March 13, 2006

Mr. Philip M. Mazor, Project Manager
Waste Management, Inc.
700 56th Avenue
Zeeland, MI 49464

SUBJECT: AMENDMENT NO. 4 TO SOURCE MATERIALS LICENSE NO. SUC-1565 AUTHORIZING THE INCORPORATION OF THE DECOMMISSIONING PLAN, THE HEALTH AND SAFETY PLAN FOR SITE DECOMMISSIONING ACTIVITIES, AND THE QUALITY ASSURANCE PROJECT PLAN FOR DECOMMISSIONING ACTIVITIES INTO THE LICENSE (TAC NO. L60510)

Dear Mr. Mazor:

I am responding to your request for the U.S. Nuclear Regulatory Commission (NRC) to incorporate the Decommissioning Plan (DP), the Health and Safety Plan, and the Quality Assurance Project Plan for the S.C. Holdings, Inc. site into Source Materials License No. SUC-1565. You submitted your request in letters dated November 26, 2003 (ADAMS Accession No. ML033450337), and September 15, 2005 (ADAMS Accession No. ML052640183). NRC evaluated your requests and developed an environmental assessment (EA) (ADAMS Accession No. ML053480086) to support the review of your Plans and the proposed license amendment request in accordance with the requirements of 10 Code of Federal Regulations (CFR) Part 51. Based on the staff's evaluation, the conclusion of the EA is a Finding of No Significant Impact on human health and the environment for this licensing action. A Safety Evaluation Report was also prepared for this licensing action and is included as an enclosure (Enclosure 1).

To incorporate the three plans, the license will be amended. Enclosed is Amendment 4 (Enclosure 2) to Materials License No. SUC-1565, incorporating the DP, the Health and Safety Plan, and the Quality Assurance Project Plan into the license to support termination of the license and release of the S.C. Holdings, Inc. site for unrestricted use.

License conditions 11.A and 11.C are deleted from the license. License condition 11.D is changed to read:

> Except as specifically provided otherwise in this license, S.C. Holdings, Inc., shall conduct its program in accordance with the statements, representations, and procedures contained in the Decommissioning Plan dated November 2003; the Radiation Safety Program as contained in the Health and Safety Plan for Site Decommissioning Activities dated September 2005; the Quality Assurance Project Plan for Decommissioning Activities dated September 2005; and S.C. Holdings, Inc. responses dated May 9, 2005, and December 8, 2005 to NRC requests for additional information. The Nuclear Regulatory Commission's regulations shall govern unless the

statements, representations and procedures in the licensee's application and Radiation Safety Program are more restrictive than the regulations.

All other license conditions shall remain the same.

If you have any questions please contact Mr. David W. Nelson, of my staff, at (301) 415-6626 or by e-mail at DWN@nrc.gov.

Sincerely,

/CCraig for RA/

Daniel M. Gillen, Deputy Director
Division of Waste Management
and Environmental Protection
Office of Nuclear Material Safety
and Safeguards

Docket No.: 040-09022

License No.: SUC-1565

cc: S.C. Holdings Inc. Service List

Enclosures:
1. Amendment No. 4 to License SUC-1565
2. Safety Evaluation Report

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DATE	2/6/06	2/27/06	3/3/06

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S.C. Holdings, Inc. Service List:

cc:

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Amendment No. 4 to License SUC-1565
Enclosure 1

MATERIALS LICENSE AMENDMENT NO. 4

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and the applicable parts of Title 10, Code of Federal Regulations, Chapter I, Parts 19, 20, 30, 31, 32, 33, 34, 35, 36, 39, 40, 51, 70, and 71, and in reliance on statements and representations heretofore made by the licensee, a licensee is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and

Licensee	
1. S.C. Holdings, Inc. 2. 700 56th Avenue Zeeland, MI 49464	3. License Number SUC-1565 4. Expiration Date Until terminated 5. Docket or Reference 040-09022

6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount that Licensee May Possess at Any One Time Under This License
A. Thorium	A. Contaminated soil, sludge, sediment, trash, building rubble, structures, and any other material contaminated in excess of background levels	A. 40 metric tons
B. Uranium	B. Contaminated soil, sludge, sediment, trash, building rubble, structures, and any other material contaminated in excess of background levels	B. 5 metric tons

