RAS 13137

DOCKETED
USNRC

February 28, 2007 (7:35am)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
SHIELDALLOY METALLURGICAL CORP.	)	Docket No. 40-7102
	)	
	)	
(Licensing Amendment Request for	)	
Decommissioning the Newfield,	)	
New Jersey Facility)	)	

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION'S REPLY TO THE RESPONSE OF NRC STAFF

The contention "focuses the hearing process on real disputes susceptible of resolution in an adjudication [and] helps to assure that . . . hearings are triggered only by those able to proffer at least some minimal factual and legal foundation in support of their contention. Duke Energy Corp., (Oconee Nuclear Station, Units 1, 2, and 3), CLI-99-11, 49 NRC 328, 334. Contentions are only required to place "other parties in the proceeding on notice of the petitioners' specific grievances and thus gives them a good idea of the claims they will be either supporting or opposing." Id.

Template=SECY-037

SECY-02

Contentions 1 and 3

NRC Staff ("Staff") does not oppose admitting these contentions except for the portions that NJDEP claims that Shieldalloy's Decommissioning Plan ("DP") should be rejected because it fails to permanently isolate the radioactive waste (Contention 1) and the cap fails to prevent rainwater infiltration (Contention 3).

Staff claims that the Low-Level Radioactive Waste Policy Act's ("LLRWPA") requirement to permanently isolate low-level radioactive waste ("LLRW"), 42 U.S.C. § 2021b(7), does not apply here because Shieldalloy does not propose to become a facility that will receive LLRW from other persons. Sr[1] page 7. However, the LLRWPA does not limit its provisions to facilities that receive LLRW from other persons. The LLRWPA states that "[e]ach State shall be responsible for providing, either by itself or in cooperation with other States, for the disposal of--(A) low-level radioactive waste generated within the State." 42 U.S.C. § 2021c(a)(1). The term "disposal" is defined as "the permanent isolation of low-level radioactive waste pursuant to the requirements established by the Nuclear Regulatory Commission under applicable laws." 42 U.S.C. § 2021b(7). The LLRWPA does not make an exception for the disposal of LLRW by the generator.

[1]"Sr" refers to the Staff's response to NJDEP's Request for a Hearing.

Furthermore, the standards set forth in the LLRWPA should apply since it regulates the same materials, LLRW, that are in issue in this case. Shieldalloy's LLRW should therefore be held to the same standards for disposal as other LLRW. To argue that the LLRWPA does not apply because Shieldalloy does not propose to accept additional LLRW is irrelevant to the goal of protecting the public health and safety from the 63,000 m^3 of LLRW that Shieldalloy proposes to dispose at its facility. The proposed engineered barrier design in the DP would not meet the provisions of the LLRW regulations at 10 C.F.R. Part 61 regarding technical requirements for land disposal facilities, including the minimization, to the extent practicable, water infiltration, and environmental monitoring.

Because the DP does not propose to permanently isolate its radioactive waste from rainwater or groundwater, there is a genuine dispute of law as to whether the LLRWPA applies to Shieldalloy that requires a hearing. See 10 C.F.R. § 2.309(f)(vi).

Contentions 5, 9, and 10

Staff does not oppose admitting these contentions except for the portions that NJDEP argues that the DP should be rejected because it failed to conduct dose modeling for the resident farmer and the "all controls fail" scenarios. Staff argues that NJDEP does not provide sufficient support for considering the resident farmer. Sr page 10. However, 10 C.F.R. § 20.1403(e) requires residual radioactivity to be reduced "so that if the institutional controls were no longer in effect, there is reasonable assurance that the TEDE from residual radioactivity distinguishable from background to the average member of the critical group is as low as reasonably achievable and would not exceed" under certain specified limits. (Emphasis added). "Critical group" means the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances." 10 C.F.R. § 20.1003. A future resident farmer conducting activities in the vicinity of Shieldalloy's facility is not only an "applicable circumstance" in this case, it is a likely circumstance based on the fact that Shieldalloy's waste will remain a radioactive hazard for billions of years. Goodman Dec.[2] ¶ 2. It is self-evident that over the course of a billion years, many land use scenarios in this area are possible, including a resident farmer. Furthermore, farms are currently located within a one-mile radius of the Shieldalloy facility. DP Appendix 19.9 Environmental Report § 3.1. In fact, a farm field is currently located less than 500 feet from Shieldalloy's slag pile. See (Aerial photograph from www.maps.yahoo.com released April 2006, attached as Exhibit A). Shieldalloy failed to give any reasonable justification as to why

[2] "Goodman Dec." refers to the Declaration of Jennifer Goodman, which was submitted with NJDEP's Request for a Hearing.

the resident farmer scenario should be excluded except to reference a deed notice and unspecified "land use factors". (DP at pages 39-40). Since a deed notice is considered an institutional control, it must be assumed to fail under 10 C.F.R. § 20.1403(e).

Staff argues there is no need to consider the all controls fail scenario because there is no NRC requirement requiring the DP to include this scenario. Sr page 10. However, as discussed above, 10 C.F.R. § 20.1403(e) requires residual radioactivity at the site to be reduced so that the TEDE to the average member of the critical group would be as low as possible and not exceed certain limits assuming institutional controls fail. Since 10 C.F.R. § 20.1403(e) requires the applicant to assume that institutional controls fail, it is reasonable to assume that engineered barriers will also fail since Shieldalloy's waste will remain a radiological hazard for billions of years. Goodman Report § 5.1. The DP itself states that it is conducting an all controls failure scenario although it is actually modeling a slight degradation of controls. DP § 5.1; Goodman Report § 5.1.

Staff argues that NJDEP's contention regarding the all controls fail and resident farmer scenario should be rejected because it relied upon a bare assertion of Goodman's Report. (Sr page 10). However, as discussed above, NJDEP relies upon the LTR for inclusion of the resident farmer scenario, the expert report of Jennifer Goodman, and facts available from the DP and public sources. NJDEP also relies upon self-evident conclusions based on these sources. NJDEP has proffered more than the "minimal factual and legal foundation in support of [its] contention" in order to receive a hearing on these issues. See Duke Energy Corp., 49 NRC at 334.

Contention 4

Staff argues that this contention, which concerns Shieldalloy's final status survey and full characterization of the site, is outside the scope of this proceeding since the NRC is only required to review the final status survey design as part of the DP review. Sr pages 12-13 (citing NUREG-1757, Vol 1 page 15-9). However, NJDEP's Contention 4 is within the scope of this proceeding because the NRC's evaluation criteria for decommissioning plans includes sufficiently characterizing the site. NUREG-1757 Vol.1 rev. 2 pages 16-22 through 16-29. NJDEP is asserting that Shieldalloy's characterization of the site, which has been incorporated into the final status survey design, is inadequate. The DP states that "[a] comprehensive site-wide survey for the presence of radioactivity at the Newfield facility was conducted in 1991." DP § 14.1.1. Because these results are presented and relied upon in Chapter 4 of the DP, and because NJDEP has found a number of specific problems with the facility's survey, NJDEP should be entitled to a hearing on this contention.

Specific problems with Shieldalloy's site characterization data are illustrated in Appendix 19.6 of the DP. There, over 150 results are presented in a table. This table is taken directly from the IT report, Assessment of Environmental Radiological Conditions at the Newfield Facility, 1992. This is the report that Shieldalloy relies on for the characterization of the site. Yet the table and report omits supporting information that is required to validate the results, including the uncertainty, the accompanying laboratory data, the minimum detectable activities, and any indication whether the samples were sealed and held for 21 days. Goodman Report § 4.

The DP is required to sufficiently characterize the site. NUREG-1757 Vol.1 rev.2 pages 16-22 through 16-29. If the site is not properly characterized, then classification of survey units may be underestimated. Since classification determines the size of the survey unit, NUREG-1575, Rev. 1 page 4-15, and the percentage of scanning, NUREG-1575, Rev. 1 p.2-32, misclassification could result in releasing a survey unit when it does not meet the release criteria. "If a survey unit is classified incorrectly, the potential for making decision errors increases." NUREG-1575, Rev. 1 page 2-28. This can happen because the lower the classification, the larger the survey unit, the larger the distance between sample locations, and the less comprehensive the scan. NUREG-1575,Rev. 1 pages 4-15 and 2-32. Since Shieldalloy states that the site has been fully characterized (DP § 14.1.1), and since Shieldalloy has classified its survey units based on the inadequate characterization (DP at Figure 18.11), the Department still considers this a valid contention.

When considering the concentration of the radionuclides in the fill slag and the fact that Shieldalloy admits that the location of the fill slag has not been determined, DP page 30 n.69, one must conclude that Shieldalloy has not adequately characterized the site. Goodman Report pages 3-5.

