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Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

for Maywood, New Jersey

U.S. Department of Energy

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109052

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COMMENTS: Susan -
A ~~formal~~ copy will follow. I won't be in on Friday.
Let's talk Monday morning.

- Jeff

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FROM:ERRD-PSB/FFS TO: 615 576 0956 OCT 1, 1993 7:09AM #194 P.01

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Attachment 1

The U.S. Department of Energy has submitted to Region II a site-specific risk assessment for the Maywood Site to support their proposed remedial goal of 15 pCi/g in the subsurface soils (defined as greater than 6" from surface). This risk assessment assumes that clean cover will be used for surface soils (0 - 6"), and therefore will not contribute any dose to potential receptors.

In reviewing this risk assessment and materials previously supplied by the DOE two key parameters have been identified as significantly affecting the potential risk attributable to residual radionuclides in soils. These two parameters are: (1) shielding, and; (2) assumed future use.

The tables contained in this attachment provide comparisons for a number of shielding and cover combinations, in addition to evaluating the potential risk to a receptor should the current commercial use of the MISS and other commercial properties become residential at some future time. With the exceptions of cover thickness and shielding values all parameters are identical to those in the DOE's risk assessments for this site. For future residential use at a current commercial site the same exposure parameters used for current residential use were entered into the RESRAD program with adjustments made for extent and thickness of contaminated zone (1000 m^2 and 2 m respectively) as well as length parallel to aquifer flow (2 m). Exposure assumptions for both residential and commercial property units are given in Tables 1 and 2.

Tables 3 and 4 evaluate potential dose and risk for current residential property units with varying levels of cover and shielding. Table 3 evaluates remediation to 15 pCi/g and Table 4 evaluates remediation to 5 pCi/g.

The potential for exposure and the resulting risk for future residential use of current commercial properties is evaluated in Tables 5 and 6 for 15 pCi/g and 5 pCi/g post remedial levels respectively. Since DOE contends that only future commercial use will occur for this property unit, DOE did not evaluate this scenario in their risk assessment. A worst case (no cover) employee scenario is also presented for both shielding values.

Soil concentration values for remediation to 15 pCi/g are the same as those in the DOE risk assessment, the distribution of activity for the 5 pCi/g post remedial concentrations is based on the ratios of contaminants presented in the DOE risk assessment. These distributions are given in Tables 7 and 8.

Table 1: Current Residential Property Units
Residential Scenario - Exposure Parameter Assumptions

Parameter	Units	RME Resident
Exposure time indoors	h/d	16.4
Exposure time outdoors	h/d	0.44
Exposure frequency	d/yr	350
Exposure duration	yr	30
Area of exposure unit	m^2	300
Depth of cover soil[a]	m	0
Indoor gamma shielding factor[b]	-	0.8 (20%)
Inhalation Rate	m^3/hr	0.83
Dust loading	ug/m^3	200
Dust from soil origin	%	50
Dust respirable fraction	%	30
Amount of outdoor dust present indoors	%	40
Soil ingestion rate	mg/d	100
Water ingestion rate	l/d	2.0
Fraction of drinking water from onsite well	-	1
Ingestion of home grown produce	g/d	80
Contaminated zone thickness	m	0.6

[a] The DOE uses a value of 0.15 - 1m for this parameter.
[b] The DOE uses a value of 0.3 or 70% for this parameter.

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Table 2: Current Commercial Property Units[1]
Residential Scenario - Exposure Parameter Assumptions

Parameter	Units	RME Resident
Exposure time indoors	h/d	16.4
Exposure time outdoors	h/d	0.44
Exposure frequency	d/yr	350
Exposure duration	yr	30
Area of exposure unit	m^2	1000
Depth of cover soil[a]	m	0
Indoor gamma shielding factor[b]	-	0.8 (20%)
Inhalation Rate	m^3/hr	0.83
Dust loading	ug/m^3	200
Dust from soil origin	%	50
Dust respirable fraction	%	30
Amount of outdoor dust present indoors	%	40
Soil ingestion rate	mg/d	100
Water ingestion rate	l/d	2.0
Fraction of drinking water from onsite well	-	1
Ingestion of home grown produce	g/d	80
Contaminated zone thickness	m	2.0

[a] The DOE uses a value of 0.15 - 1m for this parameter.
[b] The DOE uses a value of 0.3 or 70% for this parameter.

