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SHIELDALLOY METALLURGICAL CORPORATION

12 WEST BOULEVARD
P.O. BOX 768
NEWFIELD, NJ 08344-0768
TELEPHONE (856) 692-4200

DAVID R. SMITH
ENVIRONMENTAL MANAGER
Aluminum Products & Powders Division

October 6, 2003

Kenneth L. Kalman
Decommissioning Branch
Division of Waste Management
Office of Nuclear Materials Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Action Plan for Decommissioning the Newfield Facility (License No. SMB-743, Control No. 132074) - Rev. 001

Dear Mr. Kalman:

Previously Shieldalloy Metallurgical Corporation (SMC) forwarded to you an Action Plan and commitment dates as part of a phased approach to resubmission of the SMC decommissioning plan. Item No. 9 of the Action Plan was to select input parameters for dose modeling of the preferred decommissioning approach and forward that selection to the USNRC.

The purpose of this letter is to transmit our selections to you. Included herein is a brief description of the exposure scenario we are evaluating as part of the decommissioning planning process (Attachment 1), the exposure pathways associated with that scenario (Attachment 2), a listing of the input parameters that we intend to use for dose modeling (Attachment 3), and the distribution parameters for the uncertainty induced in the modeling output as a result of the inherent error in each of the input parameters (Attachments 4 and 5).

As new/improved information is gained, we will modify these parameters accordingly. However, your feedback on whether the approach described herein is generally acceptable for technical review us solicited,

If you have any questions, do not hesitate to call me at (856) 692-4200, ex. 226. We look forward to continued progress towards termination of License No. SMB-743.

Sincerely,

David R. Smith

David R. Smith
Radiation Safety Officer

cc: Eric Jackson
Joe Diegel
Charles L. Harp, Esq. - Archer & Greiner
Carol D. Berger, C.H.P. - IEM
Robert Johnson - USNRC (Hq)
Ronald Bellamy - USNRC Region I
Marie Miller - USNRC Region I

ATTACHMENT 1
Exposure Scenario for the Preferred Decommissioning Alternative

The SMC site in Newfield, as well as its general vicinity, is zoned for heavy industry. Land use plans for this location show no change over the next 50 years, and the Site Specific Advisory Board (SSAB) for the SMC decommissioning is encouraging and desirous of continued industrial activities over the years. Therefore, the Industrial Worker scenario is deemed most applicable for dose modeling of the site in order to demonstrate compliance with the requirements for restricted release as described in Title 10, Code of Federal Regulations, Section 20.1402 (10 CFR 20.1402). In this scenario, a hypothetical worker would presumably spend as much as eight (8) hours per day somewhere on the SMC property. Because no livestock or foodstuffs would be raised or produced at the site, the industrial worker would not consume any of these items. However, the industrial worker is assumed to exhibit a higher inhalation rate than a resident, and he/she is assumed to drink water from an on-site well.[3]

There are additional reasons for selecting the industrial worker scenario rather than a more restrictive scenario, such as a resident farmer or suburban resident, although the radiation doses associated with these scenarios will be evaluated as part of the decommissioning planning process. For example, the capped storage pile that is described in Rev. 1 of the DP is shaped in such a way that construction of a residence on any of its surfaces could not occur. Furthermore, there will be insufficient area to construct a home directly on the capped pile even if the surface design would support such a construction.

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[3] There have never been drinking water wells on the SMC property, and it is not likely that wells will be used in the future. The Borough of Newfield has provided drinking water to the plant for the past 50 years. However, this assumption will be included in the dose modeling in order to maintain an element of conservatism.

ATTACHMENT 2
Exposure Pathways for the Applicable Exposure Scenario

The computer code, RESRAD, will be used to model the fate and transport of the residual radioactivity at the SMC facility after decommissioning is complete, and to demonstrate compliance with the dose limits in 10 CFR 20.1402. The RESRAD code permits the selection of viable exposure pathways that are specific to the exposure scenario applicable to the site. As shown in Attachment 1, above, the applicable exposure pathway is the Industrial Worker. However, doses will also be assessed for a resident farmer and for a suburban resident.[4] The following are the exposure pathways that will be considered during the dose modeling:

Pathway	Resident Farmer	Suburban Resident	Industrial Worker
External gamma exposure	yes	yes	yes
Inhalation of dust	yes	yes	yes
Radon inhalation	no (consideration not required)	no (consideration not required)	no (consideration not required)
Ingestion of plant foods	no (geotextile liner in the cap construction prevents plant root intrusion into the contaminated zone.)	no (geotextile liner in the cap construction prevents plant root intrusion into the contaminated zone.)	no
Ingestion of meat	yes	no	no
Ingestion of milk	yes	no	no
Ingestion of fish	yes	no	no
Ingestion of soil	yes	yes	yes
Ingestion of water	yes	no	yes

[4] In the case of the resident farmer and suburban resident, it is assumed that the home will be constructed next to the capped pile since the shape of the finished pile and its dimensions will not support the construction of a residence.