Contention 6

Staff argues that this contention should be rejected on the basis that 10 C.F.R. § 20.1401(d) (regarding 1000-year modeling) applies to long-lived nuclides. Sr pages 13-14. Staff's argument is based on its reading of 62 Fed. Reg. 39058, 39083 (Response F.7.3). Sr page 14. However, this provision of the Federal Register clearly states that the 1000-year modeling requirement does not apply to long-lived nuclides. Specifically, the provision states that "[u]nlike analyses of situations where large quantities of long-lived radioactive material may be involved . . . in the analysis for decommissioning, where the consequences of exposure to residual radioactivity at levels near background are small and peak doses for radionuclides of interest in decommissioning occur within 1000 years, long term modeling thousands of years into the future of doses that are near background may be virtually meaningless." 62 Fed. Reg. at 39083 (Response F.7.3) (emphasis added).

In the Shieldalloy case, the DP proposes to dispose of radioactive waste containing long-lived nuclides. Ths waste contains thorium-232, which has a half-life of over 14 billion years, and uranium-238, which has a half-life of over 4 billion years. Goodman Dec. ¶ 2. Also, the DP is proposing an on-site disposal of large quantities of the waste--approximately 65,000 m^3 of slag. Furthermore, modeling performed by the NJDEP indicates a TEDE of 1,718 mrem per year at 800 years, Goodman Report page 11, which exceed the permissible limits set forth in the License Termination Rule, 10 C.F.R. § 20.1403(e). The DP claims that the greatest dose occurs after 1000 years. DP rev. 1a § 5.5.7. Thus, the intent of 10 C.F.R. § 20.1401(d) was to require modeling for greater than 1000 years in a case such as this where there is a large quantity of long-lived nuclides and where the future doses are well above background levels.

Contention 8

Staff argues that the NJDEP failed to provide sufficient support for its argument that the DP fails to adequately consider inflation and the cost of cap maintenance. Sr page 15. Staff argues the DP takes into account inflation by assuming the trust fund will have a real rate of return--the rate of return after subtracting inflation-of 1%. Sr page 15. However, the DP failed to consider inflation when estimating the annual costs involved to maintain the cap. The DP also failed to consider inflation when providing for the contractor's profit. NJDEP's financial expert, John Burke, supports these assertions. Burke Dec. ¶¶ 3, 5.

The DP also failed to provide any financial assurance in case the cap needs to be reconstructed in the future. Id. ¶¶ 3, 4. It is self-evident that over the course of thousands, millions, or billions of years that either natural or human induced forces would damage the cap to such an extent that will require the its complete reconstruction.

The DP also failed to provide any financial assurance for groundwater monitoring. NJDEP's RESRAD modeling shows that radium will leach into the groundwater starting at about 450 years, using Shieldalloy's parameters, with a hypothetical drinking water well at the edge of the contaminated zone. Goodman Report page 18. The DP fails to provide any financial assurance to remedy the radium leaching or to remediate the groundwater. Id.

Another reason for the inadequate financial assurance is that the DP assumes a real rate of return of 1% on the financial assurance over the entire 1000 years. However, there is general agreement that a rate of return should not be assumed over the long-term. See, e.g., Neill, H. And Neill, R. Perspectives on Radioactive Waste Disposal: A Consideration of Economic Efficiency and Intergenerational Equity pages 6, 8 (WM'03 Conference, February 23-27, 2003), attached at Exhibit B. The attached article recommends that no discount rate be used after 300 years. Id.

NJDEP has thus "[p]rovided a concise statement of the alleged facts [and] expert opinions" which support this contention. See 10 C.F.R. § 2.309(f)(1)(v). NJDEP has provided more than the "minimal factual and legal foundation in support of [its] contention." Duke Energy Corp., 49 NRC at 334.

Contention 14

Staff argues that NJDEP did not explain what information it needed for the SSAB under 10 C.F.R. § 20.1403(d) or why the information provided to the SSAB was lacking. Sr pages 16-17. However, NJDEP's Petition for a Hearing explained that the SSAB members needed better information concerning the characterization of the slag and baghouse dust and the engineering design of the engineered cap. Gaffigan Dec. ¶ 5. There were many problems with the DP's characterization, including the fact that soil samples were sporadic and the EPA protocol for further analysis of water samples was not followed properly. Goodman Report page 1. The laboratory data was either not present, or had problems, like not meeting the required minimum detectable activities (MDA). Id. Information regarding the engineering design was inadequate because the hydraulic conductivity of the native vadose zone material was a gross underestimate. Malusis Report page 4. No sorption tests were performed to verify that the underlying soil formations exhibit adsorption capacity for the contaminants of concern. Id. Despite the DP's assigning a sorption value to the underlying soil formations that is equal to the waste material itself, the nature of the underlying soils consisting primarily of sand, gravel, and little to trace silt means that the vadose zone and saturated zone materials are largely inert (i.e., do not participate in ion exchange reactions) and may provide little, if any, attenuation of inorganic contaminants (both radioactive and non-radioactive species) that leach from the waste mass. Id. Shieldalloy did not conduct adequate tests to evaluate the leachability of waste materials. Id. Pages 5-6. The SSAB was told about the recent leachability tests that were performed which they claimed demonstrated that the slag was insoluble. The data was never provided until after the last SSAB meeting when the DP was submitted in October, 2005. Likewise, the dose modeling was not provided until after the last SSAB meeting when it was submitted in Rev. 1. This modeling was proven to be inadequate since the NRC rejected Rev. 1 of the DP. The SSAB never had an ALARA analysis until after the last SSAB meeting. SMC relied on the analysis done at the Cambridge, Ohio facility and cost estimates for disposal of $102-$112 million, which were not accurate. See Exhibit A submitted with NJDEP's Hearing Request.

There was no information regarding the hydraulic performance of the cover. Id. page 7. At the time of the last SSAB meeting, a geomembrane was part of the engineered barrier design. It is still unclear whether a geomembrane with be utilized with the cover since the DP relies upon the geomembrane in developing its runoff coefficient. See DP rev. 1a page 73.

Had this information been provided to the SSAB, the SSAB could have provided better advice on whether the proposed institutional controls would assure that an average member of the public would not incur a radiation dose in excess of 25 millirem Total Effective Dose Equivalent ("TEDE"); whether the $5 million financial assurance would be adequate to enable an independent third party to assume responsibility for control and maintenance of the site; and whether the proposed engineering design of the barrier was adequate. Gaffigan Dec. ¶¶ 5-6.

Staff also asserts that NJDEP's argument, that the DP failed to account for the strong public opposition to the plan, is lacking because the DP included transcripts or summaries of all four SSAB meetings and the DP attached letters from New Jersey officials expressing opposition to the DP. Sr page 17. However, these attachments to the DP do not adequately "incorporate public advice" into the DP as required by 10 C.F.R. § 20.1403(d). Incorporating public advice means using the public advice to affect the actual decommissioning activities that will take place. In this case, Shieldalloy's proposed decommissioning activities were not influenced at all by public advice.

Staff also complains that NJDEP does not explain what additional steps Shieldalloy was required to take to incorporate public advice into the DP as required by 10 C.F.R. § 20.1403(d). Sr page 17. The SSAB advised that onsite disposal would be an undue burden on the community, but this was not incorporated into the DP. In fact, in their ALARA analysis, Shieldalloy actually contradicts the SSAB's advise by stating that aesthetic improvements associated with the engineered barrier could result in an increase in future land use value. DP rev. 1 page 89. The SSAB advised that institutional and engineering controls would not last for the duration of the radiological hazard, but this was not incorporated into the DP. The SSAB questioned how Shieldalloy would keep radioactivity from entering the groundwater and Shieldalloy responded that a geomembrane would be an integral part of the engineered barrier design, DP page 166, yet the geomembrane was later omitted from the DP, June 30, 2006 transmittal letter accompanying revision 1a of the DP, Page 7. The NJDEP believes that the DP should state, under section 16.5.4, that the SSAB was unanimously opposed to the LTC license option. NJDEP should not be required to propose a sufficient DP for Shieldalloy. However, because of the strong and nearly universal public opposition to onsite disposal, the DP should have proposed offsite disposal of the radioactive waste to an appropriate disposal facility.

To sum up, Shieldalloy failed to fully inform the SSAB of important data and details and thus deprived them of the opportunity for meaningful input into the DP which is now before the NRC for review. In addition, even the positions which the SSAB did have opportunity to express were not meaningfully incorporated in development of the DP.

