UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
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SEP 2 6 2007

Ms. Rebecca Tadesse, Chief
Materials Decommission Branch
Division of Waste Management and
Environmental Protection
United States Nuclear Regulatory Commission
M.S. 8F5
11545 Rockville Pike
Rockville, MD 20852

Subject: Shieldalloy Metallurgical Corporation's Decommissioning Plan for Newfield, NJ Site

Dear Ms. Tadesse:

This letter is written to inform you that the United States Environmental Protection Agency (EPA) has completed its review of the October 2006 Decommissioning Plan (DP) for the Shieldalloy Metallurgical Corporation (SMC) facility located in Newfield, New Jersey.

EPA's comments on the DP are enclosed. Based on EPA's review, we find that the sampling program performed by Shieldalloy Metallurgical Corporation (SMC) in support of the DP is severely deficient and failed to characterize the extent of radiological waste as well as potential mixed wastes located throughout the site. Areas of significant concern requiring additional characterization include Storage Yard wastes, surface and subsurface soils both on and off of the plant property, underground discharge lines, surface water, sediment, and groundwater. Any decision regarding the remediation of radioactive material at the site can only be made based on a complete characterization of the nature and extent of the radiological contamination found at the site. Therefore, SMC must collect and analyze significant additional data, as outlined in the attached comments, prior to a final decision on the decommissioning of this facility.

Further, since the current risk assessment is based on incomplete site characterization of the radiological contamination, SMC must conduct an appropriate risk assessment after the site characterization is complete. In addition, the risk assessment must address significant exposure pathways which

inhalation of radon decay products in indoor air due to the use of site groundwater, and ingestion of site groundwater and homegrown produce. Additional comments on SMC's risk assessment are attached.

Based on our review of the DP, EPA is concerned that the Long Term Control (LTC) option proposed by SMC in the DP, if implemented, may not be protective of human health and the environment and may not be the best option for addressing the radioactive waste materials found on the facility. Based on the limited data presented in the DP, EPA cannot support the LTC option. EPA believes that the method of decommissioning of the SMC facility may have a significant impact on the Superfund portion of the site and the surrounding communities.

In your March 6, 2007 letter to Mr. Walter Mugdan, of EPA, you indicated that you would like to meet with the EPA to discuss our assessment of the DP. This letter was forwarded to me, as the Superfund Division is the lead division for review of the DP. My technical staff would be happy to meet with your technical staff to go over the enclosed comments upon your request.

If you should have any questions regarding the above, please contact me at (212) 637-4420, or have your staff contract Mr. Trevor Anderson, of my staff, at (212) 637-4425.

Sincerely,

Carole Petersen, Chief
New Jersey Remediation Branch

Enclosure

cc: Donna Gaffigan, NJDEP

EPA's Comment on the Draft Decommissioning Plan for Shieldalloy Metallurgical Corporation, Newfield, New Jersey.

General Comments

1. Overall, EPA considers the proposed Decommissioning Plan (DP) to be inadequate. A decision regarding the remediation of radioactive material at the site can only be made based on a complete characterization of the nature and extent of contamination. The sampling program performed by Shieldalloy Metallurgical Corporation (SMC) is severely deficient and failed to characterize the extent of radiological and potential mixed wastes in the Storage Yard, surface and subsurface soils, underground discharge lines, surface water, sediment, groundwater and areas off of the plant property which appear to be impacted. Further, based on the information provided in the DP, there are significant data gaps pertaining to the radiological characterization of both the shallow and deep groundwater. Problems with the data include: poor data quality control; lack of analysis for all radiological parameters in all sampling events; and insufficient number of samples and sampling locations, specifically, from locations downgradient and cross-gradient of the Storage Yard, processing buildings, and effluent discharge lines.

2. Because of the significant lack of characterization of site contaminants, the risk evaluation performed and the development and analysis of remedial alternatives cannot be supported. The developed risk assessment scenarios were not only deficient and based on incomplete data, they failed to address potentially and very significant exposure pathways such as the inhalation of radon decay products in indoor air due to the use of site groundwater, and ingestion of site groundwater and homegrown produce.

3. For unknown reasons, many of the reports of previous investigations conducted by SMC's contractors were not included in the DP. EPA will need to review all of these reports. Such reports include, in part, the radiological characterization of the processing buildings and Haul Road, certain outdoor radiological investigations (e.g., gamma surveys and background surveys), and the radiological assessment of the Hudson Branch.

4. The DP indicates that greater than 99% of radioactivity remained in the slag and the baghouse dust after processing of raw material. Given the amount of radioactivity that SMC processed (approximately 50 curies), even one-tenth percent (0.5 curie) could have a noticeable impact on groundwater contamination if such levels had remained in liquids during the chromium extraction activities and then migrated to groundwater. The radiological site groundwater investigations performed by SMC were poorly done in both the deep and shallow groundwater. It will be necessary to re-sample existing wells and to install a number of additional wells downgradient and crossgradient of the processing buildings and the Storage Yard for the analyses of radiological parameters. Groundwater sampling for radiological parameters should also be performed within the chemical contaminant plume currently being addressed under a Superfund Record of Decision.

5. To date, SMC has not performed subsurface soil investigations, and has not addressed any underground structures such as drains and discharge lines. The potential presence of non-radiological contamination mixed with radioactivity within these underground discharge lines could constitute a mixed waste issue. It is also possible that soils in the vicinity of the discharge lines could be impacted due to potential deterioration in the discharge lines. Although it is clear from work done under the Superfund program at the site that there are non-radiological contaminants at elevated levels in site soils, there is no mention of this in the DP. SMC is currently storing radiologically contaminated materials and equipment in the Storage Yard. Such equipment is mingled with High Ratio slag and D111 Flex Kleen Bags and D116 Polishing Compound. A determination must be made, based on sampling, as to whether site soils and/or other waste on the site constitute mixed waste.

6. Some of the off-site sediment and surface water sample concentrations of radiological contaminants, in excess of the limits stated in 40CFR192 and the Safe Drinking Water Act, have been identified along the Hudson Branch during previous investigations performed by SMC. SMC stated in their DP that off-site contamination will not be addressed in their future decommissioning activities. This is inappropriate. Only a small portion of the Hudson Branch has been sampled by SMC and the extent of radiological contamination in the Hudson Branch has not been determined. The radiologically impacted Hudson Branch passes through a 19.8 acre farmland parcel which is located approximately 2,000 feet southwest of the SMC site property and has recently been acquired by SMC. Contamination on the farmland parcel and within the Hudson Branch must be fully characterized.

7. The SMC proposed Trust Fund for the Proposed Long Term Control (LTC) program appears severely inadequate to support the LTC alternative. The current estimated amount for the LTC alternative is $5,172,507. This amount only accounts for basic environmental monitoring and minimal maintenance needs. Necessary and important monitoring requirements such as groundwater monitoring downgradient and cross-gradient of the engineered barrier and monitoring of potential moisture build-up within the engineered barrier, due to moisture percolating via the soil beneath the waste pile, are not included in the environmental monitoring program for the LTC alternative. The radioactive waste currently, and under the proposed LTC alternative, sits directly over the soil without a liner to prevent any potential leaching of radioactivity into groundwater. If this alternative were selected, it would require extensive and regular groundwater monitoring to assure that groundwater was not impacted. Further, moisture build-up within the engineered barrier due to percolation via the soil beneath the radioactive waste is a plausible event. Such build-up of moisture within the engineered barrier could adversely impact the integrity of the engineered cap and aid in increasing the potential for radioactivity to leach into groundwater, and would need to be monitored. Additional funding would be required for such sampling over the long-term. It is noted that the maximum half-life of the site-related radionuclides is 14 billion years.

8. The evaluations of alternatives under the "Controls Fail/No Maintenance" scenarios presented in the DP are not comprehensive and were not properly performed. The evaluations are inappropriately biased in favor of the LTC alternative particularly with respect to aspects such as dose modeling, modeling radioactivity leaching to groundwater and associated water resources, and the impact on the surrounding community.

9. SMC cannot propose any portion of the property for unrestricted use unless the current radiological conditions are fully characterized and portions of the site are then shown to have no unacceptable levels of radiological, as well as non-radiological contamination in surface and subsurface soils.

10. The baghouse dust appears to be improperly staged in the Storage Yard. The baghouse dust must be contained to prevent its migration via airborne dust and water run-on/run-off.

11. The groundwater flow contouring (piezometric survey) is too limited and requires expansion to include areas downgradient and cross-gradient of the processing buildings and the Storage Yard. Shallow groundwater monitoring in the area east/southeast of the Storage Yard is also necessary as the groundwater flow in that area could potentially be in the east/southeast radial direction.

12. The NRC License SMB-743 allowed SMC to store licensed source material. This licensed source material is any material that contains greater than 0.05% by weight uranium and thorium radionuclides, which in this case would be the pyrochlore ore and the ferrocolumbium slag. During the course of SMC's operations at the site, very significant volumes, of materials which were radiologically contaminated, but may not meet the definition of source material (non-source materials), such as site soils and equipment, were placed in the Storage Yard, along with the slag. As part of the proposed LTC alternative presented in the DP, SMC plans to consolidate additional radiologically contaminated materials remaining on the plant property into the Storage Yard and place a cap over all of this material. Further, prior to further characterization of waste to be capped under the LTC alternative, it is not clear if significant levels of non-radiological contaminants are mixed in with this waste, such as chromium. Since source material, non-source material and mixed waste all exhibit different characteristics, it is not clear that a capping remedy would be appropriate for all of this waste. An appropriate remedy, or remedies, for this different waste cannot be determined until full characterization of all waste material is completed.

Specific Comments

VOLUME I

1. **Page xxii, Lines 24-26**
   This paragraph states *"An additional 19.8 acres of farmland, located approximately 2000 feet southwest of the primary site in Vineland, Cumberland County, New Jersey are also owned by SMC."* Previous investigations performed by Shieldalloy along the Hudson Branch section near the southern boundary of the site identified radiological contamination in sediment (e.g., maximum of 9.65 pCi/g of Th-232 and 34 pCi/g of Ra-226) and surface water (i.e., maximum of 8 pCi/L of Th-232 and 33 pCi/L of Ra-226), which are shown on maps 7 and 8 of Appendix B of Appendix 19.9. The extent of this sediment contamination has not yet been delineated. Such concentrations exceed water MCLs, UMTRCA soil standards, and exceed the EPA acceptable risk range for generic risk assessment scenarios. The Hudson Branch passes through the aforementioned farmland. Therefore, the remainder of the Hudson Branch and the farmland are potentially impacted by site contamination and required further investigation.

2. **Page xxiii, lines 15 and 16**
   SMC stated *", greater than 99% of the radioactive species remained in the slag, and to a much lesser extent, in the baghouse dust."* Please specify the percent and the concentrations of radionuclides found in the baghouse dust, and more importantly, the percent of radioactivity that remained in any liquid used during the processing and where this liquid was disposed.