9. Authorized place of use: The existing S.C. Holdings, Inc. site, 2370 South Two Mile Road, Kawkawlin, MI 48706

10. Authorized use: Licensed material shall be possessed during site activities leading to the decommissioning of the S.C. Holdings, Inc. site

MATERIALS LICENSE SUPPLEMENTARY SHEET

License Number	SUC-1565
Docket or Reference Number	040-09022
AMENDMENT NO. 4	

11. Conditions:

A. Deleted by this Amendment

B. The Radiation Safety Officer for this license is Philip Mazor.

C. Deleted by this Amendment

D. Except as specifically provided otherwise in this license, S.C. Holdings, Inc., shall conduct its program in accordance with the statements, representations, and procedures contained in the Decommissioning Plan dated November 2003; the Radiation Safety Program as contained in the Health and Safety Plan for Site Decommissioning Activities dated September 2005; the Quality Assurance Project Plan for Decommissioning Activities dated September 2005; and S.C. Holdings Inc. responses dated May 9, 2005, and December 8, 2005, to NRC requests for additional information. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and Radiation Safety Program are more restrictive than the regulations.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

/RA/

Date: 03/ /06

Claudia Craig, Acting Deputy Director
Decommissioning Directorate
Division of Waste Management
and Environmental Protection
Office of Nuclear Material Safety
and Safeguards

DOCKET NO: 040-09022

LICENSE NO: SUC-1565

FACILITY: SC HOLDINGS, INC. SITE, KAWKAWLIN TOWNSHIP, MI.

SUBJECT: SAFETY EVALUATION REPORT FOR INCORPORATING THE QUALITY ASSURANCE PROJECT, HEALTH AND SAFETY, AND DECOMMISSIONING PLANS INTO THE LICENSE (TAC #60510)

1. EXECUTIVE SUMMARY

In a letter dated November 26, 2003, SC Holdings, Inc., submitted a Decommissioning Plan (DP) for the Kawkawlin Township, MI, site for U.S. Nuclear Regulatory (NRC) staff review and approval. In a letter dated September 15, 2005, the licensee submitted a Quality Assurance Project Plan and a Health and Safety Plan for on-site decommissioning activities. The decommissioning objective of the licensee for the site is unrestricted use as defined in the License Termination Rule, Subpart E to 10 Code of Federal Regulations (CFR) Part 20. For the decommissioning of the site, a dose objective of 25 Millirem (mrem)/year (0.25 mSv/year) is the basis for demonstrating that the site can be released for unrestricted use.

The purpose of this Safety Evaluation Report (SER) is to evaluate the licensee's request to amend the license to determine whether the unrestricted release criteria will be met and if decommissioning activities will be conducted in a safe manner in accordance with NRC regulations. This SER has been prepared in conjunction with an Environmental Assessment (EA) (See ADAMS ML053480086) which evaluates the potential environmental impacts associated with this action.

2. FACILITY OPERATING HISTORY

The site is a part of the former (now closed) industrial waste disposal area locally known as the Hartley & Hartley Landfill. The landfill is a former waste disposal facility that accepted municipal and industrial waste from the 1950s until 1978. The facility is estimated to have received 18,000 barrels of spent solvents, oils, and other liquid and solid wastes for disposal during the 1960's and early 1970's. During the period from 1970 to 1972, foundry slag containing radioactive thorium (Th) and progeny was also disposed of in the Northwest Landfill and in two small slag piles (slag piles A and B). There are no records of Th-bearing slag in any area other than the Northwest Landfill and the two slag piles. In 1995, NRC issued Source Materials License No. SUC-1565 to SCA Services, Inc., for storage of radioactive Th and uranium (U) in slag/waste at the Hartley & Hartley Landfill site. The current owner of the property is S.C. Holdings, Inc., successor by merger to SCA Services, Inc. Post-closure activities at the site included construction of slurry walls with clay caps and subsurface clay dikes to encapsulate the landfills to contain the chemical wastes and preclude the potential migration of chemical (non-radioactive) contaminants beyond those areas already impacted by the disposal.