ATTACHMENT 3
Input parameters for Dose Modeling

Parameter	RESRAD Default Value	Site Specific Input Value	Basis for Selection of Site-specific Input Value
Area of contaminated zone (AREA)	10,000 m^2	20,446 m^2	IT Corporation, 1992
Thickness of contaminated zone (THICK0)	2 m	2.8 m	IT Corporation, 1992
Length parallel to aquifer flow (LCZPAQ)	100 m	182.9 m	IT Corporation, 1992
Concentration of Thorium 232 (S1) (1)	Not provided	182 pCi/gram	IT Corporation, 1992
Concentration of Radium 228 (S1) (2)	Not provided	182 pCi/gram	Assumed to be in equilibrium with parent, Th-232
Concentration of Thorium 228 (S1) (3)	Not provided	182 pCi/gram	IT Corporation, 1992
Concentration of Uranium 238 (S1) (4)	Not provided	182 pCi/gram	IT Corporation, 1992
Concentration of Uranium 234 (S1) (5)	Not provided	182 pCi/gram	Assumed to be in equilibrium with parent, U-238
Concentration of Thorium 230 (S1) (6)	Not provided	182 pCi/gram	IT Corporation, 1992
Concentration of Radium 226 (S1) (7)	Not provided	182 pCi/gram	IT Corporation, 1992
Concentration of Lead 210 (S1) (8)	Not provided	182 pCi/gram	Assumed to be in equilibrium with Ra-226
Cover depth (COVER0)	0 m	1.0 m	Proposed thickness of finished cap
Density of cover material (DENSCV)	1.5 g/cm^3	1.3 g/cm^3	TRC, 1992
Cover depth erosion rate (VCV)	0.001 m/yr	0.001 m/yr	RESRAD 6.2 default
Density of the contaminated zone (DENSCZ)	1.5 g/cm^3	2.14 g/cm^3	TRC, 1992
Density of saturated zone (DENSAQ)	1.5 g/cm^3	1.9 g/cm^3	Calculated based on 1.5 g/cm^3 bulk density, 40% porosity, and 100% saturation.
Saturated zone total porosity (TPSZ)	0.4	0.4	TRC, 1992
Well pumping rate (UW)	250 m^3/yr	340 m^3/yr	Values in Driscoll, 1986, Table 24.5
Number of unsaturated zone strata (NS)	1	1	TRC, 1992
Unsaturated zone 1, thickness (H[1])	4 m	5.2 m	TRC, 1992
Unsaturated zone 1, soil density (DENSUZ[1])	1.5 g/cm^3	1.6 g/cm^3	Typical range of bulk densities for a silty sand. (Interpreted from "Principles of Geotechnical Engineering," Das, 1985).
Unsaturated zone 1, total porosity (TPUZ[1])	0.4	0.4	TRC, 1992
Unsaturated zone 1, effective porosity (EPUZ[1])	0.2	0.3	TRC, 1992
Unsaturated zone 1, field capacity (FCUZ[1])	0.2	0.2	TRC, 1992