3. **Page xxiv, Lines 11-15,**
   SMC Stated *"Finally, a trust fund sufficient in an amount sufficient to ensure continuation of the LTC Plan will be initiated, with the USNRC as the beneficiary. In the unlikely event SMC would default on the terms/conditions of the LTC license, the trust fund will allow the USNRC to contract a third party to implement those provisions for a minimum of 1,000 years."* Given that the maximum radionuclide half-life is 14 billion years, this paragraph raises the following questions.

   i) What are the uncertainties associated with the amount of the trust fund to ensure continuation of LTC for a minimum of 1,000 years?

   ii) What will the amount of the trust fund be worth at and beyond 1,000 years from now?

   iii) What entity would be financially liable to sustain the LTC program should SMC not be present in the future and the trust fund is insufficient to maintain the LTC program?

iv) What entity would be financially liable for potential remedial actions should SMC not be present in the future and remedial action and off-site disposal at a licensed facility becomes necessary?

4. **Page xxiv, Footnote 3**

SMC stated *"The Derived Concentration Guideline Levels, or DCGLs, were determined pursuant to the recommendations of NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)."* Determining the DCGL for a given annual dose limit would require dose assessment modeling by considering site-specific contaminants, exposure routes, and receptors in addition to other parameters, which are outside the scope of MARSSIM. This is an incorrect statement and requires modification or deletion.

5. **Page 7, Line 4,**

The decommissioning activities discussed in this section appear to address surfaces and above-ground structures. It appears that underground structures (e.g., drains, pipes, discharge lines, etc.) were not sampled to determine how they should be handled as part of the evaluation for radioactive and non-radioactive contamination. If not previously investigated, such underground structures need to be evaluated and addressed in any future decommissioning activities.

6. **Page 7, Lines 19 and 20,**

a) The method of reporting the uranium and thorium concentrations in the post excavation sampling on Haul Road is not acceptable, since SMC averaged the volume. It is unclear how these concentrations were determined. The maximum concentrations detected need to be listed and a final status survey of the Haul Road performed in accordance with MARSSIM methodology.

b) Haul Road needs to be more clearly labeled on all site maps.

7. **Page 12, Lines 1 and 2**

SMC stated *"Among the recommendations included therein was the institution of deed restriction to prevent future residential development of the facility."* This seems to contradict the statements mentioned under the ALARA analyses in Chapter 7, page 75, specifically under the Long Term Control Alternative (Section 7.1.1) and the License Continuation Alternative (Section 7.1.2) where the property or the site will be released for unrestricted use. Furthermore, the word "facility" in the aforementioned statement implies the entire site, including the Storage Yard.

8. **Page 24, Line 16**

SMC stated *"Slag generated during the ore processing procedures is stored in this area, as is baghouse dust, excavated soils and other similar materials."* Based on the NRC Licensing summaries on pages 5 and 6 of this DP, Shieldalloy was permitted to store slag. It appears that consolidating the baghouse dust, contaminated soil and other similar material, which is believed to be building rubble, may be outside the scope of the NRC license. Furthermore the storage of baghouse dust with the slag in

an open field maybe inappropriate and of concern from a human health standpoint as the baghouse dust is comprised of very fine particles that may migrate due to wind or rainwater runoff. Please explain why baghouse dust was stored in the Storage Yard and the human health implications of this practice.

9. Page 25, Line 17

a) A map should be included showing which buildings and floors were surveyed and the associated ambient gamma exposure rates. The same should be done to indicate the area of the background locations.

b) Ambient gamma exposure rates are beneficial for general area exposure/dose rate measurements and in many cases are not sufficient for final release surveys of the buildings. Surface beta and gamma scan measurements, and possibly volumetric samples, should be included for any final release surveys of buildings.

10. Page 26, Line 4

This section raises the following concerns:

i) The background beta results for the hand held instrument are not included in the DP. Were beta scans of the walls performed? In most cases, an alpha scan survey alone is insufficient to characterize the surface radiological conditions due to physical conditions of the building structure coupled with the self-absorption of alpha particles. Alpha scans need to be coupled with beta and gamma scans.

ii) A map should be prepared to indicate where the alpha and beta background measurements were collected.

iii) The second paragraph talks about routine surveillance data only. Where are the results of the handheld instrument and the large area floor monitoring? The results should be presented and shown on a map.

iv) The third paragraph talks about general area dose rates for Buildings D202 and D-117. Again, any future decision regarding such buildings will require further investigations such as surface beta and gamma scans, and volumetric samples.

11. Page 26, Line 20

a) This section is titled "Surface and Subsurface Soil", however the text is only about background samples. Are the background samples from surface and subsurface soil? Shouldn't the title be "Background Soil Samples"?

b) A map should be included showing the location(s) of the background soil samples.

12. Page 26, Line 23

a) Please provide a detailed list of all contaminated and uncontaminated Systems and Equipment stored or planned to be stored in the Storage Yard. Please provide a volume estimate of this material.

b) The legend of Figure 18.3 indicates that Area 7 contains an assortment of waste, including equipment. Does this waste contain hazardous waste (e.g., mercury, chromium, PCBs, lead, etc.) that could potentially classify the waste as mixed waste? All hazardous materials in this pile must be identified and characterized and appropriately considered in any decision on the decommissioning of the site.

13. Page 27, Lines 8 through 12

SMC states that the principal form of the slag does not permit radioactive elements to leach to groundwater. Sediment and surface water results collected from the Hudson Branch and shallow groundwater samples collected south and southeast of the Storage Yard refute SMC's statements about leachability and crust formation. Further field investigations need to be performed to evaluate the radiological conditions of subsurface soil and groundwater. Leachability conclusions shouldn't only be based on bench tests under laboratory-controlled conditions. Site specific environmental conditions could enhance the solubility of radionuclides. The monitoring wells south and southeast of the Storage Yard exhibited radionuclide concentrations as high as 17 pCi/L in shallow groundwater (refer to the Letter from Carol Berger to David Smith dated June 9, 2005 regarding the groundwater samples collected on April 13, 2005, which is included in Appendix F, Volume III of the decommissioning plan).

14. Page 27, Lines 18 through 21 and Footnote 53

The interpretation of data to conclude that the slag used in the Haul Road bed is different in nature from slag present in the Storage Yard is flawed and unacceptable for the following reasons:

a) The radioactive exposure rates collected on Haul Road are taken <u>over</u> the slag pieces, while the exposure rates of the slag pile in the Storage Yard are taken in <u>direct contact</u> with the slag. Such comparison cannot be made due to different source geometries, which can give different results.

b) The volume (length, width, and thickness) of the slag pieces in the Haul Road bed is <u>far less</u> than that of the slag stored in the Storage Yard. A determination as to the appropriate remediation of the slag on Haul Road cannot be made until additional data is collected and analyzed.

Therefore, full investigation of the Haul Road must be performed to determine the nature of the radiological contamination.

15. Page 28, lines 1 and 2

a) The results of the Haul Road final status survey need to be included in this paragraph.

b) Was the Haul Road final status survey performed in accordance to MARSSIM methodology? If not, what methodology was used? Did the results meet the data quality objectives?

16. Page 28, Lines 9 through 15

a) Maps 7 and 8 of Appendix B of Appendix 19.9 show residual radioactivity in areas that are not listed in this paragraph. The following on-site areas must be identified and discussed in this paragraph:

i) Area located east of the Former Thermal Cooling Pond – A surface soil sample exhibited 6 pCi/g of Thorium-232.

ii) Southwest corner of the property near the Hudson Branch and outfall DSN-002A – Surface soil samples as high as 10.8 pCi/g of Thorium-232 and 37 pCi/g of Ra-226 and a surface water sample as high as 15 pCi/L of Radium-226.

iii) Area on the road southwest of the former AAF Baghouse building, which exhibited 35 pCi/g of Thorium-232 and 4.4 pCi/g of Radium-226.

b) In addition to the on-site areas, the following off-site areas exhibit residual radioactivity that needs to be fully characterized.

a) The Hudson Branch, which exhibited a maximum of 10 pCi/g (sediment) and 9 pCi/L (surface water) of Thorium-232 and 34 pCi/g (sediment) and 33 pCi/L (surface water) of Radium-226. This area requires further sampling to fully characterize the contamination.

b) The area north of the Storage Yard exhibited anomalous concentrations with a maximum of 5 pCi/g of Thorium-232. This area requires further sampling to fully characterize the contamination.

c) The contaminated Hudson Branch passes through the SMC owned farmland parcel, located 2,000 feet southwest of the facility. The decommissioning plan does not include any investigations performed on a significant portion of the Hudson Branch, including areas adjacent to the Storage Yard and downgradient of the site, including the Farm Parcel. Such areas require further investigation to determine the full extent of contamination.

17. Page 28, Lines 16 through 21

This paragraph states that ambient gamma exposure rates with a Bicron Microrem meter were collected at a height of one meter in outdoor areas. This method is generally sufficient to estimate general area dose rates and not appropriate to identify surface and subsurface radiological conditions. Other methods such as using more sensitive field scanning instruments should be used in closer proximity to the ground surface to assess the soil radiological conditions.

18. Page 28, Footnote 54

SMC stated *"..., a reasonable estimate of the source material concentration in the excavated soils is..."* It should be noted that the waste classification is based on percent weight or average concentrations within a given volume. As such, the contaminated soil is no longer considered licensed or source material as it contains less than 0.05% by weight uranium or thorium. The same applies to the building demolition debris, the baghouse dust, and other types of equipment that fall in the same category. Please clarify if these materials are covered under the NRC license.

19. Page 29, Line 11

a) SMC stated *"There it was shown that the presence of those materials, which were uranium and thorium plus progeny, presented an insignificant radiological risk to members of the public."* Given the radionuclide concentrations found in the Hudson Branch, the following questions are triggered.

i) Did the risk assessment model the current and future scenarios, or only current scenarios?

ii) What exposure pathways and receptors were considered in the risk assessment modeling?

b) Even if the risk is low, SMC failed to apply the As Low As Reasonably Achievable (ALARA) principle in evaluating the Hudson Branch contamination. The removal of such radiological contamination may be a reasonable approach in this case and should be fully evaluated.

20. Page 29, Lines 19 through 23

a) To state *"Subsurface contamination may also be present at a number of locations throughout the Newfield Plant where the slag was used as fill, although this is thought to be unlikely"* is a very weak statement that indicates a completely inadequate level of site characterization. Complete subsurface investigations must be conducted for all suspect areas. An appropriate remedy cannot be selected for radioactive material at the site when the extent of contamination is not known in all media.

b) The southwest fence line and the T12 Tank area are not included in the Area Classifications on Figure 18.11. All areas indicated in the above comment for page 28 lines 9 through 15 must be included on Figure 18.11 and classified accordingly. It is standard practice that when anomalies are identified, further investigation and delineation of the extent of contamination must be performed. SMC failed to do so, and the extent of contamination is unknown.

c) Again, the collection of ambient exposure rates in the areas of the southwest fence line and T12 Tank area is not an appropriate method to rule out the presence or absence of contamination, especially if the contamination is in the subsurface.

Appropriate methods must be used to fully investigate such areas and any other similar on-site and off-site areas.

21. Page 30, Lines 4 through 6

a) SMC stated *"From many years of sample collection and analysis, it can be shown that the surface water collected from the vicinity of the Newfield site does not exhibit elevated (above background) radionuclide concentrations."* Such a statement is refuted for the following reasons and must be revised to address contamination identified in surface water.

i) Map 7 of Appendix B of Appendix 19.9 - A total of five surface water samples were collected, two of which exhibited 48.4 pCi/L and 15.6 pCi/L of Thorium-232.

ii) Map 8 of Appendix B of Appendix 19.9 - A total of five surface water samples were collected, two of which exhibited 19.55 pCi/L and 15.2 pCi/L of Radium-226.

b) Surface water contamination has not been fully delineated in off-site areas. Substantial sampling is needed in the Hudson Branch.

c) Previous investigations of surface water failed to include the analyses of uranium radionuclides and the Radium-228 radionuclide. In addition to the parameters provided in this document, all surface water and groundwater samples must also be collected and analyzed for total uranium and Radium-228 radionuclide.