3. FACILITY DESCRIPTION

NRC staff has reviewed the information in the “Facility Operating History” section of the DP for the S.C. Holdings, Inc. site according to the Consolidated Office of Nuclear Material Safety and Safeguards (NMSS) Decommissioning Guidance, Volume 1, Section 16.2 (Facility Operating History). Based on this review, NRC staff has determined that the licensee has provided sufficient information to aid NRC staff in evaluating the licensee’s determination of the radiological status of the facility and the licensee’s planned decommissioning activities, to ensure that the decommissioning can be conducted in accordance with NRC requirements.

The Hartley & Hartley Landfill industrial disposal site is currently treated as two separate sites, the Michigan Department of Natural Resources (MDNR) site and the S. C. Holdings, Inc site. The S.C. Holdings, Inc. site covers about 235 acres and contains two landfills (East and Northwest Landfills) surrounded by support areas and wetlands. Both landfills are encapsulated within slurry walls and covered with clay caps. Slag piles A and B are located immediately adjacent to the landfills and are covered by a layer of clean clay.

The licensee completed site radiological characterization surveys in 1996. Reviews of site histories and characterization survey results indicated that on-site Th contamination was restricted to the Northwest Landfill and slag piles A and B. Although no buried Th wastes were detected in the Northwest Landfill via surveys conducted on the Northwest cell clay cap, no in-situ surveys were conducted within the cell. The landfills do contain hazardous chemical wastes and the state of Michigan opposed disturbing the cap clay to conduct in-situ surveys since doing so would expose workers and the surrounding environment to the non-radiological hazards located within the cell.

The State of Michigan regulates all non-radiological hazardous wastes on-site.

4. RADIOLOGICAL STATUS OF FACILITY

NRC staff has reviewed the information in the "Radiological Status of the Facility" section of the DP for the site according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 16.4 (Facility Radiological Status). Based on this review, NRC staff has determined that the licensee has described the types and activities of radioactive material contamination at the site sufficiently to allow NRC staff to evaluate the potential safety issues associated with remediating the site, whether the remediation activities and radiation control measures proposed by the licensee are appropriate for the type of radioactive material present at the site, and whether the licensee's waste management practices are appropriate.

5. DOSE MODELING

Section 5 of the Decommissioning Plan (DP) describes the dose assessment performed for the SCA Hartley & Hartley Landfill Site. The current owner of the site, S.C. Holdings, Inc. developed dose values and radionuclide-specific derived concentration guideline levels (DCGLs) that will be used to demonstrate compliance with the regulations for releasing the site for unrestricted release. The industrial worker scenario was considered in developing the dose values and DCGLs. The computer codes used by the licensee were RESRAD and MicroShield.

5.1 Site Release Criteria

S.C. Holdings, Inc. intends to release the site for unrestricted release in compliance with requirements of 10 CFR Part 20.1402. In accordance with 10 CFR 20.1402, the residual radioactivity that is distinguishable from background remaining at the site at the time of license termination cannot result in a total effective dose equivalent (TEDE) to an average member of the critical group that will exceed 25 mrem/yr. The residual radioactivity must also be reduced to levels that are as low as reasonably achievable (ALARA).

5.2 Source Terms

The primary source term responsible for the radionuclide contamination at the site consists of slag containing U and Th buried within the waste cell of the Northwest Landfill as well as two additional piles of slag located near the East Landfill and west of the Northwest Landfill (slag piles A and B).

The Northwest Landfill is bounded by a slurry wall with an area of 32,375 square meters (Earth Tech, 2003). The radioactive material is assumed to have been placed in the landfill in an heterogeneous manner; on average, the thickness of the fill containing slag is approximately 4 meters (Earth Tech, 2003). S.C. Holdings, Inc. assumed that the radionuclides were evenly distributed throughout the landfill. Slag Piles A and B will be excavated and placed on the Northwest Landfill before the cover improvements are completed.

The source term for the computer model defines the composition of the radionuclides in the Northwest Landfill, as well as the inventory and place of the material under the engineered cover. The source term for the Northwest Landfill consists of slag containing U and Th in concentrations measured by Oak Ridge Associated University (ORAU, 1985). The concentrations of individual radionuclides present in the Northwest Landfill are provided in Table 5.2. Radioactive progeny of U and Th with a radioactive half-life of less than 180 days are assumed to be in equilibrium with their parent.