Contentions 12 and 15

Staff argues that the LLRWPA is not applicable to this case and therefore does not prevent the use of the LTC license. Sr page 19. However, NJDEP asserts that the LLRWPA is applicable here, (see section titled "Contentions 1 and 3" above), and therefore prohibits the use of the LTC license in this case (see Contention 12 of NJDEP's Request for a Hearing).

Staff also argues that NJDEP failed to cite any authority for its argument that the LTC license conflicts with the Atomic

Energy Act ("AEA"). Sr page 19. However, NJDEP cited in Contention 12 of its Hearing Request the AEA provisions requiring NRC to regulate radiological material in a manner that protects the public health and safety. 42 U.S.C. §§ 2012(d), 2013(d), 2022(f)(3), (referring to § 2022(b)(2)), 2099, 2111(b)(1)(A), 2113(b)(1)(A), 2114(a)(1), 2201(b). The Hearing Request also cited the Supreme Court case which held that "[the] Commission's prime area of concern in the licensing context, . . . is national security, public health, and safety." Pac. Gas & Elec. Co. v. State Energy Res. Conservation & Dev. Comm'n, 461 U.S. 190, 207 (1983). The Hearing Request cited the declaration of Jennifer Goodman which stated that Shieldalloy's waste will remain a radiological hazard for billions of years. Goodman Dec. ¶ 2. It is self-evident that neither Shieldalloy nor a private third party trustee can be expected to endure for billions of years to enforce the LTC license. Therefore, the LTC license violates the LLRWPA by failing to isolate the radioactive waste and the AEA by failing to protect the public health and safety.

Staff argues that the LTC license is consistent with the License Termination Rule ("LTR") and that NJDEP fails to present any legal authority otherwise. Sr pages 19-20. The regulatory history for the LTR cited by Staff does not actually address the LTC license. Sr page 20 (quoting 62 Fed. Reg. at 39,070). In fact, the regulatory history actually states that for those cases involving long-lived nuclides, "[m]ore stringent institutional controls will be required in these situations, such as legally enforceable deed restrictions and/or controls backed up by State and local government control or ownership, engineered barriers, and Federal ownership, as appropriate." 62 Fed. Reg. at 39,070 (emphasis added). It is self-evident that the state, local or Federal government are the most likely entities to endure for the billions of years that the Shieldalloy waste will remain a radiological hazard. It is self-evident that a private LTC licensee or third party trustee will not endure to enforce the LTC license for billions of years. Thus, this regulatory history actually supports NJDEP's argument that the LTC license conflicts with the LTR for long-lived nuclides.

Because the DP proposes a LTC license as the institutional control for its radioactive waste containing long-lived nuclides, there is a genuine dispute of law as to whether the LTC license conflicts with the LLRWPA, AEA, and the LTR. The dispute therefore requires a hearing. See 10 C.F.R. § 2.309(f)(1)(vi).

Contention 13

Staff argues that NJDEP overlooked the language of 10 C.F.R. § 20.1003, which allows a facility to be decommissioned as long as residual radioactivity is at a level that permits release and termination of the license. Sr page 21. However, NJDEP's Hearing Request acknowledges this language and argues that the DP violates the LTR because residual radioactivity would not be reduced to a level that would permit release and termination of the license. As discussed above, it is self-evident that neither a private LTC licensee or a third party trustee will endure to enforce the institutional controls for the billions of years that the Shieldalloy waste remains a radiological hazard. Also, NJDEP's modeling indicates a TEDE of 1,718 mrem per year at year 800, Goodman Report page 11, which exceeds the limits required by the LTR, 10 C.F.R. § 20.1403(e). Therefore, residual radioactivity would not be reduced to a level that would permit release and termination of the license as required by 10 C.F.R. § 20.1003.

Contention 16

Staff claims that the papers relied upon by NJDEP, SECY-03-0069 and SECY-06-0143, endorses use of the LTC license. Sr page 22. However, these documents do not endorse use of the LTC license for materials containing long-lived nuclides. In fact, long-lived nuclides are never discussed in these documents in the context of the LTC license.

Staff claims that a LTC license may not be denied out of concern for preventing additional legacy sites. Sr pages 22-23. However, such a position reverses NRC's policy to prevent the creation of additional legacy sites. SECY-06-0143 states NRC's clear policy against allowing or promoting the creation of additional legacy sites. Pages 5-6. As discussed in the NJDEP's Request for a Hearing, this NRC policy regarding legacy sites was discussed in the context of onsite disposals for facilities that continued to operate under a license. Id. page 3. However, such concerns are warranted to a much greater extent for facilities disposing long-lived nuclides onsite under the LTR that remain hazardous in perpetuity. Goodman Dec. ¶ 5. NUREG-1757 directly contradicts this policy by making it easier for facilities to permanently dispose radioactive materials containing long-lived nuclides on-site upon decommissioning. Goodman Dec. ¶ 4. Specifically, NUREG-1757 allows the durable institutional control requirement to be met by the issuance of the LTC license or the LA/RC for sites containing long-lived nuclides where the Federal or State government is not willing to take ownership or control of the site, NUREG-1757 vol. 1 pages 17-65 to 67; NUREG-1757 allows for dose assessments of 1,000 years, regardless of the duration of the radioactive hazard, NUREG-1757 vol. 1 pages 17-87 to 17-88; and NUREG-1757 underestimates the amount of financial assurance required for facilities containing long-lived nuclides. Such a contradiction in policy regarding legacy sites without any rational basis is arbitrary and capricious and therefore not permitted. See Citizens Awareness Network v. NRC, 59 F.3d 284, 291 (1st Cir. 1995).

Contention 17

Staff argues that the AEA's requirements to promulgate rules or regulations when setting forth the information an applicant for a license is required to submit or when establishing the form and conditions of a license, 42 U.S.C. §§ 2022(f)(3) 2232(a), 2233, are not applicable here because Shieldalloy's current license would be amended to become a LTC license. Sr pages 23-24. However, NRC admitted that the LTC license is a new type of license. NUREG-1757 vol. 1 page M-9. The NRC further admitted that the LTC license is different from NRC's existing possession-only license:

> This new type of possession-only license is referred to in this guidance as a long-term control (LTC) license to clearly distinguish it from the NRC's existing possession-only licenses for storage. The existing possession-only license is typically used at NRC licensed sites in the operating or decommissioning phases. In contrast, the LTC license is for use as an institutional control in the long-term control phase after completion of decommissioning.

Id.

Furthermore, Staff admitted in guidance that the LTC license was a "new type of possession only license." NRC Staff

Interim Guidance for a Long-Term Possession Only License at the Shieldalloy Newfield Site, New Jersey, page 1 (April 15, 2004).

The AEA requires the NRC to promulgate rules or regulations before setting forth the form of a license. 42 U.S.C. § 2233. Because NRC has failed to promulgate rules or regulations concerning the form of the LTC license, NRC is not authorized to amend Shieldalloy's license into a LTC license since the amendment concerns the form of the license.

The AEA also requires the promulgation of rules or regulations when setting forth the terms and conditions of each license. 42 U.S.C. § 2233. NRC has admitted that "the LTC license is for long-term control of a restricted use site after decommissioning is completed. The LTC license is not for the purpose of storage of radioactive materials." NUREG-1757 vol 1 page M-9. Because of the different purposes of these types of licenses, the terms and conditions of the license amended upon decommissioning to be a LTC license must differ from the terms and conditions of Shieldalloy's current license which authorizes the storage of radioactive materials.

The AEA requires the promulgation of rules or regulations when setting forth the information an applicant for a license is required to submit to the NRC. 42 U.S.C. § 2232(a). Shieldalloy has submitted a DP that seeks a LTC license. However, the information contained in the DP was submitted pursuant to the provisions of

NUREG-1757, not a rule or regulation. See, e.g., DP rev. 1 pages 3, 32, 83-92; DP rev. 1a pages 32, 69.

Staff also states that rules or regulations are not required because the Commission approved the LTC license in its Staff Requirements Memorandum ("SRM") on SECY-06-0143. Sr page 24. However, Commission approval of a new license in a memorandum is not the same as promulgating a rule or regulation pursuant to the Administrative Procedures Act, 5 U.S.C. § 701 et seq. A Commission endorsement does not allow the same public scrutiny as a rule or regulation proposal.

CONCLUSION

In light of the preceding, the NJDEP respectfully requests NRC to grant a hearing regarding on the DP because Shieldalloy's proposed decommissioning will not protect the public health and safety and the LTC license sought by Shieldalloy will violate the law. A hearing should be granted because a genuine dispute exists regarding these issues.