22. Page 30, Line 7

Based on the information provided in Appendix 19.2, Tables I and VII and Figures 14 through 17, the shallow and deep groundwater investigation is very limited and fails to fully characterize the groundwater contamination. As such, it is premature for SMC to conclude that the groundwater is not being impacted by site-related radiological activities. Refer to the next comment for further details.

23. Page 30, Lines 9 through 13

a) This section only talks about the most recent sampling event, while Table VII of Appendix 19.2 lists the sampling events of 1988 and 1989. SMC must provide the date of all sampling events and discuss the results of these sampling events in this document. The discussion should include any on-site and off-site well sampling activities.

b) Upon a review of Figures 14 through 17 and Tables I and VII of Appendix 19.2, which are related to the groundwater characterization, the following concerns need to be addressed:

i) The groundwater monitoring samples in Table VII show the results of only four sampling rounds conducted in 1988 and 1989. This is an incomplete set

of data, as more recent data is available for use in making a decommissioning determination. These data are old and limited. All groundwater data collected needs to be consolidated, presented and analyzed together. In addition, further sampling to fully show current groundwater conditions are necessary.

ii) Only a limited number of monitoring wells were sampled. Were the existing on-site and off-site wells sampled? If so, the results of all sampling rounds need to be presented and discussed. If not, then there is a large data gap in the groundwater sampling effort that needs to be addressed. All existing wells constructed to evaluate non-radioactive groundwater contamination should be sampled for radioactive materials.

iii) The groundwater monitoring samples in Table VII show the results for one background well and five monitoring wells. One of these monitoring wells, well number SC11/SC11S, is located on the northern edge of the Storage Yard, which is basically upgradient. The 2nd well, well number SC12S, is located approximately 200 feet west of the Storage Yard, which could be outside or near the edge of any potential plume. The 3rd well, well number W2, is located south of the Storage Yard, with the sampling intervals from 55-60 and 116-120 feet below ground surface (bgs), which does not represent shallow groundwater. The fourth well, well number A, is located near the southwest corner of the property with the sampling interval from 114-124 feet bgs, which does not represent shallow groundwater. The 5th well, well number SC13S, is located southwest of the Storage Yard with the sampling interval from 14.7-24.7 feet bgs, which could be in the path of a potential shallow groundwater plume, but results lacked quality control and analytical parameters. This network does not adequately characterize shallow groundwater contamination at the site. To better characterize the radiological conditions in the groundwater, additional wells need to be installed downgradient of the Storage Yard, the processing buildings, discharge lines, and directly under the slag pile.

iv) The radiological analysis of water samples did not include Radium-228. This data gap must be filled. All wells should be sampled for Radium-228, as well as other parameters.

v) It is unclear why Thorium-228, Thorium-230, and Thorium-232 are included as radiological parameters for the water samples. Please explain.

vi) Certain samples, such as the unfiltered sample collected from well SC13 on August 1, 1989, did not meet the Quality Control requirements where the Minimum Detectable Activity exceeds the screening level of the Drinking Water standards for gross alpha[1]. Yet, this sample was not analyzed for Total Uranium, Radium-226, and Radium-228. Other samples (e.g., SC12-U [8/12/1989], and SC12-F and SC12-U [9/28/1989]) exceed the 1976 EPA

[1] Refer to Appendix 19.2 of Volume II of the Decommissioning Plan.

screening level for gross beta[II], and these samples were not further analyzed for Total-U, Ra-226, and Ra-228, as appropriate.

24. Memorandum: From Larry Butlien (TRC Windsor) to Gaston Leone (TRC Littleton) Dated November 17, 2005. The subject of the memorandum *"Results of Radiological Flow and Transport Ground Water Modeling to Supplement Chapter 5 of the SMC Decommissioning Plan – Newfield, NJ Facility – Shieldalloy Metallurgical Corporation"* is in response to the USNRC Issue No. 5[II], which is part of the USNRC comments on Revision 1 of the SMC Decommissioning Plan. EPA has the following concerns:

a) In the June 30, 2006 letter from SMC to NRC, SMC contends that groundwater information attached to the letter should not be considered as part of Revision 1a of the DP. EPA strongly disagrees with SMC's position. Such a memorandum, which is a justification for ruling out the groundwater pathway in its entirety from the risk assessment (Chapter 5 of the DP), should be part of Revision 1a or later revisions of the SMC DP. Furthermore, because this memorandum lacks technically defensible justifications for the conclusion that groundwater is not posing a risk, a more comprehensive groundwater assessment must be provided before a decision can be made on the remediation of the groundwater.

b) Page 1, 1st paragraph - The 1st paragraph concludes *"As a result, no radiological impact on ground water is anticipated"*. This statement cannot be supported. There is no engineering barrier and the groundwater data is insufficient to support this statement. The impact to the groundwater should be assessed based on current storage conditions and the period of time that the waste has been stored. Current groundwater conditions have not been fully characterized. Until current conditions have been characterized, modeling results have limited value. That is, the assessment should consider current and future scenarios. Furthermore, there may be other sources that could contribute to the groundwater contamination such as radiologically contaminated liquids from the processing buildings and discharge lines.

c) Page 1, 2nd paragraph - The paragraph discusses, in part, the exclusion of the ingestion pathway of drinking water for the risk assessment. The rationale is indefensible, as it does not consider the current conditions to assess current and future scenarios. The ingestion pathway should be included in the risk assessment. Furthermore, SMC needs to list what exposure pathways were considered in the groundwater exposure route.

d) Page 1, 2nd paragraph - The last sentence discusses existing groundwater data collected downgradient of the Storage Yard. Were those data validated? SMC must provide the dataset, the sampling periods, and the sampling locations along with QC and data validation results.

[II] Letter from David R. Smith (RSO for SMC) to Kenneth L. Kalman (USNRC) dated June 30 2006, RE: Follow-up to the March 9, 2006 Meeting and Response to USNRC Letter of January 26, 2006.

e) Page 1, 3rd paragraph - The 1st sentence stated *"Ground water ingestion is not considered to be a likely or reasonably foreseeable pathway by which hypothetical receptors could incur a radiation dose."* Regardless, it should be assessed for a hypothetical scenario along with the indoor air inhalation of radon progeny resulting from the use of a private well.

f) Page 1, 3rd paragraph - The 2nd sentence states *"Even if all controls fail, negative radiological impacts to ground water quality due to leaching are also unlikely to result in population dose potentials in excess of the USNRC's criteria."* First, the EPA and State drinking water standards should be considered. Second, EPA disagrees with this statement for the following reasons:

i) The maximum calculated dose for all sensitivity scenarios is 27.31 mrem/year when only the Ra-226 and Ac-227 are considered (refer to Table 3), which is greater than the USNRC criterion of 25 mrem/year.

ii) When other radionuclides of concern (e.g., Ra-228, Rn-222, Ac-228, Pa-234m) are included in the assessment, the total effective dose equivalent would be far in excess of the USNRC criterion of 25 mrem/year.

iii) The toxicity from uranium must be included in the risk assessment using the following exposure routes: groundwater ingestion, and dermal contact with groundwater, for a resident and worker scenarios.

g) Page 2, last paragraph – Other radionuclides of concern (Ra-228, Ac-228, Rn-222, and Pa-234m) must also be included in the modeling scenario.

h) Page 2, Last paragraph – The input parameters provided by Integrated Environmental Management need to be listed and data validated.

i) Page 3, last paragraph - The 3rd sentence states *"Chain decay was not explicitly simulated because the effect of the progeny was considered negligible."* It is unclear what is meant by "effect". From a dose or risk assessment point of view, the decay progeny could have a significant effect on the total risk or the total effective dose equivalent. As such, the decay progeny must be included in the risk evaluation.

j) Page 4, Table 1 – Other radionuclides of concern (e.g., Ra-228, Rn-222, Ac-228, and Pa-234m) must be added to this table.

k) Page 5, last paragraph – The 3rd sentence only lists the dose from Ra-226. The cumulative dose from all radionuclides of concern (e.g., Ra-226, Ac-227, Pa-231, Ra-228, Rn-222, Ac-228, Pa-234m, etc.) is what needs to be addressed.

l) Page 5, Table 2 - Other radionuclides of concern (e.g., Ra-228, Rn-222, Ac-228, and Pa-234m) should be added to this table.

m) Page 5, Table 3 - Other radionuclides of concern (e.g., Ra-228, Rn-222, Ac-228, and Pa-234m) should be added to this table.

n) Figure 2 – It is unclear why the starting data point is set at 600 years. Please explain.

o) Figure 2 – The figure shows that the Ra-226 concentration reaching the water table is approximately 2,600 pCi/L, which is approximately 520 times the drinking water standard of 5 pCi/L. This does not even take into account Ra-228, which was not addressed in such modeling.

p) Figure 5 – The peak contaminant concentration is shown to increase exponentially and peaks at the last considered data point (i.e., 1,000 years). What types of concentrations are expected beyond a 1,000 years timeframe? This should be discussed.

25. Page 31, Line 1

a) Given that the subsurface soil radiological characterization has not been performed and the groundwater radiological conditions are still largely unknown, it is premature to perform the dose modeling. Dose modeling should be performed after soil and groundwater are fully characterized.

b) In addition to the carcinogenic risks from uranium, there are also toxicological risks that need to be addressed in the decommissioning plan after a full characterization of the subsurface soil and groundwater radiological conditions.

c) The decommissioning plan needs to include an ecological assessment after a full characterization of the surface soil, subsurface soil, surface water and groundwater radiological conditions are performed.

d) The residential scenario used in the dose modeling fails to address potentially major exposure pathways and uses improperly developed scenarios. Resident farmer and rural resident scenarios should be included in the dose modeling.

26. Page 34, Footnote 84

Was the reasonable maximum exposure (RME) used in the dose modeling or only the central tendency (CT), or some other methodology? If only the CT, then the RME also must be considered.

27. Page 35, Lines 18 through 20

The modeling only addresses on-site conditions. All impacted areas, including areas outside the SMC facility need to be addressed.

28. Page 39, Lines 29 through 31

The exposure scenarios only address future (post decommissioning) receptors. Current scenarios also need to be addressed. The impact of the former and existing storage of radioactive material in the Storage Yard to contaminant migration both on and off the SMC property (e.g., surface water, sediment, and groundwater) must be assessed and included in the dose modeling.

29. Page 40, Lines 3 through 11 and Footnote 101

SMC proposes to have restricted use only in the Storage Yard portion of the property. As such, the proposed unrestricted portion of the site may be used for residential rather than industrial use only. This is unacceptable. The exposure scenarios should be bounding in the sense that they correspond to actions, events, and processes that will result in the largest exposure likely to occur to individual and groups. Therefore, resident farmer and rural resident scenarios should be included along with additional exposure pathways (e.g., groundwater, homegrown produce, and feed stock). Note that radon needs to be included with the remainder of the radionuclides to account for the radon decay products in indoor air.