Table 5.2 Radionuclide Concentrations used by S.C. Holdings, Inc.

Radionuclide	Concentration Present in the Northwest Landfill picocuries per gram (pCi/g)
Lead-210	0.61
Radium-226	0.61
Radium-228	18.67
Th-228	17.96
Th-230	2.54
Th-232	18.67
U-234	2.54
U-238	2.54

The characterization data set for the site also include samples of buried waste analyzed as part of an initial waste characterization of the slag piles collected in 1996 (Earth Tech, 2003a), and in 2003. Analysis of the material in the slag piles in 2003, indicated maximum activity levels of Th-230 and Th-232 of 21 pCi/g and 19.6 pCi/g, respectively, confirming levels reported in 1996. Most samples of the waste collected in 2003 indicated that the Th-230/Th-232 ratio is generally 1:1 and activity levels for Th isotopes were typically between 5 and 10 pCi/g.

Additional radiological contamination could result from the primary source term at the site through the operation of the existing Leachate Collection and Treatment System (LCTS). The LCTS could result in the leakage of Th and its daughter products on the cap surface. Also, the storage of Th and its daughter products in an above ground leachate tank associated with the LCTS could result in gamma radiation exposure to site workers. Radioactivity associated with the LCTS and the leachate tank would originate from groundwater in contact with the Th-bearing slag in the waste cell. S.C. Holdings, Inc. assumed that the leachate's concentration of Th and its daughter products would be similar to the primary source term.

Based on the staff review of the cited data, the staff believes that the licensee's representation of the source term is appropriate.

5.3 Critical Group, Scenarios, and Pathway Identification and Selection

The critical group is defined in 10 CFR Part 20.1003 as "the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity of any applicable set of circumstances." Compliance is demonstrated by showing that the dose to the average member of the critical group meets the dose criteria set forth by Subpart E of 10 CFR Part 20.

S.C. Holdings Inc. chose to assume future use of the site based on a "reasonably foreseeable land use" scenario rather than a conservative scenario, such as a resident farmer. The reasonable foreseeable future was defined as the next few decades and possibly as many as 100 years. The reasonable use of the land at the SCA Hartley & Hartley Landfill site in the foreseeable future was determined to be industrial use, which matches the other applications that exist in the immediate area.

The key assumptions for the industrial use scenario were that (1) the hypothetical industrial worker is on site 8 hours per day and does not work on weekends, (2) municipal water is used for drinking and irrigation, (3) there is no ingestion of meat and milk from livestock raised on the site and no other food or water is consumed from the site, and (4) the industrial worker works on the site after the landfill cover improvements have been completed. Therefore, the pathways identified for the industrial worker scenario were the following:

- Inhalation of radioactive material
- Direct exposure to gamma radiation, and
- Ingestion of soil

While it is possible for an industrial worker to consume water from an onsite drinking water well, S.C. Holdings Inc. provided details regarding the site that would preclude the use of a well. First, the concentrations of several inorganic and organic constituents in shallow water exceed Michigan residential water quality standards. In addition, Michigan well construction administrative rules would prohibit development of water supply wells in the shallow aquifer. This is because the area only provides for 5 to 10 feet of well casing, while the required minimum would be 25 feet.

S.C. Holdings, Inc. also described aspects of the site that limit future development for residential and agricultural use. These include depth to groundwater, water quality, and engineering characteristics of the soil. The water from the area of the landfill has a high salinity that is likely to be phytotoxic. Accordingly, this water would be unsuitable for irrigation or other agricultural use. The shallow depth to groundwater, due to ponds or wetlands, provides limitation to site development and create poor conditions for farming. In addition, much of the site is covered by landfills which would be poorly suited for construction. Because the waste in the East and Northwest Landfills was not placed in an engineered manner, the heterogeneity of the filled areas would cause differential settlement if if a load is applied to the waste. Therefore, the surface of the landfill is unlikely to support a large structure without undergoing substantial subsidence.