Respectfully submitted,

STUART RABNER
ATTORNEY GENERAL OF NEW JERSEY

Dated: 2/27/07

By: Andrew D Reese
ANDREW D. REESE
KENNETH W. ELWELL
Deputy Attorneys General

Exhibit A

250 m
0.2 miles
© 2006 Yahoo! Inc.
Imagery © 2006 Aerials Express, i-cubed

Exhibit B

PERSPECTIVES ON RADIOACTIVE WASTE DISPOSAL: A CONSIDERATION OF ECONOMIC EFFICIENCY AND INTERGENERATIONAL EQUITY

Helen R. Neill, Chair and Associate Professor
Department of Environmental Studies
Greenspun College of Urban Affairs
University of Nevada Las Vegas
4505 Maryland Parkway Box 454030
Las Vegas, Nevada 89154-4030
(o) (702) 895 – 4892
(fax) (702) 895 – 4436
e-mail: neill@ccmail.nevada.edu

and

Robert H. Neill, Director Emeritus
Environmental Evaluation Group
9409 Thornton NE
Albuquerque, NM 87109
(h) (505) 821 – 5170
e-mail: righters@highfiber.com

ABSTRACT

There are both internal and external pressures on the U.S. Department of Energy to reduce the estimated costs of isolating radioactive waste, $19 billion for transuranic waste at Waste Isolation Pilot Plant (WIPP) and $57 billion for high level waste at Yucca Mountain. The question arises whether economic analyses would add to the decision-making process to reduce costs yet maintain the same level of radiological protection. This paper examines the advantages and disadvantages of using cost-benefit analysis (CBA), a tool used to measure economic efficiency as an input for these decisions. Using a comparative research approach, we find that CBA analyses appear particularly applicable where the benefits and costs are in the near term. These findings can help policymakers become more informed on funding decisions and to develop public confidence in the merits of the program for waste disposal.

INTRODUCTION

The estimated costs of isolating unwanted long-lived radioactive residues through deep geologic disposal range from $19 billion for transuranic waste at WIPP in New Mexico(i) to an excess of

$57 billion for high level waste at the Yucca Mountain Project in Nevada. (ii) There are both internal and external pressures on the U.S. Department of Energy to reduce these high costs (iii, iv) yet maintain public confidence in each project. In high profile environmental projects such as these, policymakers are often conflicted between efforts to promote economic efficiency and efforts to promote public health for both present and future generations.

How useful are cost-benefit analyses for the formation of public policy decisions regarding nuclear waste disposal? Can policymakers assure the same level of radiological protection to both present and future generations utilizing cost-benefit analyses for comparisons? This paper examines the advantages and disadvantages of using cost-benefit analysis (CBA), a tool used to measure economic efficiency as an input in the decision-making process. We consider when CBA is an appropriate input in the decision making process and when other criteria such as intergenerational equity is more appropriate. This paper employs a comparative research approach (v) to examine the efficacy of CBA for public policy decisions on the disposal of nuclear waste.

This paper focuses on dynamic economic efficiency requirements and implications of using a positive discount rate to examine dollar values over short-term versus long-term time horizons. **The remainder of the paper is organized as follows. The next section presents background information on** cost-benefit analysis, nuclear waste disposal, dynamic efficiency requirements, and inter-generational equity issues. **The following section provides an example where a substantive cost-benefit analysis might have helped decision makers. A discussion of these follows. The final section contains concluding remarks.**

BACKGROUND

In evaluating the merits of any proposed endeavor, one generally compares the advantages to the disadvantages to see if it is worth pursuing. Analysts use CBA to quantify the benefits and costs of an endeavor. To do this, both need to be expressed in comparable monetary units and that the comparison be made at the same point in time. When comparing several options, efficiency requires the option where the net benefits are maximized. The implication of using efficiency as an input in regulatory decisions means that resources are being used optimally, a foundation of economic theory.

Critics often cite ethical and moral concerns in using CBA to evaluate regulations with public health and environmental dimensions.(vi) Other critics point to incomplete CBAs as evidence that that the technique is flawed.(vii) Others point to the seemingly impossible task of placing meaningful dollar values on reduced risks to present and future generations. Finally, critics point to the practice of discounting as problematic when comparing present costs and future benefits.

To address these and other criticisms of CBA, a group of economists developed eight principles

(viii) to guide evaluation of environmental, health and safety regulation. First, compare favorable and unfavorable effects and recognize uncertainties. Second, government agencies should not be precluded from using benefit-cost analysis when developing regulations or setting regulatory priorities. Third, require benefit-cost analysis for major regulatory decisions. Fourth, in regulatory decisions where costs are greater than benefits, recognize that factors other than economic efficiency such as equity within and across generations may be an important factor. Fifth, report best estimates of benefits and costs but care should be taken to assure that quantitative factors do not dominate important qualitative factors in decision-making. Sixth, subject CBA to external reviews. Seventh, create a standard format for presenting results (ix) and finally consider distributional consequences on subgroups of the population. Some principles are clearly administrative (principles 2, 3, 6, and 7) while others are evaluative (principles 1, 4, 5 and 8). The key concepts to gather from this list to be examined further in this paper are time horizon, intergenerational equity, and uncertainty. These principles can be used to examine projects such as the disposal of high level waste (HLW) and transuranic (TRU) waste where many of the benefits will be realized by future generations. The rest of this section is organized as follows: (A) history of CBA, (B) advantages and disadvantages of nuclear waste disposal, (C) use of ionizing radiation to dispose of nuclear waste, (D) dynamic economic efficiency, (E) intergenerational equity, (F) uncertainties, and (G) summary of advantages and disadvantages of CBA.

History of CBA for Environmental Decision Making

Quantifying costs and benefits for radiation protection is not new. The 1977 report by the International Committee on Radiation Protection (x) recommended the use of cost-benefit analyses in determining the acceptability of any operation involving exposure to radiation.

However, there are differences in the legal and administrative bases for economic comparisons using CBA. (xi, xii) When Congress passed various environmental protection laws, specific direction was provided to EPA on the use of CBA. Some Acts such as the Toxic Substances Control Act (TSCA) and the revision of the Safe Drinking Water Act require forms of CBA. Other environmental Acts such as the 1990 amendments to the Clean Air Act, Clean Water Act and Resource Conservation and Recovery Act require EPA to use "maximum achievable control technology." Strong requirements such as these preclude the use of CBA. (xiii) Both Acts dealing with transuranic and high level waste disposal are silent on whether to use CBA.

All Presidents since Carter have issued Executive Orders requiring some form of CBA. (xiv) Both President Reagan and President Clinton issued Executive Orders to federal agencies to do regulatory impact analyses. (xv, xvi)

Background on Nuclear Waste Disposal

Table I summarizes the advantages and disadvantages to present and future generations. The current generation is bearing the costs of the disposal of high level waste (HLW) and transuranic (TRU) waste now since this generation is also the beneficiary of operations that produced the waste; namely electricity from commercial power plants and national security from the deterrent of nuclear weapons. The EPA Standards for TRU waste disposal (xvii) and HLW (xviii) limit radioactive releases for 10,000 years in order to limit adverse health effects of latent cancer fatalities during that period. Local near-term benefits for both TRU and HLW are economic. Costs include small health risks currently and the avoidance of major long-term health risks. We present our results with respect to the relationship between nuclear waste disposal, CBA and intergenerational equity issues below.

Table I: Summary of Major Costs and Benefits of TRU and HLW Disposal

	Costs of Disposal	Benefits of Disposal
Present Generation	To be paid now	Electricity from nuclear power(HLW)
Present Generation	To be paid now	Nuclear weapons deterrence (TRU)
Long-Term Future Generations	Small number of calculated health effects	Prevention of large number of health effects from HLW and TRU

Using ionizing radiation to dispose of nuclear waste

USDOE devotes significant resources to limit the release of long-lived ionizing radiation sources containing mixed fission products and actinides through deep geologic disposal to prevent ionizing radiation exposure to present and future generations.

There are both short term and long term aspects of disposal. Short term considerations include worker and public safety issues. This section considers ionizing radiation sources used in nuclear waste disposal. The extent that ionizing radiation sources are routinely used to aid in the safe disposal of ionizing radioactive waste is generally not recognized. The benefits of these applications used routinely at WIPP are believed to outweigh the risks. We believe the following seven examples of the beneficial use of ionizing radiation should be quantified for both TRU and HLW and the results published to show the merits of these applications. Note that these applications generally entail only 1×10^{11} Becquerel (Bq) (a few curies) in contrast to the 3×10^{17} Bq (7.5 million Curie) WIPP operational inventory or the 5×10^{20} Bq, (10 billion Curie) Yucca Mountain Project inventory.