30. Page 41, lines 7 through 15

The paragraph claims that potential future residential use restrictions due to soil contaminant levels under CERCLA would prevent the construction of homes in close proximity to the engineering barrier. This is an inaccurate statement and cannot be used as a justification for restricting future residential development at the site. This paragraph should be deleted. A remedy for contaminated site soils has not yet been selected by EPA and NJDEP under CERCLA.

31. Page 41, Lines 14 through 26

EPA strongly disagrees with SMC's proposal to omit the groundwater pathway from the dose assessments for the following reasons. SMC has failed to present sampling data to fully characterize the current radiological groundwater conditions. Also the pathway of contaminants migrating from the leachate to groundwater within the Storage Yard when the engineering barrier fails and no maintenance is performed must be considered.

a) Even if the engineered barrier is initially designed to prevent rainwater infiltration into the consolidated material, there is still a possibility that the engineered barrier could fail and maintenance is discontinued. Furthermore, SMC must consider the current impact of the radioactive material in the Storage Yard on the groundwater and off-site effluent discharge conditions due to storing the material without any engineered barrier to-date. To do so, additional data must be collected.

b) SMC stated that the TCLP results and distribution coefficients showed that the slag is resistant to leaching. SMC has not supported its conclusion with real sampling data. The memorandum From Larry Butlien (TRC Windsor) to Gaston Leone (TRC Littleton) Dated November 17, 2005, titled *"Results of Radiological Flow and Transport Ground Water Modeling to Supplement Chapter 5 of the*

SMC Decommissioning Plan – Newfield, NJ Facility" indicates that leaching to groundwater is predicted in the future in the case when the engineered barrier fails and no maintenance is taking place. Please clarify this contradiction.

c) The site-related groundwater contaminant plume, which contains high levels of hexavalent chromium, among other contaminants, is currently undergoing remediation under the Superfund program. The goal of this ongoing cleanup is to return the groundwater, which is classified as a drinking water source, to meet drinking water standards and to be used as a potable water supply in the future. Therefore, the resident farmer, rural resident, or suburban resident are potentially future receptors of concern along with industrial workers, construction workers, hunters, recreationalists, and trespassers.

32. Page 42, Line 12

The EPA Exposure Factor Handbook (EPA 1997) considers water ingestion for the industrial worker scenario. This exposure pathway must be included after evaluating the current and predicting the future groundwater radiological conditions.

33. Page 50, Lines 1 through 5

The NRC statement should also consider the transport of radon gas into indoor air.

34. Page 56, lines 22 through 31

The NRC statement does not account for other exposure pathways such as the groundwater pathway should the engineering controls fail. Nor it does account for the migration of the fine particles of the baghouse dust. These pathways must be accounted for.

35. Page 59, Lines 31 and 32

SMC assumes that the cover is maintained and does not erode while institutional controls are in place. This assumption is improper as the section pertains to the exposure scenario involving the restricted portion of the site where <u>Controls Fail and there is no maintenance</u> (refer to line 9 on page 56).

36. Page 60, lines 22 and 23 and footnote 156

a) This sentence states that a hypothetical family lives in a house located 1,000 feet from the restricted area. This is not a sufficiently conservative assumption. For future scenarios, a resident could live directly downgradient of the Storage Yard in the proposed unrestricted area of the site, especially when SMC has not made a commitment to keep the property intact (refer to Page 40, line 10 and footnote 101).

b) SMC must distinguish between a resident child and resident adult and address them accordingly in the risk assessment.

37. Page 60, Lines 23 through 25

SMC's assumptions that the future resident uses a publicly owned water supply instead of site groundwater and does not grow food or vegetables are unjustifiable. The ingestion of site groundwater, inhalation of indoor radon decay products, and ingestion of homegrown produce must be included in the dose assessment modeling for future resident.

38. Page 61, Lines 1 through 5

In this paragraph, SMC only discusses the likelihood of a resident building a home inside the restricted area (i.e., Storage Yard). SMC must recognize the likelihood of the resident constructing a home outside and downgradient of the restricted area where the resident could be using a private well instead of a municipal well.

39. Page 61, Lines 9 through 11

Other exposure pathways such as ingestion of site groundwater, inhalation of radon decay products in indoor air, and ingestion of homegrown produce, should be added to this list of exposure pathways.

40. Page 61, Lines 13 and 14

a) Although the ResRad User's Manual supports the position that the suburban resident does not drink groundwater, the EPA Exposure Factor Handbook (EPA 1997) supports the use of drinking site groundwater as an exposure pathway In addition, the Class 2A Drinking Water Aquifer underlying the site must be restored to drinking water standards. As such, this pathway must be included in the dose assessment modeling. Because of the potential future use of the site groundwater, the inhalation pathway of indoor radon decay products must to be included as well.

b) Both ResRad and the EPA Exposure Factor Handbook (EPA 1997) support the use of homegrown produce as an exposure pathway, which SMC failed to include in the dose modeling assessment. Such a pathway must be included.

41. Page 65, Lines 15 through 22

In this paragraph, SMC indicates that it is difficult to chip and pulverize the slag to justify excluding the chipping and pulverizing of slag from the inhalation and ingestion pathways. The chipping and pulverizing of the slag should be included in the inhalation and ingestion pathways. SMC must also include the fine particles of the baghouse dust in its evaluation of the inhalation and ingestion pathways.

42. Page 65, Line 30

Because the external exposure pathway is not likely to be the only pathway (e.g., inhalation and ingestion need to be included), the use of Microshield® would no longer be appropriate. The ResRad family of computer codes, or equivalent, should replace the Microshield® sections in the DP.

43. Page 66, Line 4

The recreational hunter exposure scenario must include the ingestion of meat, and must take into account the radiological conditions both on-site and off-site (e.g., contaminants along Hudson Branch).

44. Page 66, Line 16

The assumption that a future resident is located 300 meters away from the open excavation is not sufficiently conservative. The shortest distance between the restricted area (i.e., Storage Yard) and the site northern boundary is approximately 50 feet (15.2 meters). Furthermore, the nearest off-site resident from the property boundary is currently located at a distance of 28 meters (100 feet)[III].

45. Page 69, Lines 24 and 25

SMC stated *"For example, it is difficult to predict with absolute certainty the characteristics of a future society."* Due to this difficulty, SMC should consider worst case modeling scenarios in their dose assessment, such as resident farmer exposure scenarios.

46. Page 75, Lines 20 through 25

SMC proposes specific legal restrictions against future residential construction, farming or business redevelopment on the restricted area while the remainder of the property will be released for unrestricted use. There are potentially significant concerns with this proposition, which are outlined below.

a) Based on the insufficient groundwater analytical data provided in the DP, the current radiological groundwater conditions both on-site and off-site are unknown. As such, SMC can't propose the remainder of the property for unrestricted release until the radiological groundwater conditions is fully and properly characterized. SMC must expand their groundwater investigations both on-site and off-site and prepare complete dose and risk assessments based on a complete data set.

b) Radiological leaching modeling performed by SMC's contractor, TRC, showed that leaching does occur in the future when engineering controls fail[IV]. This modeling concluded that the Radium-226 concentration <u>alone</u> in the water table beneath the Restricted Area (e.g., Storage Yard) is about 520 times the drinking water standard. This modeling, which was limited to 1,000 years time period, also showed that the radioactivity is moving downgradient. As such, given the extremely long half-life of the site-related radionuclides, SMC needs to perform more comprehensive modeling to evaluate the impact on human health and the environment. The SMC proposal to release the remainder of the property for unrestricted use shouldn't be accepted unless a comprehensive groundwater

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[III] Refer to page xxii, line 27

[IV] Memorandum from Larry Butlien (TRC Windsor) to Gaston Leone (TRC Littleton) Dated November 17, 2005. The subject of the memorandum *"Results of Radiological Flow and Transport Ground Water Modeling to Supplement Chapter 5 of the SMC Decommissioning Plan – Newfield, NJ Facility – Shieldalloy Metallurgical Corporation"*.

modeling is conducted and indicates acceptable risks to human health and the environment.

47. Pages 75 through 84

These sections need to be revised to address the receptors and exposure pathways as per the above comments provided on Chapter 5, *Dose Modeling Evaluation*, of the Decommissioning Plan.

48. Page 79, lines 19 and 20

Modeling of radon emanation into indoor air via the groundwater pathway should be assessed and included in the dose assessment.

49. Page 81, Line 9

Some of the sample concentrations collected off-site exceeds the DCGLs listed in Table 17.6. As such, SMC must address the remediation of off-site contamination.

50. Page 82, Lines 10 and 11

These equations address the DCGL's for uranium and thorium in soil that correspond to the dose limit of 25 mrem/year. The potential dose from the groundwater should be considered as well as the non-carcinogenic risk from uranium.

51. Page 87, lines 7 through 29

These paragraphs need to be revised to address the receptors and exposure pathways as per the comments provided on Chapter 5, *Dose Modeling Evaluation*, of the DP.

52. Page 88, line 18

Section 7.3.8 needs to be revised to include the impact on off-site land value under the License Continuation (LC) and the Long-term control (LTC) alternatives, especially when on-site and off-site groundwater is potentially impacted by the SMC site-related radiological conditions.

53. Page 89, Lines 25 through 38

These paragraphs discussing environmental impact must include the impact of the groundwater radiological conditions both on-site and off-site and the associated costs of addressing the groundwater contamination.

54. Page 93, Lines 26 through 30

a) The paragraph discussing contaminated structures on site needs to address underground structures such as drains, discharge lines, etc., and provide a drawing of the underground structures.

b) The potential presence of hazardous materials commingled with radioactivity in the underground discharge lines could create a potential mixed waste issue. This must be evaluated further.

55. Page 94, Lines 11 through 13

In this description of proposed actions for the LTC, SMC discusses erosion and sedimentation control systems. Explain what erosion control systems are currently in place within the Storage Yard?

56. Page 97, Lines 17 and 18

The statement that currently, the closest residence is hundreds of feet from the SMC property boundary contradicts the statement on Page xxii, line 27, which states that the nearest off-site resident is located approximately 28 meters (100 feet) from the property. Changes of future residential conditions need to be considered given that the closest distance from the proposed Restricted Area and the site boundary is approximately 50 feet (15.2 meters). Additionally, a residential scenario where a resident could construct a house adjacent to and downgradient for the Storage Yard in the future must be considered.

57. Page 97, line 21

a) This section discussing adjacent soil contamination also needs to consider any contamination present in the subsurface soils.

b) Following this section, another section needs to be added to consider radiological conditions in surface water and groundwater.

58. Page 99, Line 20

The groundwater sampling data provided in this DP are insufficient to fully characterize radiological contaminations and lack quality control. As such, no conclusions can be made about the groundwater radiological conditions.

59. Page 121, Line 1

a) The environmental monitoring program should also include monitoring of percent moisture that builds-up within the engineered barrier due to the build-up of moisture that percolates vertically through the soil beneath the barrier. Lysimeters, or equivalent, must be installed within any engineered barrier and monitored for as long as the LTC program is in place.

b) The proposed long-term environmental monitoring program should include monitoring of groundwater downgradient and cross-gradient of the engineered barrier. This program should be executed for as long as the LTC program is in place.

c) The proposed long-term environmental monitoring program should include monitoring of vegetation growth to maintain the erosion of the engineered cover. This program should be executed for as long as the LTC program is in place.