NRC staff agrees with the use of an industrial worker scenario and believes that this scenario is conservative, given the site limitations mentioned above. Staff also agrees that exclusion of the groundwater pathway is appropriate. Therefore, the staff finds that the critical group, scenarios, and pathways identified for this site are acceptable.

5.4 Modeling Approach

S.C. Holdings Inc. used residual radioactivity code RESRAD, Version 6.2, to estimate the site-specific total annual dose for the Northwest Landfill. RESRAD was also used develop soil DCGLs for the slag pile areas. The licensee performed both deterministic and probabilistic analyses for the RESRAD analysis. To determine input parameters, the licensee compared RESRAD default parameters against site-specific conditions of the Northwest Landfill and determined that many of the RESRAD default parameters were representative of the Northwest Landfill. These selected default parameters were used as input parameters. Parameters which relate to source term, distribution coefficients and hydrogeology of the landfill were changed in the model to match site conditions.

MicroShield, Version 5.01, was used to determine the dose from exposure to the leachate tank. S.C. Holdings assumed that the 15,000-gallon leachate storage tank that is located on the site is used to collect leachate for the Northwest Landfill. The modeled scenario assumed that tank is always completely full and the presence of Th radioactivity in slag at the specific activity limit. The exposure scenario involves a worker who hypothetically stands 1 meter from the leachate storage tank. For leachate leakage from the LCTS, the licensee used an analysis performed by MDNR (MDNR, 2004).

5.5 Uncertainty Analysis

Uncertainty in the dose assessment is based upon the uncertainty of the input parameters, scenarios, and models. S.C. Holdings, Inc. uncertainty analysis was limited to evaluating the uncertainty of several input parameters used in RESRAD. Uncertainty and sensitivity analyses were not performed on MicroShield model runs.

S.C. Holdings, Inc uncertainty and sensitivity analysis at this site included the following:

- Each scenario was evaluated using the deterministic module of RESRAD to identify a concentration in the soil corresponding to the deterministic regulatory limit.

- Exposure pathways that contribute most significantly to the radiation dose were identified. Direct exposure to gamma radiation from the surface soil was consistently the most significant pathway for exposure for the surface soil and was detected in the first year of the evaluation. Migration via the water pathways represented the dominant pathway of potential exposure for the Northwest Landfill after 1,000 years.

- Where site-specific knowledge was lacking, or where the default parameter distribution was judged to reasonably representative of the site conditions, the RESRAD default was used.

- The LHS algorithm was set to obtain 900 samples.

S.C. Holdings, Inc. used NRC ranking system to select the parameters that would be assigned uncertainty distributions. The RESRAD parameters were ranked into the following 3 levels based upon the parameters' contribution to the dose calculation: Priority 1 (high priority), Priority 2 (medium priority), and Priority 3 (low priority). Each priority 1 parameter was assigned RESRAD default distribution values and a selected number of Priority 2 parameters were assigned default distribution values. The following is a list of the Priority 1 parameters.

- Distribution coefficients
- Density of the cover materials
- Density of the contaminated zone
- Density of the saturated zone

- Total porosity of the saturated zone
- Effective porosity of the saturated zone
- Hydraulic conductivity of the saturated zone
- Thickness of the unsaturated zone
- Depth of the roots
- Transfer factors to the plants

5.6 Input Parameters

NRC staff agrees with the licensee's selected input parameters for its RESRAD and MicroShield analyses. The licensee's uncertainty analysis performed on the RESRAD input parameters provides assurance that a broad range of input parameters were evaluated in the RESRAD dose assessments.

5.7 Modeling Results

The licensee's expected dose from the Northwest landfill was 5 mrem/yr and no DCGLs were reported for this area. This dose was based upon the results of the uncertainty analysis, which resulted in an average radiation dose of 5±2 mrem/yr. The minimum dose from the uncertainty analysis was calculated to be 2 mrem/yr after 1000 years and the maximum dose was calculated to be 14 mrem/year. The primary element of the exposure was from direct radiation exposure after the cover erodes.