Parameter	RESRAD Default Value	Site Specific Input Value	Basis for Selection of Site-specific Input Value
Unsaturated zone 1, soil-specific "b" parameter (BUZ[1])	5.3	4.9	Sandy loam from RI Report. Default value for sandy loam from the RESRAD Table E.2.
Unsaturated zone 1, hydraulic conductivity (HCUZ[1])	10 m/yr	1,090 m/yr	Sandy loam from RI Report. Default value for sandy loam from the RESRAD Table E.2.
Distribution coefficient for Th232 contaminated zone (DCNUCC[1])	60,000 mL/g	5,800 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Th232 unsaturated zone (DCNUCU[1])	60,000 mL/g	5,800 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Th232 saturated zone (DCNUCS[1])	60,000 mL/g	3,200 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Ra228 contaminated zone (DCNUCC[2])	70 mL/g	9,100 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Ra228 unsaturated zone (DCNUCU[2])	70 mL/g	9,100 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Ra228 saturated zone (DCNUCS[2])	70 mL/g	500 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Th228 contaminated zone (DCNUCC[3])	60,000 mL/g	5,800 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Th228 unsaturated zone (DCNUCU[3])	60,000 mL/g	5,800 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Th228 saturated zone (DCNUCS[3])	60,000 mL/g	3,200 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Th230 contaminated zone (DCNUCC[4])	60,000 mL/g	5,800 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Th230 unsaturated zone (DCNUCU[4])	60,000 mL/g	5,800 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Th230 saturated zone (DCNUCS[4])	60,000 mL/g	3,200 mL/g	Shepard and Thibault, 1990
Distribution coefficient for U238 contaminated zone (DCNUCC[5])	50 mL/g	1,600 mL/g	Shepard and Thibault, 1990
Distribution coefficient for U238 unsaturated zone (DCNUCU[5])	50 mL/g	1,600 mL/g	Shepard and Thibault, 1990
Distribution coefficient for U238 saturated zone (DCNUCS[5])	50 mL/g	35 mL/g	Shepard and Thibault, 1990
Distribution coefficient for U234 contaminated zone (DCNUCC[5])	50 mL/g	1,600 mL/g	Shepard and Thibault, 1990

Parameter	RESRAD Default Value	Site Specific Input Value	Basis for Selection of Site-specific Input Value
Distribution coefficient for U234 unsaturated zone (DCNUCU[5])	50 mL/g	1,600 mL/g	Shepard and Thibault, 1990
Distribution coefficient for U234 saturated zone (DCNUCS[5])	50 mL/g	35 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Ra226 contaminated zone (DCNUCC[7])	70 mL/g	9,100 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Ra226 unsaturated zone (DCNUCU[7])	70 mL/g	9,100 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Ra226 saturated zone (DCNUCS[7])	70 mL/g	500 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Pb210 contaminated zone (DCNUCC[8])	100 mL/g	550 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Pb210 unsaturated contaminated zone (DCNUCU[8])	100 mL/g	550 mL/g	Shepard and Thibault, 1990
Distribution coefficient for Pb210 saturated zone (DCNUCC[8])	100 mL/g	270 mL/g	Shepard and Thibault, 1990
Dose Conversion Factors	Based upon ICRP Publication 30 factors, assuming a 1 micrometer AMAD particle size.	Based upon ICRP Publication 68 factors and a five (5) micrometer AMAD particle size.	Justification to be presented in the decommissioning plan.

ATTACHMENT 4
Probabilistic Input Parameters for RESRAD - Priority 1

Parameter	Code	Value	Distribution	Range and Fit	Reference
Distribution Coefficient for Th232	SOLUBKO(1)	5,800 mL/g	Lognormal-n	μ = 8.68 s=3.62	NUREG 6697, Appendix C, Table 3.9-1
Distribution Coefficient for Ra228	SOLUBKO(2)	9,100 mL/g	Lognormal-n	μ = 8.17 s=1.70	NUREG 6697, Appendix C, Table 3.9-1
Distribution Coefficient for Th228	SOLUBKO(3)	5,800 mL/g	Lognormal-n	μ = 8.68 s=3.62	NUREG 6697, Appendix C, Table 3.9-1
Distribution Coefficient for Th230	SOLUBKO(4)	5,800 mL/g	Lognormal-n	μ: = 8.68 s=3.62	NUREG 6697, Appendix C, Table 3.9-1
Distribution Coefficient for U238	SOLUBKO(5)	1,600 mL/g	Lognormal-n	μ: = 4.84 s=3.13	NUREG 6697, Appendix C, Table 3.9-1
Distribution Coefficient for U234	SOLUBKO(6)	5,800 mL/g	Lognormal-n	μ: = 4.84 s=3.13	NUREG 6697, Appendix C, Table 3.9-1
Distribution Coefficient for Ra226	SOLUBKO(7)	9,100 mL/g	Lognormal-n	μ: = 8.17 s=1.70	NUREG 6697, Appendix C, Table 3.9-1
Distribution Coefficient for Pb210	SOLUBKO(8)	550 mL/g	Lognormal-n	μ: = 7.78 s=2.76	NUREG 6697, Appendix C, Table 3.9-1
Density of cover material	DENSCV	2.3 g/cm^3	Truncated normal	μ: = 1.52 s=0.23	IT Corporation, 1992
Density of contaminated zone	DENSCZ	2.0 g/cm^3	Truncated normal	μ: = 1.52 s=0.23	IT Corporation, 1992
Density of saturated zone	DENSAQ	1.9 g/cm^3	Truncated normal	μ: = 1.52 s=0.23	Calculated based on 1.5 g/cm^3 bulk density, 40% porosity, and 100% saturation.
Saturated Zone Total Porosity	TPSZ	0.4	Truncated normal	μ: = 0.425 s=0.0867	TRC, 1992.
Saturated Zone Effective Porosity	EPSZ	0.2	Truncated normal	μ: = 0.425 s=0.0867	TRC, 1992
Saturated Zone hydraulic conductivity	HCSZ	100 m/yr	Bounded lognormal-n	μ: = 2.3 s=2.11 Minimum 0.004 Maximum 9250 m/yr	RESRAD 6.2 Default
Unsaturated Zone thickness	H(1)	1 m	Bounded lognormal-n	μ: = 2.296 s=1.276 Minimum 0.18 Maximum 320 m	TRC, 1992
Depth of roots	DROOT	0.9 m	Uniform	Minimum 0.3 m Maximum 4 m	RESRAD 6.2 Default
Transfer factor for plants Thorium	BRTF(90,1)	derived	Lognormal-n	μ: = -6.91 s = 0.916	RESRAD 6.2 Default