1. Site characterization
To determine the characteristics of a potential underground site, gamma ray sources are lowered in a borehole and the extent of absorption or Compton scattering provides information on the soil composition. Similarly, neutron sources (produced by Americium-241 alpha particles reacting with Berylium-9) provide information on any hydrogenous material present by the scattering distribution.

2. Quantity of radioactivity in the drums containing waste
The scattering of neutrons passed through the drums of TRU waste determines the identity and measures the quantity of actinides. This non-invasive procedure does not require the vented drums to be opened , thus avoiding unnecessary radiation worker exposure.

3. Presence of prohibited items in drum
Radiography (X-Ray) helps identify RCRA banned items of pressurized containers in the drums of waste and this non-invasive procedure also avoids the need to open the drums for inspection.

4. Shipping container integrity
The TRUPACT pressure vessels undergo radiography to determine the efficacy of the welds. (xix)

5. Radiation detection instrumentation
Survey meters, such as ionization chambers and Geiger Muller counters, use the principle of ionization to measure the presence of radiation. Radioactive alpha, beta, and gamma sources are routinely used in the various WIPP Laboratories such as EEG's to calibrate equipment such as proportional counters. Biological uptake studies use Carbon-14 and Tritium.

6. Tracer Studies
While tracer studies have not been used at WIPP, the observed migration of cesium-137 from underground weapons testing at the Nevada Test Site provides empirical knowledge on the travel behavior of that fission product for breach and leach calculations.

7. Worker health
Diagnostic radiology (X-Ray), such as chest X-rays, mammography, and CT scans, is used to detect tissue abnormalities.

Non-ionizing radiation applications include lasers in the mine to insure proper alignment in drilling tunnels and ultrasound has been investigated to measure thickness of drums. It also illustrates that ionizing radiation from radioactive waste disposal is not unique. Quantifying advantages and disadvantages of each of these applications helps develop public confidence that our actions are appropriate.

Dynamic Efficiency: Time Horizon and Discount Rate

There are many different relevant time horizons for the disposal of nuclear waste. Some of these time horizons involve current generations while others involve hundreds of future generations.

These alternative time horizons (t) in nuclear waste disposal require use of a discount rate to conduct a CBA. The discount rate (r) enables economists to compare future values (FV) of dollars with present values (PV). Two formulas (a) discrete formula where

$$PV = FV\,(1 + r)^{-t} \qquad \text{(Eq. 1)}$$

and (b) continuous formula where

$$PV = FV\,e^{-rt}. \qquad \text{(Eq. 2)}$$

As t becomes very large, the results of both equations approach zero. A positive discount rate greater than 0 is based on the following two assumptions of impatience and productivity of capital. Table II summarizes the relationship between alternative discount rates and time horizons using the continuous formula. The shaded area of Table II represents present values of less than 1% (or 1.00 E-02) of the future value.

Table II shows that for a discount rate equal to 5% or more and a time horizon of 100 years or more leads to a present value of 0. Thus any benefit cost analysis comparing present costs with benefits to future generations of more than 100 years will never pass a cost-benefit test. What is the appropriate discount rate to use for WIPP and Yucca Mountain? This is a subject of great debate with respect to the type of project, public versus private and the desire to emphasize risk reduction benefits to future generations.

Intergenerational Equity

In 1999, Resources for the Future (RFF) published papers by 20 eminent economists convened at a forum sponsored by RFF and the Electrical Power Research Institute (EPRI) to address the issue whether cost benefit analyses of long-term projects should be discounted, what the rate should be, or whether it is even appropriate to use CBA at all in decision-making for the disposal of high level wastes.(xx) The overall view, published by RFF concluded that some form of discounting was appropriate, albeit with limitations, and the rate should be positive. Weitzman(xxi) recommended a stepwise sliding scale in which the rate should be 3 to 4% for the first 25 years, 2% for the next 50 years, 1% for the following 225 years and then drop to zero

Table II: Present Value of $1 in Future Assuming Different Time Horizons (t) and Discount Rates (r)

Time Horizon	Alternative Discount Rates (r)												
Years (t)	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
1	$1	$ 9.90E-01	$9.80E-01	$9.70E-01	$9.61E-01	$9.51E-01	$9.42E-01	$9.32E-01	$9.23E-01	$9.14E-01	$9.05E-01	$8.96E-01	$8.87E-01
10	1	9.05E-01	8.19E-01	7.41E-01	6.70E-01	6.07E-01	5.49E-01	4.97E-01	4.49E-01	4.07E-01	3.68E-01	3.33E-01	3.01E-01
20	1	8.19E-01	6.70E-01	5.49E-01	4.49E-01	3.68E-01	3.01E-01	2.47E-01	2.02E-01	1.65E-01	1.35E-01	1.11E-01	9.07E-02
30	1	7.41E-01	5.49E-01	4.07E-01	3.01E-01	2.23E-01	1.65E-01	1.22E-01	9.07E-02	6.72E-02	4.98E-02	3.69E-02	2.73E-02
40	1	6.70E-01	4.49E-01	3.01E-01	2.02E-01	1.35E-01	9.07E-02	6.08E-02	4.08E-02	2.73E-02	1.83E-02	1.23E-02	8.23E-03
50	1	6.07E-01	3.68E-01	2.23E-01	1.35E-01	8.21E-02	4.98E-02	3.02E-02	1.83E-02	1.11E-02	6.74E-03	4.09E-03	2.48E-03
60	1	5.49E-01	3.01E-01	1.65E-01	9.07E-02	4.98E-02	2.73E-02	1.50E-02	8.23E-03	4.52E-03	2.48E-03	1.36E-03	7.47E-04
70	1	4.97E-01	2.47E-01	1.22E-01	6.08E-02	3.02E-02	1.50E-02	7.45E-03	3.70E-03	1.84E-03	9.12E-04	4.53E-04	2.25E-04
80	1	4.49E-01	2.02E-01	9.07E-02	4.08E-02	1.83E-02	8.23E-03	3.70E-03	1.66E-03	7.47E-04	3.35E-04	1.51E-04	6.77E-05
90	1	4.07E-01	1.65E-01	6.72E-02	2.73E-02	1.11E-02	4.52E-03	1.84E-03	7.47E-04	3.04E-04	1.23E-04	5.02E-05	2.04E-05
100	1	3.68E-01	1.35E-01	4.98E-02	1.83E-02	6.74E-03	2.48E-03	9.12E-04	3.35E-04	1.23E-04	4.54E-05	1.67E-05	6.14E-06
200	1	1.35E-01	1.83E-02	2.48E-03	3.35E-04	4.54E-05	6.14E-06	8.32E-07	1.13E-07	1.52E-08	2.06E-09	2.79E-10	3.78E-11
300	1	4.98E-02	2.48E-03	1.23E-04	6.14E-06	3.06E-07	1.52E-08	7.58E-10	3.78E-11	1.88E-12	9.36E-14	4.66E-15	2.32E-16
400	1	1.83E-02	3.35E-04	6.14E-06	1.13E-07	2.06E-09	3.78E-11	6.91E-13	1.27E-14	2.32E-16	4.25E-18	7.78E-20	1.43E-21
500	1	6.74E-03	4.54E-05	3.06E-07	2.06E-09	1.39E-11	9.36E-14	6.31E-16	4.25E-18	2.86E-20	1.93E-22	1.30E-24	8.76E-27
600	1	2.48E-03	6.14E-06	1.52E-08	3.78E-11	9.36E-14	2.32E-16	5.75E-19	1.43E-21	3.53E-24	8.76E-27	2.17E-29	5.38E-32
700	1	9.12E-04	8.32E-07	7.58E-10	6.91E-13	6.31E-16	5.75E-19	5.24E-22	4.78E-25	4.36E-28	3.98E-31	3.63E-34	3.31E-37
800	1	3.35E-04	1.13E-07	3.78E-11	1.27E-14	4.25E-18	1.43E-21	4.78E-25	1.60E-28	5.38E-32	1.80E-35	6.05E-39	2.03E-42
900	1	1.23E-04	1.52E-08	1.88E-12	2.32E-16	2.86E-20	3.53E-24	4.36E-28	5.38E-32	6.64E-36	8.19E-40	1.01E-43	1.25E-47
1000	1	4.54E-05	2.06E-09	9.36E-14	4.25E-18	1.93E-22	8.76E-27	3.98E-31	1.80E-35	8.19E-40	3.72E-44	1.69E-48	7.67E-53
10000	1	3.72E-44	1.38E-87	5.15E-131	1.92E-174	7.12E-218	2.65E-261	9.86E-305	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

after 300 years. Cropper and Laibson (xxii) recommended hyperbolic discounting which leads to a lower annual discount rate in the distant future. Lind (xxiii) notes that the use of discount rates does not provide a complete basis for decision making or for determining what is an optimal policy. The majority of the participants had similar reservations.