60. Page 135, lines 17 and 23

SMC needs to provide a justification as to why soils underlying the paved areas were not investigated. Such soils at the facility must be included in future investigations.

61. Page 135, lines 33 through 36 and Page 136, lines 1 and 2

a) SMC stated *"Isotopic analysis was performed if the gross alpha activity exceeded the 1976 EPA screening level (applicable at that time) of 15 pCi/liter or if gross beta activity exceeded the screening level of 50 pCi/liter."* Samples SC13 [8/1/1989], SC12-U [8/12/1989], SC12-F, and SC12-U [9/28/1989]) exceed the 1976 EPA screening level for either gross alpha, and yet isotopic analysis were not performed. This is unacceptable and must be addressed.

b) It is unclear why the water samples were analyzed for Th-232. Please explain.

c) It is unclear why some of the samples did not include the analyses of Ra-226. Please explain.

d) It is unclear why none of the samples included the analyses of Ra-228. Please explain.

e) It is unclear why samples included the analyses of Th-228, Th-230, and Th-232, which are not required by the drinking water standards, and excluded the analyses of Ra-226, and Ra-228, which are required by the drinking water standards. Please explain.

62. Page 136, Line 13

Appendix 19.6 referred to here only contains the analytical results, site drawings are missing. The adequacy of classifying the unrestricted areas can't be reviewed until the site drawings are included. Furthermore, proposing areas of the SMC property as non-impacted is premature, since the groundwater, soil, and the Hudson Branch (sediments and surface water) radiological conditions are not properly and fully characterized.

63. Page 136, Lines 18 and 19

SMC stated *"The data and the surveillance summaries confirm that no significant quantities of residual radioactivity have migrated past the restricted areas."* This is inaccurate. Sediment and surface water samples collected along the Hudson Branch and shallow groundwater samples collected south and southeast of the Storage Yard refute this statement. Concentrations as high as 34 pCi/g and 33 pCi/L of Ra-226 were identified along the Hudson Branch and as high as 17 pCi/L of Ra-228 was identified in the groundwater samples.

64. Page 152, Footnote 98

The financial assurance must be adjusted to account for potential future impacts of contaminant migration. The environmental monitoring program should also include groundwater and moisture monitoring.

65. Page 154, lines 9 through 12

SMC cannot support the conclusion that the LTC alternative poses a lower exposure risk compared to the LC and LT alternatives, since the risks associated with the groundwater pathway and residential scenarios have not been fully evaluated.

66. Page 154, lines 12 through 16

Because the hazards have not been fully and properly evaluated, SMC can not support the statement that the costs of the LT alternative outweigh the benefits. Similarly, SMC's proposal to release of a portion of the site under the provisions of 10 CFR 20.1403, with the remainder released under 10 CFR 20.1402 is not supported.

67. Page 154, lines 18 and 19

Most of the Newfield property can not be released for unrestricted use until the groundwater and subsurface soil radiological conditions are fully characterized and show that the groundwater is not currently impacted by site-related radioactivity and will not be impacted in the future as a result of leaching under the LTC alternative. In addition, the DP should note that under CERCLA, a final remedy for soil, sediment, and surface water has not been selected and may impact future use of the site.

68. Page 154, line 24

SMC cannot support their statement that the exposure potential within the Storage Yard Areas is trivial. The dose modeling evaluation must be revised to include the groundwater pathway and residential scenarios, including a toxicity assessment for uranium. Further, an ecological assessment must be performed.

69. Page 154, Footnote 102

It is unlikely that the funds that SMC is allocating for long-term monitoring and maintenance will be sufficient for the following reasons.

a) The $5.0 million estimated to be necessary for long term monitoring under the LTC alternative does not take into account full evaluation of all future costs far beyond 1,000 years (given that the maximum half-life of the radionuclides at the Newfield site is 14 billion years). As such, the $5.0 million Trust Fund is clearly insufficient to support the appropriate maintenance and monitoring of the LTC alternative.

b) The proposed trust fund does not account for future risks associated with radioactivity leaching into the groundwater table should engineering controls fail and the associated costs to remediate the contaminants in groundwater under this scenario.

c) The proposed trust fund does not account for groundwater and moisture monitoring under the LTC program. Long-term groundwater monitoring would be necessary downgradient and cross-gradient of the Storage Yard. Regular moisture monitoring inside the engineered barrier would be necessary to monitor the percent of moisture intrusion via the soil beneath the engineered barrier.

70. Page 155, Footnote 103

This footnote must be revised based on the significant revisions required for Chapter 5. (See comments above).

71. Page 157 lines 26 through 33 and page 158. lines 1 through 13

Because of the method of radioactive waste storage to date, and the potential of radioactivity leaching into the groundwater in the future, SMC would need to include groundwater monitoring as part of the long-term sampling program should the LTC alternative be selected.

72. Page 177, Table 17.2

The background soil concentrations for Ra-226 and Ra-228 should be included in this table.

73. Table 17.3.1, Justification of the watershed area

a) The use of the entire site surface area as the watershed area for the nearby stream or pond does not appear to be sufficiently conservative as the larger the watershed area, the larger the dilution factor, which would result in lower radiation doses.

b) Under the justification column, SMC stated *"While there is no pathway for humans to drink surface water, animals may use the pond for their water supply."* There are two gaps in this statement. First, although surface water may not be potable, humans may get in contact with the surface water by trespassing or during recreational use. As such, the toxicological risk from uranium via dermal contact with surface water must be addressed. Second, because animals use the surface water as their water supply, an ecological risk assessment must be prepared and included in the DP. Further, the ingestion pathway must be included in the hunter modeling scenario for the dose assessment.

c) Under the justification column for the depth of roots, SMC assumes no degradation of the barrier, while in the dose modeling "controls fails" scenario, the barrier degrades. This is inconsistent and must be addressed by assuming degradation of the barrier.

74. Table 17.3.1, Kd values for uranium, thorium and radium and footnote 121

SMC appears to have done leachability studies only on slag. Leachability studies must also be performed on the baghouse dust. Any studies must be supported by sufficient field sampling of groundwater, which SMC has not yet done.

75. Page 217 (revision 1), Table 17.9

The overall health risks for the industrial and residential scenarios must include the health risks from the groundwater pathway and the toxicity from uranium for the current and future scenarios.

76. Page 217 (revision 1a), Table 17.4.1

Although it may be appropriate for the radon pathway to be suppressed for the trespasser scenario, the comment provided on the table is unjustifiable (refer to the comments below). Please revise.

77. Page 218 - 226 (revision 1a)

The comments provided below must be applied equally to Tables 17.4.2, 17.4.3, 17.4.5, 17.4.9, and Table 17.4.10:

a) The comment or the rationale for not retaining the radon pathway is refuted from both the regulatory and the technical standpoints. Although NRC does not regulate groundwater or the monitoring of radon in indoor air, the radon pathway should be included in the dose assessment as it pertains to site related radionuclide contamination. From the technical standpoint, it is scientifically incorrect to state that the source term found at the site is not a significant producer of radon due to relatively long half-life of the thorium isotopes found in the slag for the reasons listed below. As such, the radon pathway must be retained in the dose modeling assessment.

   i) To be clear, the thorium decay chain contains Radon-220 (thoron) as one of its decay products. Thoron reaches 90% of the secular equilibrium with its parent Th-232 in 30 years and essentially in full secular equilibrium in 50 years. From a basic technical perspective, the half-life of the daughter (thoron) with respect to that of the parent (Thorium-232) is the proper way to assess the significance of ingrowth and not only by looking for the long half-life of the parent.

   ii) SMC failed to address the uranium decay chain as another source term that contains Radon-222. Because the entire chain should be in secular equilibrium, Radon-222 reaches secular equilibrium with its parent Ra-226 in essentially 10 years.

b) The rationale for not retaining the drinking water pathway is unjustifiable. SMC must include the drinking water pathway in their dose assessment scenarios.

   i) SMC stated *"<u>surface water</u> on-site is unfit for consumption as drinking water."* However, for human consumption it is the groundwater that must be considered and not the surface water.

   ii) SMC further stated *"No on-site sources of groundwater have been developed for drinking water."* This assumption could only hold true for the current scenario; however, for future scenarios, industry or future residents may install private wells. Furthermore, SMC fails to address the likelihood of off-site private wells, specifically downgradient of the proposed restricted area (e.g., Storage Yard). It should also be noted that the groundwater underlying the site is classified by the state of New Jersey as a potable aquifer and, under

an ongoing Superfund cleanup, the aquifer is being restored to meet drinking water standards.

78. Page 220 (revision 1a), Table 17.4.4

Although it may be appropriate for the radon pathway to be suppressed for the maintenance, the comment provided on the table is unjustifiable (refer to comment 97, above). Please revise.

79. Page 222 (revision 1a), Table 17.4.6

Although it may be appropriate for the radon pathway to be suppressed for the trespasser scenario, the comment provided on the table is unjustifiable (refer to comment 97, above). Please clarify and revise, accordingly.

80. Page 223 (revision 1a), Table 17.4.7

Although it may be appropriate for the radon pathway to be suppressed for the Recreational Hunter scenario, the comment provided on the table is unjustifiable (refer to comment 97, above). Please revise.

81. Page 224 (revision 1a), Table 17.4.8

Although it may be appropriate for the radon pathway to be suppressed in the trespasser scenario, the comment provided on the table is unjustifiable (refer to comment 97, above). Please revise.

82. Page 212 (revision 1a), Table 17.7

a) The information used to develop Table 17.7 should be included in an appendix. The appendix should include, in part, the following information.

   i) The number of samples from each medium (e.g., soil slag, and baghouse dust).

   ii) The range of concentrations in each medium.

   iii) The volume of each medium.

   iv) The associated uncertainties and the detection limits for each sample.

b) The statistical distribution of radioactivity in the waste should be evaluated to determine the level of confidence and the associated Upper Confidence Limit (UCL) that should be used instead of using the average concentration. This table should be revised accordingly to use a UCL instead of the mean, which would represent a reasonable maximum concentration instead of a central tendency concentration.