Parameter	Code	Value	Distribution	Range and Fit	Reference
Transfer factor for plants Radium	BRTF(88,1)	derived	Lognormal-n	μ: = -3.22 s = 0.916	RESRAD 6.2 Default
Transfer factor for plants Uranium	BRTF(92,1)	derived	Lognormal-n	μ: = -6.21 s = 0.916	RESRAD 6.2 Default
Transfer factor for plants Lead	BRTF(82,1)	derived	Lognormal-n	μ: = -5.52 s = 0.916	RESRAD 6.2 Default

ATTACHMENT 5
Probabilistic Input Parameters for RESRAD - Priority 2

Parameter	Code	Value	Distribution	Range and Fit	Reference
Area of contaminated zone	Area	20,446.1 m2	Log uniform	Min = 16,000 m2 Max = 20,446.1m2	IT Corporation, 1992
Thickness of contaminated zone	THICK0	2.8 m	Bounded lognormal-n	μ: = 2 s=2 Minimum 0.4 Maximum 2.8 m	IT Corporation, 1992
Contaminated Zone Total Porosity	TPCZ	0.4	Truncated normal	μ: = 0.425 s= 0.0867	RESRAD 6.2 Default
Contaminated Zone Erosion Rate	VCZ	0.001 m/yr	Continuous logarithmic	μ: = 0.001 s= 0.95	RESRAD 6.2 Default
Contaminated Zone hydraulic Conductivity	HCCZ	10 m/yr	Bounded lognormal-n	μ: = 2.3 s=2.11 Minimum 0.004 Maximum 9250 m/yr	RESRAD 6.2 Default
Contaminated Zone B parameter	BCZ	5.3	Bounded lognormal-n	μ = 1.06 s=0.66 Minimum 0.5 Maximum 30	RESRAD 6.2 Default Sandy loam from RI Report. Default value for sandy loam from the RESRAD Table E.2.
Saturated Zone B parameter	BSZ	5.3	Bounded lognormal-n	μ = 1.06 s=0.66 Minimum 0.5 Maximum 30	RESRAD 6.2 Default Sandy loam from RI Report. Default value for sandy loam from the RESRAD Table E.2.
Unsaturated zone density	DENSUZ(1)	1.6 g/cm^3	Truncated normal	μ = 1.52 s= 0.23	Typical range of bulk densities for a silty sand. (Interpreted from "Principles of Geotechnical Engineering," Das, 1985).
Unsaturated zone total porosity	TPUZ(1)	0.4	Truncated normal	μ = 0.425 s=0.0867	TRC, 1992
Unsaturated zone B parameter	BUZ(1)	5.3	Bounded lognormal-n	μ = 1.06 s=0.66 Minimum 0.5 Maximum 30	Sandy loam from RI Report. Default value for sandy loam from the RESRAD Table E.2.
Unsaturated zone hydraulic conductivity	HCUZ(1)	1090 m/yr	Bounded lognormal-n	μ = 2.3 s=2.11 Minimum 0.004 Maximum 9250 m/yr	Sandy loam from RI Report. Default value for sandy loam from the RESRAD Table E.2