[1] The DOE assumes that current commercial properties remain commercial for future use, therefore this scenario has not been evaluated by the DOE. This assessment performed using the exposure parameters for the residential units in combination with the values of contaminated zone and thickness from the commercial use scenario given in the August 23, 1993 DOE "Attachment A".

Table 3: Current Residential Property Units Remediated to 15 pCi/g[2]

Scenario	Cover Thickness (m)	Shielding Value	Maximum Dose Rate (mRem/yr)	Excess Lifetime Cancer Risk
Residential	0	70%	52	5×10^{-4}
Residential	0	20%	122	1×10^{-3}
Residential	.3	70%	8	6×10^{-5}
Residential	.3	20%	15	1×10^{-4}
Residential	1	70%	2	6×10^{-6}
Residential	1	20%	2	6×10^{-6}

Table 4: Current Residential Property Units Remediated to 5 pCi/g[3]

Scenario	Cover Thickness (m)	Shielding Value	Maximum Dose Rate (mRem/yr)	Excess Lifetime Cancer Risk
Residential	0	70%	17	2×10^{-4}
Residential	0	20%	40	4×10^{-4}
Residential	.3	70%	3	2×10^{-5}
Residential	.3	20%	5	5×10^{-5}
Residential	1	70%	0.6	2×10^{-6}
Residential	1	20%	0.6	2×10^{-6}

[2] For distribution of activity refer to Table 7.

[3] For distribution of activity refer to Table 8.

Table 5: Current Commercial Property Units Remediated to 15 pCi/g.

Scenario	Cover Thickness (m)	Shielding Value	Maximum Dose Rate (mRem/yr)	Excess Lifetime Cancer Risk
Future Use Commercial	0	70%	36	3×10^{-4}
	0	20%	66	6×10^{-4}
Future Use Residential	0	70%	92	8×10^{-4}
	0	20%	189	2×10^{-3}
Future Use Residential	.15	70%	47	4×10^{-4}
	.15	20%	86	8×10^{-4}
Future Use Residential	.3	70%	23	1×10^{-4}
	.3	20%	33	2×10^{-4}

Table 6: Current Commercial Property Units Remediated to 5 pCi/g.

Scenario	Cover Thickness (m)	Shielding Value	Maximum Dose Rate (mRem/yr)	Excess Lifetime Cancer Risk
Future Use Commercial	0	70%	12	1×10^{-4}
	0	20%	22	2×10^{-4}
Future Use Residential	0	70%	30	3×10^{-4}
	0	20%	61	6×10^{-4}
Future Use Residential	.15	70%	15	1×10^{-4}
	.15	20%	28	3×10^{-4}
Future Use Residential	.3	70%	7	4×10^{-5}
	.3	20%	10	8×10^{-5}

Table 7: Assumed Soil Concentrations for 15 pCi/g Residual Activity, Combined Ra-226 + Ra-228

Radionuclide	Post Remedial Activity (pCi/g)
Ac-227	0.6
Pa-231	0.6
Pb-210	3.0
Ra-226	3.0
Ra-228	12.0
Th-228	12.0
Th-230	3.0
Th-232	12.0
U-234	12.0
U-235	0.6
U-238	12.0

Table 8: Assumed Soil Concentrations for 5 pCi/g Residual Activity, Combined Ra-226 + Ra-228

Radionuclide	Post Remedial Activity (pCi/g)
Ac-227	0.2
Pa-231	0.2
Pb-210	0.9
Ra-226	0.9
Ra-228	4.0
Th-228	4.0
Th-230	0.9
Th-232	4.0
U-234	4.0
U-235	0.2
U-238	4.0