VOLUME II

83. Appendix 19.2, Figures 14 through 17 and Table VII

a) The figures show various types of wells at many locations both on SMC's property and off the property, while Table VII only shows the results from 5 wells. Were the other wells sampled? If so, the data should be included in the DP. If not, all of these wells should be sampled for all radiological parameters.

b) In addition to the well locations shown on the figures, there must be more wells installed within the storage yard and downgradient from the Storage Yard both on the SMC property and off the SMC property.

c) The wells included in Table VII are not properly located to characterize the shallow groundwater radiological conditions.

d) Upon a review of Figures 14 through 17 and Tables I and VII of Appendix 19.2, which are related to the groundwater characterization, the following concerns must be addressed.

i) The groundwater monitoring samples in Table VII show the results of only four sampling rounds conducted in 1988 and 1989. This is an incomplete set of data, as more recent data is available for use in making a decommissioning determination. These data are old and limited. All groundwater data collected needs to be consolidated and presented and analyzed together. In addition, further sampling to fully show current groundwater conditions, particularly in the shallow groundwater underlying and adjacent to the Storage Yard, is necessary.

ii) Only a limited number of monitoring wells were sampled. Were the existing on-site and off-site wells sampled? If so, the results of all sampling rounds need to be presented and discussed. If not, then there is a large data gap in the groundwater sampling effort that needs to be addressed. All existing wells constructed to evaluate non-radioactive groundwater contamination should be sampled for radioactive materials.

iii) The groundwater monitoring samples in Table VII show the results for one background well and five monitoring wells. One of these monitoring wells, well number SC11/SC11S, is located on the northern edge of the Storage Yard, which is basically upgradient. The 2nd well, well number SC12S, is located approximately 200 feet west of the Storage Yard, which could be outside or near the edge of any potential plume. The 3rd well, well number W2, is located south of the Storage Yard with the sampling intervals from 55-60 and 116-120 feet below ground surface (bgs), which basically does not represent shallow groundwater. The fourth well, well number A, is located near the southwest corner of the property with the sampling interval from 114-124 feet bgs, which does not represent shallow groundwater. The 5th well, well

number SC13S, is located southwest of the Storage Yard with the sampling interval from 14.7-24.7 feet bgs, which could be in the path of a potential shallow groundwater plume, but results lacked quality control and analytical parameters. This network does not adequately characterize shallow groundwater contamination at the site. To better characterize the radiological conditions in the groundwater, additional wells need to be installed within the Storage Yard, along the south and southwestern boundary of the Storage Yard, and south of the Hudson Branch.

iv) The radiological analysis of water samples did not include Radium-228. This gap must be filled. All wells should be sampled for Radium-228, as wells as other parameters.

v) It is unclear why Thorium-228, Thorium-230, and Thorium-232 are included as radiological parameters for the water samples. Please explain.

vi) Certain samples, such as the unfiltered sample collected from well SC13 on August 1, 1989, did not meet the Quality Control requirements where the Minimum Detectable Activity exceeds the screening level of the Drinking Water standards for gross alpha[V]. Yet, this sample was not analyzed for Total Uranium, Radium-226, and Radium-228. Other samples (e.g., SC12-U [8/12/1989], and SC12-F and SC12-U [9/28/1989]) exceed the 1976 EPA screening level for gross beta[II], and these samples were not further analyzed for Total-U, Ra-226, and Ra-228, as appropriate. In addition, a sample from 1989 is 18 years old and does not accurately represent current groundwater conditions in the well.

84. Appendix 19.4

a) Attachment C contains Certificates of Analysis, but is not included in the Decommissioning Plan. The appropriateness of the leachability and the Kd values cannot be fully evaluated. Please submit Attachment C.

b) Does the laboratory leachability analysis simulate environmental conditions such as the impact of acid rain on solubility? All environmental conditions, such as acid rain, must be considered when evaluating leachability.

85. Appendix 19.4, Attachment B

a) It is unclear why the Kd values for the baghouse dust are not included in this attachment. Such values need to be included.

b) For sample ID 2-9-05-002, it is unclear why there is a significant difference between the Ra-226 concentration (i.e., 428 pCi/g) and the Th-230 concentration (i.e., 135 pCi/g) when they should be in secular equilibrium. Similarly, with the Ra-228 (i.e., 91 pCi/g) and the Th-232 (i.e., 254 pCi/g) concentrations. Please explain and provide the associated quality control data.

[V] Refer to Appendix 19.2 of Volume II of the Decommissioning Plan.

c) The same applies to Sample ID 2-9-05-003 as indicated in the above paragraph.

d) SMC did not collect sufficiently representative groundwater data downgradient from the storage yard to support such leachability studies.

86. Appendix 19.5

The comments provided on the ResRad modeling and the MicroShield® analyses need to be revised according to the comments provided above.

VOLUME III

87. Page 1-3, line 25

Should the LTC be approved by NRC, and the modified dose modeling show that it meets the dose criteria, then groundwater monitoring downgradient and cross-gradient of the Storage Yard along with moisture monitoring within the engineered barrier must be included for the proposed long-term monitoring.

88. Page 1-4, line 28 and page 1-5, lines 1 and 2

SMC stated *"Since SMC has never used this property for manufacturing or related activities, this report focuses on the main...facility area"*. This property, the 19.8 acres farmland property, is potentially impacted because the Hudson Branch, which is radiologically contaminated by site-related radioactivity, passes through the farmland. As such, SMC must fully characterize surface water, sediments, and the associated soils in the farmland and the remainder of the Hudson Branch.

89. Page 1-8, Lines 14through 16

Haul Road and the east end of the Storage Yard area are not the only areas within the undeveloped portion of the SMC property that are impacted by licensed operations. The T12 Tank area, the southwestern portion of the site, Areas 11 and 12 (refer to Figure 1-6) where contaminated concrete from Buildings D111 and D112 was piled, the Hudson Branch watershed, and any areas south and southwest of the Storage Yard that experienced run-on/run-off of surface water are potentially impacted and must be fully characterized prior to making any decommissioning decisions.

90. Page 1-9, Lines 30 and 31

SMC stated *"The only materials that are in the Storage Yard today are those that are the USNRC's Jurisdiction."* The source material that is under the USNRC's jurisdiction is the material that contains more than 0.05% by weight uranium and thorium. EPA understands that the soil, concrete rubble, contaminated equipment, and baghouse dust may contain less than 0.05% by weight uranium and thorium; therefore, it is not clear if the commingling of this material with the slag, which is occurring in the Storage Yard, was done appropriately under the NRC license authority.

91. Page 1-11, lines 30and 31

SMC stated *"No contaminated systems or equipment remain to be addressed elsewhere on the property."* EPA strongly disagrees with this assessment. No data has been presented regarding contamination that may be present in the discharge systems such as drains and underground lines. SMC must characterize such systems.

92. Page 1-13, lines 7and 8

SMC stated *"While the contaminants therein were natural uranium and natural thorium, the isotopic ratios were not characteristic of licensed material (i.e., slag)."* How were the isotopic ratios determined? If only based on field exposure rate measurements as stated on Page 27, Lines 18 through 21 and Footnote 53 of Volume I of the DP, then such a conclusion can not be drawn and the use of the term "isotopic ratios" is inappropriate.

93. Figure 1-5

This figure does not show other potentially impacted areas such as Areas 10 and 11 where the contaminated concrete from Buildings D111 and D112 is stored, the southwest corner of the property, the T12 tank area, any run-on/run-off surface water areas, and the Hudson Branch.

94. Page 2-1, lines 1 and 2

The use of the term "residual radioactivity" is inappropriate in this context, as SMC is proposing to consolidate the entire volume of radioactive material on-site. The term "residual radioactivity" is used to refer to remaining amounts of radioactive material after remediation.

95. Page 2-2, Line 2

SMC states *"...additional regulated soils will be excavated..."* Replace the term "regulated soil" with "contaminated soil" as the soil is unlikely to contain 0.05% by weight uranium and thorium and may not be source material.

96. Page 2-2, lines 6 through 9

These sentences talk about dust suppression and drainage features for the engineered barrier. What controls have been implemented to date for the current storage conditions to prevent the wind from blowing the baghouse dust and run-off of baghouse dust by rainwater.

97. Page 2-2, lines 12 through 19

This paragraph provides the details on what the maintenance of the engineered barrier will comprise. Details on what the proposed monitoring would comprise must be added into this paragraph and must include groundwater monitoring (downgradient and cross-gradient of the Storage Yard) and moisture monitoring (within the engineered barrier) should the proposed LTC alternative be approved.

98. Page 2-2, line 20

SMC stated *"Impacts associated with the proposed action would be fairly minimal."* This maybe true for the initial status, however, it should be noted that under the "Controls Fail, No Maintenance" future scenario, the impact could be significant, especially if radioactivity leaches into groundwater.

99. Page 2-2, lines 23 through 25

SMC stated *"Ecological and visual impacts would be beneficial, resulting in a more attractive Storage Yard area that also provides a greater ecological habitat value."* This statement is only limited to the Storage Yard and only accounts for when engineering controls are in place. Attracting wildlife to this area would be problematic as animals burrowing into the landfill can cause significant damage and result in exposure to the animal and humans. The "Controls Fail, No Maintenance" future scenario must be considered.

100. Page 2-3, lines 13 and 14

Crushing of the slag does not need to be performed on-site. The crushing can be conducted at the licensed disposal facility. This option must be evaluated.

101. Page 2-3, lines 19 and 20

Air emissions could be exceeded during the transfer and crushing of the slag only if engineering controls to suppress the dust are not employed. In addition, off-site crushing of slag should be considered. The slag can be shipped as is to the licensed waste disposal facility for processing.

102. Page 2-3, lines 22 and 24

a) The presence of enhanced rail access could increase the potential desirability of the area for future industrial use <u>only</u> if the rail is not recycled and the town permits its usage. As such, SMC should take into consideration the scenario of the rail not being present and assess the ecological risk during decommissioning.

b) SMC stated *"Therefore, the long-term ecological value and aesthetic value of the area are difficult to define."* EPA disagrees and an ecological evaluation should be performed for the LTC alternative.

103. Page 2-3, line 26

This paragraph only talks about the slag. SMC must address the appropriate disposal options for the baghouse dust along with the other non-source material (contaminated soil and building debris) such as recycling of baghouse dust and disposal of non-source material at a licensed radioactive waste disposal facility.

104. Page 2-4, lines 6 through 8

EPA disagrees with the statement that CERCLA activities would likely prohibit future residential development of the property. Following the conclusion of all CERCLA related activities, the site may be available for unrestricted use and not require a prohibition on future residential development of the property. Therefore,

this section must be revised to account for the possibility of future residential development of the property.

105. Page 2-4, lines 12 through 16

These paragraphs only address the Storage Yard and the soil conditions on the remainder of the SMC property. The impact of current and potential groundwater contamination on-site and off-site needs to be addressed along with the off-site surface water and sediment contamination.