Public health officials and environmentalists often disagree with the emphasis economists place on the present as opposed to future values to generations far in the future. So how do we provide assurance that the residual long-term intergenerational risks of health effects are reasonable and equitable? Basically, try to design repositories so as to limit the predicted long-term detriment to future generations to be comparable to allowable radiation doses considered to be acceptable to society today. Hence the issue of selecting an appropriate method to calculate today's value of benefits over a 10,000 year period has, in effect, been sidestepped.

Uncertainties

Developments in science may continue to change the values of benefits in the future. For example, will the allowable annual exposure of 15 millirem (mrem) be an acceptable criterion over the long term future? During atmospheric weapons testing at the Nevada Test Site in 1957, the AEC guide for off-site radiation exposure to any person was 3.9 Roentgen per test series which was essentially the same standard used in previous Nevada test series. (xxiv) The total exposure to any person should not exceed 3.9 Roentgen. This is approximately equal to 3900 mrem. We now consider 15 mrem per year to the reasonably maximally exposed individual to be acceptable for waste disposal in the area adjacent to the Nevada Test Site for the next 10,000 years. (xxv)

Summary of CBA

Table III reports the advantages and disadvantages of CBA. The punchline is that the CBA appears to be useful as an input for short term projects but not long term.

Table III: Advantages and Disadvantages of CBA

Advantages	Disadvantages
Use economic efficiency as an input in decision-making process	Economic efficiency does not include equity (either present and/or future). Difficult to include values for future generations, a significant part of the equity standard.
Monetary values understandable to general public	Seemingly straightforward CBA results on the surface require complex and potentially controversial assumptions based on science, resource requirements of the present generation, and resource requirements of future generations.
Useful as an input in short term analyses	The longer the time horizon, the greater the uncertainties

EXAMPLE

An example where either CBA or cost comparisons might have helped in a decision-making process was the decision to ship TRU waste by truck. DOE announced its decision to transport TRU waste to WIPP initially by truck while reserving the option to use commercial rail transportation in the future. (xxvi) One of the primary factors they based this decision on was dedicated trains are more expensive than trucks. While dedicated rail is significantly more expensive than trucks, shipments could be made by regular rail which is one-third the cost of truck.

While examining the advantages and disadvantages of both truck and rail, Neill and Neill (xxvii) estimate a $600 million savings for using rail at Hanford and INEEL for both CH and RH TRU waste. These findings were examined by the National Academy of Sciences who made a similar recommendation to reevaluate the use of rail for WIPP. (xxviii) Clearly a more rigorous analysis of both the benefits and costs subject to external review before a decision is final might have saved tax payers significant resources.

DISCUSSION

This section discusses the implications of our findings. First, CBA does not appear to be appropriate for all stages of nuclear waste disposal. Given the relative short time horizons where one can make meaningful comparisons between present costs and future benefits, one cannot use CBA when deciding whether or not to build a repository. Given Table II, any time horizon greater than 50 years will not pass a benefit-cost test. Obviously a time horizon of 50 years is significantly less than the 10,000 year standard for both TRU and HLW.

Second, seemingly straightforward CBA results on the surface require careful examination by external reviewers. Oftentimes the assumptions may not capture important complexities in science, politics and needs of present and future generations.

Finally, the longer the time horizon, the greater the uncertainty. The needs of future generations are not clear. We face tradeoffs between benefits of preventing harm (reducing risks) to future generation and alternative uses of resources today. What will make future generations better off, preventing harm or increasing consumption (nuclear power and nuclear deterrence)? From an economic perspective, current consumption levels build the infrastructure of today and tomorrow (better schools, highways, standard of living etc.). From a public health and intergenerational equity perspective, we owe it to future generations to properly manage our unwanted radioactive residuals.

CONCLUSION

We find that CBA appears particularly applicable where the benefits and costs are in the near term. An inventory of ionizing radiation sources used to help in the disposal of ionizing radiation waste is presented. We find cost benefit analyses applied to long term horizons are problematic and require careful consideration of intergenerational equity issues. These findings can help policymakers become more informed on funding decisions and to develop public confidence in the merits of the program for waste disposal. Along these findings we recommend the following:

1. USDOE should perform CBA analyses on the RCRA requirements for the non-radiological characterization of Mixed TRU waste to determine whether the benefits exceed the costs.

2. USDOE should publish CBA on the various ionizing radiation sources used to insure the safe disposal of ionizing radioactive waste at both WIPP and Yucca Mountain.

The challenges of conducting CBA for intermediate term projects are formidable, but such quantification can contribute substantially to providing a firmer basis for justification to policymakers for funding those projects that are in the national interest and help develop public confidence. While this generation has a moral responsibility to properly manage our unwanted radioactive residuals, it is important to try to calculate the net worth of our actions. These analyses require consideration of not only economic issues, but require consideration of technical, social, logistical, and political issues as well.

VIII. REFERENCES

i. U. S. Department of Energy (DOE), "WIPP Disposal Phase Final Supplemental Environmental Impact Statement," 2 Vol., Document Number DOE/EIS-0026-S-2 (September 1997)

ii. U. S. Department of Energy (DOE), "Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and HLW at Yucca Mountain, NV," Document Number DOE/EIS-0250, 2 Vol., (February 2002)

iii. Michael E. Long, "America's Nuclear Waste: Seeking Solutions," National Geographic, (July 2002)

iv. Steve Tetreault, "Yucca Mountain Project: Director says she wants to shave billions," Las Vegas Review-Journal (July 31, 2002)

v. Robert K. Yin, "Case Study Research: Design and Methods, Second Edition," Sage Publications, Inc. (1994)

vi. Steven Kelman, "Cost Benefit Analysis An Ethical Critique" Regulation, (January/February 1981)

vii. Richard O. Zerbe, "Is Cost-Benefit Analysis Legal? Three Rules" Journal of Policy Analysis and Management, Vol. 17, No. 3, pp. 419-456 (1998). Note: Zerbe disagrees with this criticism and argues that an understanding of what values count, whose values count and why they count obviates most criticisms of benefit-cost analysis as a technique.

viii. Kenneth J. Arrow, Maureen L. Cropper, George C. Eads, Robert W. Hahn, Lester B. Lave, Roger G. Noll, Paul R. Portney, Milton Russell, Richard Schmalensee, V. Kerry Smith, and Robert Stavins, "Is There a Role for Benefit-Cost Analysis in Environmental, Health and Safety Regulation?" Science, vol. 272, pp. 221 - 222 (April 1996).

ix. U.S. Environmental Protection Agency (EPA), "Guidelines for Preparing Economic Analyses," (September 2000)

x. Recommendations of the International Committee on Radiological Protection, ICRP Publication 26, (1977)

xi. Scott Farrow, "Using benefit-cost analysis to improve environmental regulations" Environment, (March 1999)

xii. Scott Farrow, Michael Toman, "Using Environmental Benefit-Cost Analysis to Improve Government Performance" Resources for the Future, Discussion Paper 99-11 (December 1998)

xiii. Scott Farrow, "Using benefit-cost analysis to improve environmental regulations" Environment, p. 2 (March 1999)

xiv. Jimmy Carter, Executive Order 12044, "Improving Government Regulations" **Federal Register, Vol. 43.**(Mar. 23, 1978); **Ronald Reagan, Executive Order 12291, "Federal Regulation," Federal Register, Vol. 46.(Feb. 17, 1981); George Bush, Executive Order 12498 "Regulatory Planning and Review" Federal Register, Vol. 50. (Jan. 4, 1985); Clinton, Bill, Executive Order 12866, "Regulatory Planning and Review" Federal Register Vol. 58, No, 190 (Sept. 30, 1993); George W.** Bush, Executive Order 13258, "Amending Executive Order 12866 on Regulatory Planning and Review" Federal Register, Vol. 67, No. 40. (Feb. 26, 2002)

xv. Executive Order 12291, President Ronald Reagan, (Feb 17, 1981)

xvi. Executive Order 12866, President Bill Clinton, (Sept 30, 1993)

xvii. U. S. Environmental Protection Agency (EPA), 40 CFR Part 191, "Standards for the Safe Disposal of HLW and TRU," (1993)

xviii. U. S. Environmental Protection Agency (EPA) 40 CFR Part 197, "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV; Final Rule," (June 13, 2001)

xix. NRC 10 CFR 71

xx. Portney, Paul R and John P Weyant, Editors, "Discounting and Intergenerational Equity," Resources for the Future, Washington, DC., p. 6 (1999)