For the residual radioactivity on the surface soil of the excavated slag piles, the licensee derived derived concentration guideline levels (DCGLs). The licensee did not take into account the presence of the capped Northwest Landfill in derivation of the DCGLs for the remediated slag pile areas because the dose contribution from the capped landfill at slag pile locations would not be distinguishable from background. The DCGLs reflect the concentration of radionuclides that may be present outside of the Northwest Landfill and result in a maximum dose of less than 25 mrem/yr over background. The primary exposure pathway is direct radiation from the surface soil. The analysis of uncertainty indicated an average radiation dose of 23±2 mrem/yr. The minium exposure was calculated to be 10 mrem/yr after 1 year, and the maximum exposure was calculated to be 25 mrem/yr over background. Table 5.7 lists the DCGLs developed by the licensee for the slag piles.

Table 5.7 DCGLs Derived by the Licensee
for the Surface Soil Outside the Northwest Landfill

Radionuclide	Concentration (pCi/g)
Lead-210	2.2
Radium-226	108
Radium-228	228
Th-230	141
Th-232	358
U-234	358
U-238	2.54

The annual dose for the potential leaking of the LCTS determined by MDNR was less than 1 mrem/yr. S.C. Holdings's analysis for the gamma radiation exposure for a worker within close proximity to the leachate tank was less than 2 mrem/yr.

5.8 Independent Analyses

Staff performed independent runs of the RESRAD and MicroShield computer codes using the same parameter assignments as used in the licensee's analysis and confirmed the above expectation. Staff noticed that the licensee's RESRAD model for the Northwest Landfill included the aquatic food and meat ingestion pathways. These are not typical pathways for an industrial worker scenario. With the inclusion of these pathways, the licensees analysis of the Northwest Landfill provided added conservatism, and still resulted in a dose below the 25 mrem/yr dose limit. For analysis of the leachate collection tank, the licensee's analysis is considered to be conservative based on the assumption that the tank is completely full for the entire work year. Because the licensee's analyses are considered to be conservative, staff finds the licensee's dose estimates to be acceptable.

S.C. Holdings, Inc. referenced the MDNR dose analysis of a leaking LCTS as being representative of the SCA Hartley & Hartley landfill site. However, SC Holdings Inc. provided no justification for why the analysis by MDNR would be suitable for the SCA site. NRC staff noticed that MDNR's analysis assumes recreational activities, while SC Holdings, Inc. assessment assumes industrial work. NRC staff reviewed the MDNR analysis and compared it to the assumptions made in the S.C. Holdings, Inc. analysis. NRC staff focused on those parameters that dose is most sensitive to (i.e. cover depth, cover erosion rate, outdoor time fraction and source concentration). Staff found that S.C. Holdings, Inc. values for cover depth and erosion rate were greater than MDNR's values; however, staff determined that the MDNR analysis is bounding for the SCA site for the following reasons:

1. MDNR assumed an outdoor time fraction of .0285 (250 hr/yr). While this time fraction is a conservative value for MDNR's recreational user scenario, it is greater than the time fraction provided by S.C. Holdings, Inc. (.006 or 53 hr/yr).

2. MDNR used soil concentration values that are several times higher than those used by S.C. Holdings, Inc. For example, MDNR provided a concentration of 3.4E5 pCi/g for Th-230, in comparison to 2.54 pCi/g used by S.C. Holdings, Inc.

3. MDNR's analysis has the same exposure pathways as that of the S.C. Holdings, Inc. analysis.

NRC staff assessed the potential exposure to an offsite receptor from radioactive materials being transported offsite in the groundwater, including groundwater seeping through the slurry walls. Any seepage of radiological contaminated groundwater through the slurry walls will be dispersed and diluted as the groundwater slowly travels to Saginaw Bay of Lake Huron. The travel time for groundwater to reach Saginaw Bay from the site is several thousand years because of the distance (2.24 kilometers) between the two locations and because of the low hydraulic gradient (0.0002 ft/ft) of the water table. The radiological impact on a potential receptor is low because Th solubility in groundwater is low, the dispersion and dilution of the radionuclides in the groundwater that occurs along the pathway, and the dilution of the radiologically contaminated groundwater when it flows into the much larger surface water volume of Saginaw Bay. The lack of receptors along the groundwater pathway further reduces the impact of any radionuclides migrating from the waste cell.

