.44E-13	227	15	3.41E+03	26
C-14	2.00E-12	227	15	3.41E+03	26
Cl-36	4.44E-12	227	15	3.41E+03	26
Co-60	2.23E-11	227	15	3.41E+03	26
Sr-90	9.53E-11	227	15	3.41E+03	26
Tc-99	4.00E-12	227	15	3.41E+03	26
I-129	3.22E-10	227	15	3.41E+03	26
Cs-137	3.74E-11	227	15	3.41E+03	26
Eu-154	1.42E-11	227	15	3.41E+03	26
Pb-210	3.44E-09	227	15	3.41E+03	26
Ra-226	5.14E-10	227	15	3.41E+03	26
Ra-228	1.42E-09	227	15	3.41E+03	26
Th-228	4.22E-10	227	15	3.41E+03	26
Th-230	1.19E-10	227	15	3.41E+03	26
Th-232	1.33E-10	227	15	3.41E+03	26
U-233/U-234	9.69E-11	227	15	3.41E+03	26
U-235/U-236	9.76E-11	227	15	3.41E+03	26
Np-237	9.10E-11	227	15	3.41E+03	26
U-238	1.21E-10	227	15	3.41E+03	26
Pu-238	1.69E-10	227	15	3.41E+03	26
Pu-239	1.74E-10	227	15	3.41E+03	26
Am-241	1.34E-10	227	15	3.41E+03	26

(zero values were used for negative net concentrations)

Fish Tissue Conc (pCi/g)	Baseline Risk	Remaining Target Risk (1E-5 minus baseline risk)	Fish tissue PRG (pCi/g)	EPA PRG Default Bioconc. Factor (pCi/kg per pCi/L)
0.255763636	3.26E-09	1.00E-05	7.84E+02	9.00E-01
0	0.00E+00	1.00E-05	5.65E+01	4.00E+05
0	0.00E+00	1.00E-05	2.54E+01	4.70E+01
0.000600727	1.19E-09	1.00E-05	5.06E+00	7.60E+01
0.069972727	5.90E-07	9.41E-06	1.12E+00	2.90E+00
0	0.00E+00	1.00E-05	2.82E+01	1.50E+01
0.011720909	3.34E-07	9.67E-06	3.39E-01	3.00E+01
0.016736364	5.54E-08	9.94E-06	3.00E+00	2.50E+03
0.005990909	7.53E-09	9.99E-06	7.95E+00	1.30E+02
0	0.00E+00	1.00E-05	3.28E-02	2.50E+01
0	0.00E+00	1.00E-05	2.20E-01	4.00E+00
0	0.00E+00	1.00E-05	7.95E-02	4.00E+00
0.007297364	2.73E-07	9.73E-06	2.60E-01	6.00E+00
0	0.00E+00	1.00E-05	9.49E-01	6.00E+00
0	0.00E+00	1.00E-05	8.49E-01	6.00E+00
3.13636E-05	2.69E-10	1.00E-05	1.17E+00	9.60E-01
0.001133155	9.79E-09	9.99E-06	1.16E+00	9.60E-01
0	0.00E+00	1.00E-05	1.24E+00	3.00E+01
0	0.00E+00	1.00E-05	9.34E-01	9.60E-01
0.002262364	3.38E-08	9.97E-06	6.66E-01	2.10E+04
0.002300909	3.54E-08	9.96E-06	6.47E-01	2.10E+04
0.001413518	1.68E-08	9.98E-06	8.42E-01	2.40E+02

Water column PRG (also Rad Discharge Limit w/o assimilative capacity) (pCi/L)	Ratio Rad discharge Limit to 25% DCS	Rad Discharge Limit w/factor 3 assimilative mixing (pCi/L)	Ratio Rad discharge Limit to 25% DCS	Rad Discharge Limit w/factor 16 assimilative mixing (pCi/L)	Ratio Rad discharge Limit to 25% DCS	EMWMF Mean Meas (pCi/L)	2011 ver. 25% DCS (pCi/L)	2011 ver. DCS (pCi/L)
8.71E+05	4.053	2.61E+06	12.158	1.39E+07	64.84	5.97E+02	**2.15E+05**	8.60E+05
1.41E-01	9.11E-06	4.24E-01	2.73E-05	2.26E+00	1.46E-04		**1.55E+04**	6.20E+04
5.41E+02	0.068	1.62E+03	0.203	8.66E+03	1.083		**8.00E+03**	3.20E+04
6.66E+01	0.037	2.00E+02	0.111	1.07E+03	0.592	3.46E+00	**1.80E+03**	7.20E+03
3.85E+02	1.398	1.15E+03	4.195	6.15E+03	22.376	3.41E+00	**2.75E+02**	1.10E+03
1.88E+03	0.171	5.65E+03	0.513	3.01E+04	2.738	1.71E+02	**1.10E+04**	4.40E+04
1.13E+01	0.137	3.39E+01	0.411	1.81E+02	2.192	1.46E+00	**8.25E+01**	3.30E+02
1.20E+00	0.002	3.60E+00	0.005	1.92E+01	0.026	5.05E+00	**7.50E+02**	3.00E+03
6.11E+01	0.016	1.83E+02	0.049	9.78E+02	0.261	8.65E+00	**3.75E+03**	1.50E+04
1.31E+00	0.135	3.94E+00	0.404	2.10E+01	2.155		**9.75E+00**	3.90E+01
5.49E+01	2.526	1.65E+02	7.578	8.79E+02	40.415	5.14E-01	**2.18E+01**	8.70E+01
1.99E+01	3.182	5.97E+01	9.546	3.18E+02	50.910	8.33E-01	**6.25E+00**	2.50E+01
4.34E+01	0.511	1.30E+02	1.532	6.94E+02	8.169	3.31E-01	**8.50E+01**	3.40E+02
1.58E+02	3.955	4.75E+02	11.865	2.53E+03	63.281	3.65E-01	**4.00E+01**	1.60E+02
1.42E+02	4.044	4.25E+02	12.133	2.26E+03	64.708	2.99E-01	**3.50E+01**	1.40E+02
1.21E+03	7.359	3.64E+03	22.077	1.94E+04	117.744	1.48E+01	**1.65E+02**	6.60E+02
1.20E+03	6.691	3.61E+03	20.073	1.93E+04	107.056	1.50E+00	**1.80E+02**	7.20E+02
4.14E+01	0.517	1.24E+02	1.552	6.62E+02	8.275	2.93E-01	**8.00E+01**	3.20E+02
9.72E+02	5.186	2.92E+03	15.559	1.56E+04	82.980	1.66E+00	**1.88E+02**	7.50E+02
3.17E-02	0.0008	9.52E-02	0.003	5.08E-01	0.014		**3.75E+01**	1.50E+02
3.08E-02	0.0009	9.24E-02	0.003	4.93E-01	0.014	2.76E-01	**3.50E+01**	1.40E+02
3.51E+00	0.083	1.05E+01	0.248	5.61E+01	1.320		**4.25E+01**	1.70E+02