xxi. Portney, Paul R and John P Weyant, Editors, "Discounting and Intergenerational Equity," Resources for the Future, Washington, DC., p. 29 (1999)

xxii. Portney, Paul R and John P Weyant, Editors, Discounting and Intergenerational Equity, Resources for the Future, Washington, DC., p. 164 (1999)

xxiii. Portney, Paul R and John P Weyant, Editors, Discounting and Intergenerational Equity, Resources for the Future, Washington, DC., p. 180 (1999)

xxiv. U. S. Atomic Energy Commission, Atomic Tests in Nevada, p. 28 (March 1957)

xxv. U. S. Environmental Protection Agency (EPA), "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV; Final Rule," 40 CFR Part 197 (June 13, 2001)

xxvi. Record of Decision for the Department of Energy's Waste Isolation Pilot Plant Disposal Phase, 63 Fed. Reg. 3624, 3624-26 (1998)

xxvii. Helen R. Neill and Robert H. Neill, "Transportation of Transuranic Nuclear Waste to WIPP: A Reconsideration of Truck versus Rail for Two Sites" Natural Resources Journal, vol. 40, no. 1 pp. 93-124 (2000)

xxviii. U. S. National Research Council, "Improving Operations and Long Term Safety of the Waste Isolation Pilot Plant" National Academy Press (2001)

Exhibit C

Table of Contents

Part I: Mixture Sums and Single Radionuclide Guidelines

Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.720E+00	6.720E+00	DCF2(1)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(2)
B-1	Pb-210+D	2.320E-02	2.320E-02	DCF2(3)
B-1	Ra-226+D	8.600E-03	8.600E-03	DCF2(4)
B-1	Ra-228+D	5.080E-03	5.080E-03	DCF2(5)
B-1	Th-228+D	3.450E-01	3.450E-01	DCF2(6)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(7)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(8)
B-1	U-234	1.320E-01	1.320E-01	DCF2(9)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(10)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(11)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.480E-02	DCF3(1)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(2)
D-1	Pb-210+D	7.270E-03	7.270E-03	DCF3(3)
D-1	Ra-226+D	1.330E-03	1.330E-03	DCF3(4)
D-1	Ra-228+D	1.440E-03	1.440E-03	DCF3(5)
D-1	Th-228+D	8.080E-04	8.080E-04	DCF3(6)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(7)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(8)
D-1	U-234	2.830E-04	2.830E-04	DCF3(9)
D-1	U-235+D	2.670E-04	2.670E-04	DCF3(10)
D-1	U-238+D	2.690E-04	2.690E-04	DCF3(11)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(2,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(2,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(3,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(3,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(4,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(4,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(5,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(5,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(6,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(6,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(6,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(7,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(7,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(7,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(8,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(8,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(9,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(9,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(10,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(10,3)
D-34				
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(11,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(11,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(11,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(2,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(2,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(3,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(3,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(4,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(4,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(5,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(5,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(6,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(6,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(7,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(7,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(8,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(8,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(9,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(9,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(10,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(10,2)
D-5				

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 Morbidity

Menu	Parameter	Current Value	Default	Parameter Name
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(11,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(11,2)

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.823E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	2.800E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	1.350E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.000E+02	2.500E+01	---	BRDL
R011	Time since placement of material (yr)	4.300E+01	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	1.000E+01	3.000E+00	---	T(3)
R011	Times for calculations (yr)	3.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	1.000E+02	3.000E+01	---	T(5)
R011	Times for calculations (yr)	1.000E+03	1.000E+02	---	T(6)
R011	Times for calculations (yr)	1.000E+04	3.000E+02	---	T(7)
R011	Times for calculations (yr)	1.000E+05	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ac-227	1.600E+01	0.000E+00	---	S1(1)
R012	Initial principal radionuclide (pCi/g): Pa-231	3.590E+02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pb-210	3.590E+02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): Ra-226	3.590E+02	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Ra-228	3.590E+02	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Th-228	3.590E+02	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Th-230	3.590E+02	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Th-232	3.590E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): U-234	3.590E+02	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): U-235	1.600E+01	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): U-238	3.590E+02	0.000E+00	---	S1(11)
R012	Concentration in groundwater (pCi/L): Ac-227	not used	0.000E+00	---	W1(1)
R012	Concentration in groundwater (pCi/L): Pa-231	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pb-210	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Th-230	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): U-234	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(11)
R013	Cover depth (m)	1.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	1.900E+00	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	0.000E+00	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	2.800E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	4.650E-05	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	2.000E+03	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	2.880E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	4.250E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	6.250E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.050E+00	1.000E+00	---	PRECIP

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Irrigation (m/yr)	0.000E+00	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.600E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.520E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.000E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	2.000E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	2.200E+04	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	2.000E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	2.880E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	1.000E+01	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	1	1	---	NS
R015	Unsat. zone 1, thickness (m)	2.500E+00	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	1.650E+00	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	4.000E-01	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	2.000E-01	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	1.000E+04	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Ac-227				
R016	Contaminated zone (cm**3/g)	2.400E+03	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.549E-05	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for Pa-231				
R016	Contaminated zone (cm**3/g)	2.700E+03	5.000E+01	---	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.376E-05	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.714E-04	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	5.300E+01	7.000E+01	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.003E-04	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	5.300E+01	7.000E+01	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.003E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	5.201E+04	6.000E+04	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.146E-07	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Th-230				
R016	Contaminated zone (cm**3/g)	5.201E+04	6.000E+04	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.146E-07	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	5.201E+04	6.000E+04	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.146E-07	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for U-234				
R016	Contaminated zone (cm**3/g)	7.036E+04	5.000E+01	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.283E-07	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	7.036E+04	5.000E+01	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.283E-07	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	7.036E+04	5.000E+01	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.283E-07	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R017	Inhalation rate (m**3/yr)	8.400E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	3.000E-05	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	not used	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	5.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.500E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	not used	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	1.800E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	5.100E+02	5.100E+02	---	DWI

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	8.894E+01	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	1	---	---	LYMAX
TITL	Maximum number of integration points for risk	1	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	suppressed
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Contaminated Zone Dimensions	
Area:	18230.00 square meters
Thickness:	2.80 meters
Cover Depth:	1.00 meters

Initial Soil Concentrations, pCi/g	
Ac-227	1.600E+01
Pa-231	3.590E+02
Pb-210	3.590E+02
Ra-226	3.590E+02
Ra-228	3.590E+02
Th-228	3.590E+02
Th-230	3.590E+02
Th-232	3.590E+02
U-234	3.590E+02
U-235	1.600E+01
U-238	3.590E+02

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.000E+02 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	1.000E+01	3.000E+01	1.000E+02	1.000E+03	1.000E+04	1.000E+05
TDOSE(t):	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.554E+03	4.637E+02	1.698E+01
M(t):	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.554E+01	4.637E+00	1.698E-01

Maximum TDOSE(t): 1.718E+03 mrem/yr at t = 801 ± 2 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 8.011E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ac-227	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pa-231	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

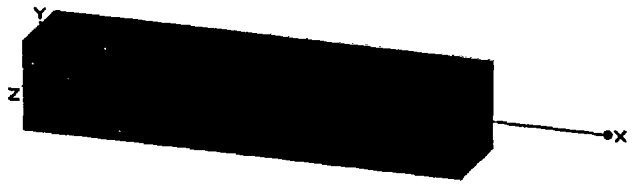
Exhibit D

MicroShield v5.05 (5.05-00532)
Bureau of Radiation Protection

Page : 1
DOS File : SMC_INF.MS5
Run Date: February 26, 2007
Run Time: 2:15:15 PM
Duration : 00:00:00

File Ref: SMC
Date: 2/26/07
By: E. Truskowski
Checked: J. Goodman

Case Title: shield alloyCase 1
Description: 3, 20 and 100 ft from 6 ft infinite slab
Geometry: 16 - Infinite Slab



Source Dimensions

Thickness	100.0 cm	3 ft 3.4 in

Dose Points

	X	Y	Z
#1	130.48 cm	0 cm	0 cm
	4 ft 3.4 in	0.0 in	0.0 in

Shields

Shield Name	Dimension	Material	Density
Source	Infinite	Concrete	2.8
Air Gap		Air	0.00122

Source Input
Grouping Method : Standard Indices
Number of Groups : 25
Lower Energy Cutoff : 0.015
Photons < 0.015 : Excluded
Library : Grove