106. Table 2-1, Summary of Predicted Environmental Impacts

a) "Land Use" category: Under the "Adverse Impacts" of the LTC alternative, SMC must consider the current impact of potentially contaminated groundwater on the proposed unrestricted portion of the property and off-site areas. To do this, additional groundwater data is required. SMC also must consider the future impact of contamination leaching into the groundwater table and migrating into the unrestricted portion of the property as well as into off-site areas.

b) "Geology and Soil" category: Under the "Adverse Impacts" of the LTC alternative, SMC is only assuming the condition of no degradation of the engineered barrier. SMC must address the condition when the engineered barrier fails and no maintenance is performed and the associated impact on contaminants leaching into the groundwater for both on-site and off-site areas.

c) "Water Resources" category: Under the "Adverse Impacts" of the LTC alternative, SMC is only assuming the condition of no degradation of the engineered barrier. SMC must address the condition when the engineered barrier fails and no maintenance is performed, and the associated impact on contaminants leaching into the groundwater table for both on-site and off-site areas.

d) "Ecological Resources" category: Under the "Adverse Impacts" of the LTC alternative, SMC is only assuming the condition of no degradation of the engineered barrier. SMC must also address the condition when the engineered barrier fails and no maintenance is performed and the associated impact on ecological resources both on-site and off-site.

e) "Air Quality" category: Under the "Adverse Impacts" of the LTC alternative, SMC is only assuming the condition of no degradation of the engineered barrier. SMC must address the condition when the engineered barrier fails and no maintenance is performed and the associated impact from air emissions both on-site and off-site. This was done under the LT (no action) alternative (e.g., potential for future emissions associated with exposed material due to barrier degradation may happen).

f) "Noise" category: Under the "Adverse Impacts" of the LTC alternative, SMC must include the following bullet:

Because of the restricted area, the surrounding area is proposed for industrial purposes; therefore, higher noise levels may occur in the long-term, whereas long-term noise levels would be lower if the entire area is available for unrestricted use (i.e., residential).

g) "Historic and Cultural Resource" category: Under the "Benefits" category, it is unclear in the first bullet how the glass stack is associated with the LTC alternative in maintaining it for eligibility for the National Register. Wouldn't the glass stack remain eligible for the national register regardless of which alternative is chosen? Please explain or delete associated text.

h) "Historic and Cultural Resource" category: Under the "Benefits" of the LTC alternative, it is unclear in the 2nd bullet who would neglect the site in the future under the LT scenario. This bullet should be deleted.

i) "Historic and Cultural Resource" category: Under the "Adverse Impacts" of the LTC alternative, SMC didn't identify any adverse impacts. The following adverse impact should be included.

i) The restricted use would impact the surrounding community by limiting other future use (e.g., residential, recreational, etc.).

j) "Visual/Scenic Resource" category: Under the "Benefits" of the LTC alternative, it is unclear in the 2nd bullet how the visibility of the stabilized pile is limited to on-site locations when the proposed pile is only about 50 feet away from the northern site boundary and is expected to be 30 feet high and 948 feet long. This would be a highly visible waste pile.

k) "Socioeconomic Impacts" category: Under the "Adverse Impacts" of the LTC alternative, SMC must consider the current impact of potentially contaminated groundwater on the proposed unrestricted portion of the property and off-site areas. SMC also must consider the future impact of contamination leaching into the groundwater table and migrating into the unrestricted portion of the property as well as into off-site areas.

l) "Public Health and Safety" category: Under the "Benefits" of the LTC alternative, the statement about minimal off-site impacts for public health and safety is not supported since SMC cannot prove that when "Controls Fail, No Maintenance for the LTC alternative" scenario there will be no public exposure and no groundwater contamination.

m) "Public Health and Safety" category: Under the "Adverse Impacts" of the LTC alternative, SMC is only assuming the condition of no degradation of the engineered barrier. SMC must address the condition when the engineered barrier fails and no maintenance is performed and the associated impact on public health and safety via air emissions and groundwater contaminant migration, both on-site and off-site.

n) "Waste Management" category: Under the "Adverse Impacts" for the LTC Alternative, SMC did not identify any adverse impacts. The following bullet needs to be added:

i) Will create additional waste disposal sites across the country requiring significant long term management without assurance of responsible parties to finance potential future site cleanups of the disposal site.

o) "Land Use" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, SMC did not identify any benefits. SMC needs to list benefits such as unrestricted land use for suburban residents, resident farmers, and/or recreational use, and no cap to maintain for the estimated millions of years, etc. In addition, real estate values would improve, whereas under the LTC the land would never be available for use and could significantly decrease the real estate values of the surrounding community. As another benefit, the potential for contaminant migration into groundwater and via air emissions would be eliminated should engineering controls fail and no maintenance is conducted. Such subjects need to be added into the "Benefits" category.

p) "Land Use" category: Under the "Adverse Impacts" for the Off-Site Disposal With License Termination (LT) Alternative, SMC stated adverse impact may be true <u>only</u> if the rail is not removed after the decommissioning and the town permits its usage. EPA disagrees. The presence of the railroad is not necessarily an adverse impact.

q) "Transportation" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, SMC did not identify any benefits. SMC must list benefits such as the waste will be transferred into a <u>remote</u> licensed waste disposal facility where it will have much less potential impact on human health, hydrogeology, and the ecosystem.

i) "Transportation" category: Under the "Adverse Impacts" for the Off-Site Disposal With License Termination (LT) Alternative, SMC stated in the first bullet *"Requires long-distance rail transport of licensed material to disposal facility in Utah; therefore, transportation impacts a much larger area than the proposed action."* This statement is misleading and should be deleted. The impact from transportation is a short term impact and should not be directly compared to the impact of the LTC alternative. Impacts from the LTC alternative are long-term impacts, not short-term impact. The impact from transportation via

railroad, would not be expected to result in aerial contamination along the transport route under normal conditions. Whereas, the impact from the LTC alternative could be significant for reasons which are stated in previous comments.

r) "Water Resources" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, SMC must add the following bullet.

i) Licensed material are removed from the facility; thereby permanently preventing this material from being a potential source of soil, surface water and groundwater contamination due to radioactivity leaching under the "Controls Fail, No Maintenance" scenario of the LTC alternative.

s) "Ecological Resources" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, the second half of the sentence *"; however, lack of future use restrictions does not guarantee long-term ecological value of area"* should be deleted.

t) "Air Quality" category: Under the "Adverse Impacts" for the Off-Site Disposal With License Termination (LT) Alternative, The statement in this category should be deleted or modified to reflect the following alternative or control.

i) Alternative: If the slag can be transferred to the waste disposal facility for processing (e.g., crushing prior to storage), then SMC should consider this alternative.

ii) Control: Proper standard engineering controls such as water spraying, performing crushing activities within reasonably enclosed areas, or a combination thereof, can be put in place to suppress airborne dust and maintain it within the impacted area without exceeding the NAAQS limits in surrounding areas.

u) "Noise" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, the last bullet (Long-term noise impact…no longer a restricted area) should be deleted.

v) "Noise" category: Under the "Adverse Impacts" for the Off-Site Disposal With License Termination (LT) Alternative, the last bullet maybe true <u>only</u> if the slag is crushed on-site without the deployment of noise barriers. SMC should consider the feasibility of crushing the slag at the waste disposal facility or employing appropriate short-term engineering methods to address noise concerns related to on-site processing.

w) "Historic and Cultural Resources" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, the existing bullet is inappropriately included as it relates to an adverse impact and not a benefit. As such, it should be deleted.

x) "Historic and Cultural Resources" category: Under the "Adverse Impacts" for the Off-Site Disposal With License Termination (LT) Alternative, the 2nd bullet needs to list the likelihood of an accident to occur.

y) "Socioeconomic Impacts" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, the 2nd half of the 2nd bullet (other development..., however) needs to be deleted as future potential CERCLA restrictions have not been determined.

z) Socioeconomic Impacts" category: Under the "Adverse Impacts" for the Off-Site Disposal With License Termination (LT) Alternative, SMC states that there will be no or limited local economic benefits associated with the transport and off-site disposal of the licensed materials. This statement cannot be supported and should be deleted. The LT Alternative presents positive socioeconomic impacts for the local community which would have no future restrictions on development of this property. This should be discussed under the "Benefits" category of Socioeconomic Impacts.

aa) "Public Health and Safety" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, the following bullet needs to be added.

    i) Eliminates any potential future threats to public health and the environment that may arise from the LTC alternative.

bb) "Waste Management" category: Under the "Benefits" for the Off-Site Disposal With License Termination (LT) Alternative, SMC did not identify any benefits. The following benefits should be included.

    i) Eliminates the creation of sporadic waste disposal facilities across the country, which require millions of years of Operation and Maintenance to remain protective.

cc) "Water resources" category: Under the "Adverse Impacts" for the License Continuation (LC) Alternative (No Action), the following bullet needs to be added.

    i) Potential for impacts to soil, surface water, and groundwater quality due to radioactive material leaching from the uncovered piles remains.

dd) "Visual/Scenic Resource" category: Under the "Adverse Impacts" of the LC alternative, it is unclear how the visibility of the stabilized pile is limited to locations on the SMC facility when the proposed pile is only about 50 feet away from the northern site boundary. Explain or delete the associated text.

ee) "Socioeconomic Impacts" category: Under the "Adverse Impacts" of the LC alternative, SMC needs to list the impacts on the surrounding community and not only on the Storage Yard. As such, SMC must consider the current impact of potentially contaminated groundwater on the proposed unrestricted portion of the property and off-site areas. SMC also must consider the future impact of contamination leaching into the groundwater table and migrating into the unrestricted portion of the property as well as into off-site areas.

ff) "Public Health and Safety" category: Under the "Adverse Impacts" of the LC alternative, SMC must include a bullet about the impacts to surface water and groundwater, and consequently to public health and safety, due to run-off and leaching of waste at the site.

gg) "Waste Management" category: Under the "Adverse Impacts" of the LC alternative, SMC should include a bullet about future financial liabilities associated with site maintenance should SMC not exist in the future.

107. Page 2-4, lines 23 and 24

1. The federal statutes and regulations summarized in Table 1-2 should also include the LT and the LC alternatives and not only the LTC alternative.

108. Table 1-2

a) This Table provides the regulations associated with the LTC alternative. SMC needs to provide the regulations associated with the LT and the LC alternatives as well.

b) Under the "Applicability to Site Conditions" for the Ambient Water Quality Criteria (AWQC) (40 CFR 131.36 (b)(1)) of the Clean Water Act, SMC stated *"While AWQC would be applicable to discharges to surface water, no discharges expected to be associated with the proposed action."* The discharges to surface water from previous operations, which impacted surface water on-site and off-site, specifically along the Hudson Branch, must be characterized and discussed here.

c) With respect to the Effluent Discharge Limitations (40 CFR 401.15) of the Clean Water Act, see comment 2, above.

d) Under the "Applicability to Site Conditions" for the Land Disposal Restrictions (40 CFR 268) of the Resource Conservation and Recovery Act (RCRA), SMC stated *"This regulation will be applicable to any off-site disposal of soil determined to be a hazardous waste."* How will SMC make the determination with respect to on-site vs. offsite soil disposal? Is there any soil on-site that contains or potentially contains hazardous waste that is proposed for consolidation with the radioactive waste on-site under the LTC alternative? SMC must be clear on the disposition of site soils.

e) Under the "Applicability to Site Conditions" for Executive Order 11990, Protection of Wetlands, SMC stated *"While wetlands are located along the southern edge of the SMC facility, the proposed action is not expected to impact the wetland areas."* What about previous site activities that radiologically impacted the Hudson Branch? And the condition when "controls fail, no maintenance" under the LTC alternative.

f) Under the "Applicability to Site Conditions" for the Wetlands Construction and Management Procedures (40 CFR 6, Appendix A), SMC stated *"While wetlands are located along the southern edge of the SMC facility, the proposed action is not expected to impact the wetland areas."* Limited investigations of the Hudson Branch have determined an impact. This impact must be addressed.

g) Under the "Applicability to Site Conditions" for the Protection of Significant/Important Farmland of the Farmland Protection Policy Act (7 USC 4201 et. Seq.), SMC stated *"While areas designated as Prime Farmlands are located in the vicinity of the SMC facility, the proposed action is not expected to impact these lands."* This statement doesn't take into consideration the potential impact to surface water and sediment due to erosion/run-off or the impact to groundwater due to leaching as a result of current site conditions or the "controls fail, no maintenance" scenario under the LTC alternative. As such, SMC must address these issues and the impact on off-site farmland, as the majority of the off-site areas southwest of the SMC main facility comprise farmland areas.

h) Under the "Applicability to Site Conditions" for the Protection of Groundwater Used for a Potable Water Supply of the Safe Drinking Water Act (40 CFR 149), SMC stated *"The SMC facility is located within the New Jersey Coastal Plain Aquifer, an EPA designated sole-source aquifer, proposed action not expected to adversely impact aquifer use."*

i) All groundwater at the site is classified as drinking water. As such SMC must address the shallow, as well as deep groundwater.

ii) The site radioactive contamination has impacted the groundwater. However, this impact has not been fully characterized. Additional groundwater samples are required. Further, SMC hasn't fully addressed the future impact to groundwater under the LTC alternative for the scenario where controls fail and no maintenance of the barrier is conducted. As such, SMC can not support the above statement.