Nuclide	μCi/cm³	Bq/cm³
Ac-227	1.0000e-005	3.7000e-001
Ac-228	1.0000e-003	3.7000e+001
Bi-210	1.0000e-003	3.7000e+001
Bi-211	1.0000e-005	3.7000e-001
Bi-212	1.0000e-003	3.7000e+001
Bi-214	1.0000e-003	3.7000e+001
Fr-223	1.4000e-005	5.1800e-001
Pa-231	1.0000e-005	3.7000e-001
Pa-234	1.3000e-006	4.8100e-002
Pa-234m	1.0000e-003	3.7000e+001
Pb-210	1.0000e-003	3.7000e+001
Pb-211	2.8000e-006	1.0360e-001
Pb-212	1.0000e-003	3.7000e+001
Pb-214	1.0000e-003	3.7000e+001
Po-210	1.0000e-003	3.7000e+001
Po-211	1.0000e-003	3.7000e+001
Po-212	6.4000e-004	2.3680e+001
Po-214	1.0000e-003	3.7000e+001
Po-215	1.0000e-005	3.7000e-001
Po-216	1.0000e-003	3.7000e+001

DOS File : SMC_INF.MS5
Run Date: February 26, 2007
Run Time: 2:15:15 PM
Duration : 00:00:00

Nuclide	µCi/cm³	Bq/cm³
Po-218	1.0000e-003	3.7000e+001
Ra-223	1.0000e-005	3.7000e-001
Ra-224	1.0000e-003	3.7000e+001
Ra-226	1.0000e-003	3.7000e+001
Ra-228	1.0000e-003	3.7000e+001
Rn-219	1.0000e-005	3.7000e-001
Rn-220	1.0000e-003	3.7000e+001
Rn-222	1.0000e-003	3.7000e+001
Th-227	9.8600e-004	3.6482e+001
Th-228	1.0000e-003	3.7000e+001
Th-230	1.0000e-003	3.7000e+001
Th-231	1.0000e-005	3.7000e-001
Th-232	1.0000e-003	3.7000e+001
Th-234	1.0000e-003	3.7000e+001
Tl-207	9.9700e-004	3.6889e+001
Tl-208	3.6000e-004	1.3320e+001
U-234	1.0000e-003	3.7000e+001
U-235	1.0000e-005	3.7000e-001
U-238	1.0000e-003	3.7000e+001

Buildup
The material reference is : Air Gap

Results

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
0.015	8.300e-04	2.235e-07	2.539e-07	1.917e-08	2.178e-08
0.02	7.820e-02	7.092e-05	9.752e-05	2.457e-06	3.378e-06
0.03	1.251e-01	5.525e-04	1.303e-03	5.476e-06	1.291e-05
0.04	4.628e-01	5.558e-03	2.020e-02	2.458e-05	8.936e-05
0.05	5.258e+00	1.236e-01	7.633e-01	3.293e-04	2.033e-03
0.06	1.933e+00	7.269e-02	6.613e-01	1.444e-04	1.314e-03
0.08	2.691e+01	1.857e+00	2.199e+01	2.939e-03	3.480e-02
0.1	6.281e+00	6.382e-01	8.006e+00	9.764e-04	1.225e-02
0.15	1.749e+00	3.257e-01	3.616e+00	5.364e-04	5.954e-03
0.2	3.004e+01	8.362e+00	7.142e+01	1.476e-02	1.261e-01
0.3	2.449e+01	1.195e+01	8.305e+01	2.266e-02	1.575e-01
0.4	1.516e+01	1.107e+01	6.096e+01	2.157e-02	1.188e-01
0.5	5.811e+00	5.826e+00	2.743e+01	1.144e-02	5.385e-02
0.6	2.984e+01	3.888e+01	1.566e+02	7.589e-02	3.056e-01
0.8	1.569e+01	3.111e+01	1.046e+02	5.917e-02	1.990e-01
1.0	3.352e+01	9.255e+01	2.691e+02	1.706e-01	4.960e-01
1.5	1.201e+01	6.124e+01	1.406e+02	1.030e-01	2.365e-01

DOS File : SMC_INF.MS5
Run Date: February 26, 2007
Run Time: 2:15:15 PM
Duration : 00:00:00

Energy MeV	Activity photons/sec	Fluence Rate MeV/cm²/sec No Buildup	Fluence Rate MeV/cm²/sec With Buildup	Exposure Rate mR/hr No Buildup	Exposure Rate mR/hr With Buildup
2.0	1.002e+01	7.908e+01	1.609e+02	1.223e-01	2.487e-01
3.0	1.329e+01	1.935e+02	3.445e+02	2.625e-01	4.674e-01
TOTALS:	2.327e+02	5.366e+02	1.454e+03	8.689e-01	2.466e+00

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
SHIELDALLOY METALLURGICAL CORP.	)	Docket No. 40-7102
	)	
	)	
(Newfield, New Jersey)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of NJDEP's Reply to the Response of NRC Staff and NJDEP's Reply to the Answer of Shieldalloy, with attached exhibits, have been served upon the following persons by deposit of paper copies in the U.S. mail, first class, and where indicated by an asterisk be electronic mail, this 27th day of February 2007.

*Administrative Judge
Alan S. Rosenthal, Chair
Atomic Safety and Licensing Board
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
rsnth@comcast.net

*Administrative Judge
Dr. Richard E. Wardwell
Atomic Safety and Licensing Board
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
rew@nrc.gov

*Administrative Judge
William Reed
Atomic Safety and Licensing Board
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
whrcville@earthlink.net

Office of Commission Appellate
Adjudication
Mail Stop O -16 C1
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

*Office of the Secretary
Att'n Rulemakings and Adjudications Staff
Mail Stop O-16 C1
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
secy@nrc.gov; hearingdocket@nrc.gov

Adjudicatory File
Atomic Safety and Licensing Board
Mail Stop - T-3 F23
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

*Margaret J. Bupp, Esq.
*Michael J. Clark, Esq.
Office of the General Counsel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
MJB5@nrc.gov, mjc 1 @ nrc.gov

Loretta Williams
310 Oakwood Drive
P.O. Box 311
Newfield, NJ 08344

Joseph J. McGovern, Esq.
Parker McCay, P.A.
Three Greentree Centre
7001 Lincoln Drive West
P.O. Box 974
Marlton, NJ 08053

*Terry Ragone
White Dove Lane
P.O. Box 605
Newfield N.J. 08344
foxragone@aol.com

*John C. Eastlack, Jr., Esq.
Holston MacDonald Uzdavinis Eastlack
Ziegler & Lodge
66 Euclid Street
Woodbury, NJ 08096
jeastlack@holstonlaw.com

*Gary D. Wodlinger, Esq.
110 North 6th Street
Box 729
Vineland, NJ 08362
gwodlinger@lipmanlaw.org

Fred H. Madden, Senator
David R. Mayer, Assemblyman
Paul Moriarty, Assemblyman
Fourth District
New Jersey Senate and General Assembly
Holly Oak Office Park
129 Johnson Road, Suite 1
Turnersville, NJ 08012

*Jered Lindsay, Clerk
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
JJL5@nrc.gov

*SherVerne R. Cloyd
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
M/S T -3F23
Washington, D.C. 20555-0001
src2@nrc.gov

Jay E. Silberg, Esq.
Robert B. Haemer, Esq.
Matias F. Travieso-Diaz, Esq.
Pillsbury Winthrop Shaw Pittman LLP
2300 N Street, N.W.
Washington, DC 20037-1128
jay.silberg@pillsburylaw.com;
matias.travieso-diaz@pillsubylaw.com;
robert.haemer@pillsburylaw.com

Jamaal Muchinson

Date: February 27, 2007

JON S. CORZINE
Governor

State of New Jersey
OFFICE OF THE ATTORNEY GENERAL
DEPARTMENT OF LAW AND PUBLIC SAFETY
DIVISION OF LAW
25 MARKET STREET
PO BOX 093
TRENTON, NJ 08625-0093

STUART RABNER
Attorney General

ROBERT J. GILSON
Director

February 27, 2007

Re: NJDEP's Reply to the Response of the NRC Staff and NJDEP's Reply to the Answer of Shieldalloy
Docket No. 40-7102

To Attached Service List:

This office represents the New Jersey Department of Environmental Protection ("NJDEP"), which previously filed a Petition for a Hearing on the Shieldalloy Metallurgical Corporation (License No. SMB-743) Decommissioning Plan. Enclosed for filing, please find copies of NJDEP's Reply to the Response of the NRC Staff and NJDEP's Reply to the Answer of Shieldalloy.

Thank you for your attention in this matter.

Sincerely yours,

STUART RABNER
ATTORNEY GENERAL OF NEW JERSEY

By: *Andrew D Reese*
Andrew D. Reese
Deputy Attorney General

Encl.