109. Page 3-1, line 6 and Figure 3-1

Because the majority of the land areas downgradient (southwest) of the SMC facility are designated for agricultural and residential use, SMC must thoroughly evaluate current groundwater contamination. In addition, the LTC (controls fail, no maintenance) scenario and the dose assessment must be evaluated.

110. Page 3-33, Lines 20 through 22

a) W3 is a deep well. It is not an appropriate well to use to represent the radiological conditions in shallow groundwater. The monitoring well network used to evaluate the groundwater contamination within the Storage Yard is inadequate. A number of wells must be installed within the Storage Yard, including the eastern, southern, and western boundaries of the Storage Yard.

b) Depending, in part, on the depth of the groundwater table, these wells (e.g., W2, SC11, SC12, and SC13) are not fully representative of the radiological groundwater conditions within the Storage Yard, as the conditions adjacent to the slag piles could be significantly different from those beneath the slag pile due to potential vertical migration within the unsaturated zone. EPA recommends that shallow groundwater directly below the slag piles be evaluated through several new wells installed employing directional drilling techniques.

111. Page 3-33, line 22

a) Well A is downgradient of the Storage Yard; however, it is a deep well and may not be close enough to the Storage Yard to characterize the groundwater contamination. Furthermore, one downgradient well is insufficient to draw a conclusion about the radiological groundwater conditions. As such, more downgradient wells at varied distances from the Storage Yard must be installed and sampled for radiological parameters.

b) Given the amount of radioactive material that SMC processed at the site (approximately 50 curies of uranium and thorium), the groundwater monitoring performed at the site is insufficient to characterize potential significant radiological contamination of the groundwater. As such, SMC must sample all existing wells downgradient of the processing buildings for radiological parameters and install additional wells to fill data gaps.

112. Page 3-34, lines 1 through 24

a) Because the results of the background well (Well W3) are not included in Table F-4 of Appendix F, the upgradient or cross-gradient well SC14S is assumed to represent background. Based on this, the results of the screening parameters (e.g., gross alpha/beta) for the Storage Yard wells (e.g., Well SC12, its duplicate SC32, and to some degree SC13) are significantly higher than those of the background well. This could be an indication of some anomalies in the Storage Yard and will require additional investigation.

b) A footnote needs to be included under Table F-4 to indicate the analytical laboratory methods used in the isotopic/spectroscopy analyses. The associated sample uncertainties and detection limits also need to be included within the table along with the validation results.

c) The footnote under Table F-4 indicates that the isotopic uranium analyses were performed on the sediments retained on the filter paper. It is unclear what the

justification for this approach was. What was the chemical form of uranium and the chemical groundwater conditions to assume that uranium was 100% insoluble? The proper way to perform the isotopic uranium analyses is to analyze the filtered and unfiltered samples themselves.

d) The locations of the sampled wells [A, W2(R), OBS-2A, SC11S(R), SC12S and its duplicate SC32S, SC13S, and SC14S] are not sufficient for characterizing the groundwater radiological conditions. Three of these wells (e.g., OBS-2A, SC11S, and SC14S) are upgradient wells. Two of these wells (e.g., W2 and SC13S) are somewhat cross-gradient of the Storage Yard, where SC13S is closer to the Storage Yard and yet exhibited anomalous gross alpha/beta screening results (e.g., 14 and 115 g pCi/L of gross alpha and beta, respectively). Well SC12S is within the Storage Yard and may not be representative of the groundwater radiological conditions within the yard depending on the depth of the saturated zone. Well A is downgradient; however, it is at a significant distance from the Storage Yard. More wells downgradient and cross-gradient from the Storage Yard and the former processing buildings must be installed to properly characterize the current groundwater radiological conditions.

113. Page 3-48, line 1

An ecological risk assessment, summarized here, does not address radiological contamination and must be amended to include an evaluation of radiological contamination. Also, an ecological assessment must be performed for receptors based on radiological contaminants.

114. Page 3-73, line 9

a. This section only talks about <u>ambient</u> background surveys. Ambient background is usually measured at a height of 1 meter from the ground surface at given fixed locations. It is not clear that this was done; please describe the details of SMC's ambient background survey. The surveys described in this section are not appropriate to identify surface/subsurface soil contamination.

b. SMC needs to provide a figure showing where the ambient background measurements were collected.

c. If surface gamma surveys were not conducted, then they must be conducted to cover 100% of surface areas suspected to contain radiological contamination.

115. Page 3-73, line 20

The 7 to 8 microrem per hours, is it indoors or outdoors? Specify.

116. Page 3-73, lines 17 through 20

Why isn't the beta background level for the handheld instrument listed? Explain.

117. Page 3-74, lines 3 through 5

A figure showing the location of the background soil samples needs to be provided.

118. Page 3-74, lines 8 and 9

Please specify what the background concentration in surface water is and show the sample locations on a figure.

119. Page 3-74, lines 27 and 28

Please provide additional details regarding the equipment that is currently stored in the Storage Yard. Is this equipment proposed to be consolidated with the rest of the slag under the LTC alternative? Does this equipment contain hazardous material such as mercury, lead, PCB, etc? Justify the radiological and chemical conditions of the equipment and provide the approximate volume.

120. Page 3-75, lines 1 through 6

a) The survey conducted by IT along the Hudson Branch and SMC's conclusion related to this survey is inadequate to justify a no-further action along the Hudson Branch for the following reasons.

   i) Ambient exposure rate surveys are inappropriate to delineate the horizontal and vertical extent of contamination.

   ii) Ambient exposure rate is not the only exposure pathway to receptors, other pathways must also be considered.

121. Page 3-75, lines 13 and 14

SMC stated *"The residual radioactivity in the slag and baghouse dust is not readily transportable in the environment."* Elevated radioactivity is present in the stream and groundwater in the vicinity of the Storage Yard, therefore this statement must be deleted.

   a) Site-related radioactivity has been found along the Hudson Branch during previous surveys performed by SMC.

   b) SMC hasn't fully characterized the groundwater radiological conditions. Further, elevated radiological indicators and radionuclide concentrations have been measured in monitoring wells installed within the Storage Yard and southeast of the Storage Yard.

122. Page 3-75, lines 14 and 15

SMC stated *"The physical form of the slag in the Storage Yard (glass-like rock) results in negligible leaching of the radioactive elements into the regional water supply or local wetlands."* This statement can not be justified by the data for the following reasons and should be deleted.

a) Appropriate leachability studies were not performed.

b) The statement limits discussion to the regional water supply and local wetlands and doesn't include the impact to groundwater and farmland areas (i.e.., private wells and irrigation wells).

c) The statement limits its discussion to the slag and ignores the baghouse dust and other potential forms of radioactivity resulting from the extraction of chromium.

d) The word "negligible" is a relative term and needs to be defined specifically. For example SMC estimated the presence of 23 curies of each of uranium and thorium in the Storage Yard giving a total of 46 curies. EPA does not consider 10 percent leachate (i.e., 4.6 curies leaching into the groundwater) negligible.

123. Page 3-76, lines 9 through 13

a) Are any of the chemically impacted soils proposed for consolidation in the Storage Yard under the LTC alternative?

b) Line 15 on page xxiii of Volume I of the DP states that a greater than 99 percent of radioactivity remained in slag after processing and a much lesser extent in the baghouse dust. EPA must point out that radiological contamination has been detected in groundwater, surface water, and soil. Retgardless of SMC's unsupported estimates of how much radioactivity remains in site waste, the full extent of this contamination remains to be determined.

124. Page 3-77, line 12

Refer to the comments provided above on Chapter 5 Volume I.

125. Page 3-77, line 29

Did the non-carcinogenic risk account for the toxicity from uranium? Please clarify.

126. Page 6-3, Line 1

a) Long-term groundwater monitoring must be included under the LTC alternative and the monitoring locations shouldn't be limited to the Storage Yard area, but should include varied distances downgradient and cross gradient of the Storage Yard.

b) Existing wells downgradient of the processing buildings must also be sampled prior to a decommissioning decision for radiological parameters analysis and additional wells must be installed throughout the site.

c) Moisture content monitoring using Lysimeters, or equivalent technology, within the engineered barrier must be included under this alternative. It is essential to perform such monitoring to track the percent of moisture that percolates via the soil beneath the engineered barrier and accumulates inside the engineered barrier. Such moisture build-up could potentially impact the structural integrity of the engineered cap or increase the leachability of radionuclides into groundwater.

127. Page 6-3, line 16

a) Long-term groundwater monitoring must be included under the LC alternative and the monitoring locations should not be limited to the Storage Yard area, but should include varied distances downgradient and cross gradient of the Storage Yard.

b) Existing wells downgradient of the processing buildings must also be sampled for radiological parameters prior to a decommissioning decision and additional wells must be installed throughout the site.

128. Appendix F, Letter from Carol Berger (IEM) to David Smith (SMC), dated June 9, 2005, Titled "Results of Ground Water Sampling (April 13, 2005)"

a) The letter does not specify the depth of the sampling intervals. This needs to be specified in the response to the comments. Sample data failing proper QA/QC protocol should be rejected and new samples collected and analyzed.

b) The 2nd paragraph states that TRC forwarded the samples to the off-site laboratory for radiological analyses <u>without preservative</u>. This is of concern to the data quality objectives as the radioactivity within a non-preserved sample tends to plate out on the interior surface of the sample container resulting in underestimating the radionuclide concentration within the sample.

c) Table 1 - Well number SC25S, which is located near the southeast corner of the facility property or east of the Storage Yard, exhibited a Ra-228 concentration of 17 pCi/L, and well number SC12S, which is located south of the Storage Yard, exhibited Ra-228 concentration of 7.6 pCi/L. These levels exceed drinking water standards. The extent of the contouring of the groundwater flow (piezometric survey) is limited. Such concentrations are unlikely to be naturally occurring, especially in shallow groundwater. The groundwater flow near the southeast corner of the property could potentially be towards the east/southeast direction. As such, more water level data points are necessary to determine the groundwater flow direction in the vicinity of the southeastern portion of the SMC site. The RA-228 concentrations detected are indicative of groundwater contamination and yet SMC is ruling out the groundwater from any further consideration and excluded groundwater from the dose modeling evaluation. This is unacceptable.

d) Table 1 – The limited well network used to evaluate groundwater conditions associated with the Storage Yard is insufficient to fully characterize the radiological groundwater conditions. Additional wells downgradient and cross-gradient from the Storage Yard and the former processing buildings must be installed. Also, all of the existing monitor wells associated with the site must be sampled for radiological parameters.

e) Table 1 and Table 2 – It is unclear how the filtered samples from well number SC11S contain 5.5 pCi/L while the unfiltered sample contains only 1.79 pCi/L. Explain.

f) Table 3 – The uranium and thorium isotopes are alpha emitters and the drinking water standard of 4 mrem/year applies to site-related beta emitting radionuclides. As such, it is unclear what the rationale was to include the uranium and thorium isotopes in this table and in the unity rule equation presented beneath the table.