5.9 Conclusions

NRC staff has reviewed the dose assessment for the SCA Hartley & Hartley Landfill site based upon the guidance in NUREG-1757, Volume 2, for conducting dose assessment to demonstrate compliance with the termination rule.

The staff concluded that the dose modeling completed for this site is adequate. The DCGLs for the surface soils can be used in the final status survey with assurance that the dose from the exposure to residual radioactive materials at this site is sufficiently low to allow unrestricted release of this site in accordance with 10 CFR 20.1402. The expected dose for an industrial worker located on the Northwest landfill is 5 mrem/yr.

The licensee should have provided justification for using the MDNR leachate leakage analysis. However, staff found the MDNR leachate leakage analysis to be bounding for the SCA site. The annual dose for the potential leachate leaking from the LCTS is less than 1 mrem/yr, and the dose from gamma radiation exposure for a worker within close proximity to the leachate tank is less than 2 mrem/yr.

These conclusions are based on the modeling effort performed by the licensee and the independent analysis performed by NRC staff.

6. PLANNED DECOMMISSIONING ACTIVITIES

NRC staff has reviewed the information in the "Planned Decommissioning Activities" section of the DP according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.1 (Planned Decommissioning Activities). Based on this review, NRC staff has determined that the licensee has provided sufficient information to allow NRC staff to conclude that the licensee's planned decommissioning activities can be conducted in accordance with NRC requirements.

Decommissioning activities include the excavation and relocation of slag piles A and B into the Northwest Landfill, installation of a leachate collection and treatment system (LCTS), and upgrading the existing cover (clay cap) over the East and Northwest Landfills. Wells and piping for a LCTS will be installed in the Northwest Landfill and that piping will connect with the piping that had already been installed in the East Landfill and the adjacent MDNR waste cell.

7. PROJECT MANAGEMENT AND ORGANIZATION

NRC staff has reviewed the information in the "Project Management and Organization" section of the DP describing the decommissioning project management organization, position descriptions, management and safety position qualification requirements and the manner in which the licensee will use contractors during the decommissioning of the site according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.2 (Project Management and Organization). Based on this review, NRC staff has determined that the licensee has provided sufficient information to allow NRC staff to evaluate the licensee's decommissioning project management organization and structure to determine if the decommissioning can be conducted safely and in accordance with NRC requirements.

8. HEALTH AND SAFETY PROGRAM DURING DECOMMISSIONING

8.1 Radiation Safety Controls and Monitoring for Workers

8.1.1 Workplace Air Sampling Program

NRC staff has reviewed the information in the "Health and Safety Program During Decommissioning" section of the DP and the "Health and Safety Plan for Site Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.3.1.1 (Workplace Air Sampling Program). Based on this review, NRC staff has determined that the licensee has provided sufficient information on when air samples will be taken in work areas, the types of air sampling equipment to be used and where they will be located in the work areas, calibration of flow meters, minimum detectable activities of equipment to be used for analysis of radionuclides collected during air sampling, action levels for airborne radioactivity (and corrective actions to be taken when these levels are exceeded) to allow NRC staff to conclude that the licensee's air sampling program will comply with 10 CFR 20.1204, 20.1501(a)-(b), 20.1502(b), 20.1703(a)(3)(i)-(ii), and Regulatory Guide 8.25.

8.1.2 Respiratory Protection Program

NRC staff has reviewed the information in the "Health and Safety Program During Decommissioning" section of the DP and the "Health and Safety Plan for Site Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.3.1.2 (Respiratory Protection Program). Based on this review, NRC staff has determined that the licensee has provided sufficient information to implement an acceptable respiratory protection program so as to allow NRC staff to conclude that the licensee's program will comply with 10 CFR 20.1101(b), and 10 CFR 20.1701 to 20.1704 and Appendix A of 10 CFR 20.

8.1.3 Internal Exposure Determination

NRC staff has reviewed the information in the "Health and Safety Program During Decommissioning" section of the DP and the "Health and Safety Plan for Site Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.3.1.3 (Internal Exposure Determination). Based on this review, NRC staff has determined that the licensee has provided sufficient information on methods to calculate internal dose of a worker based upon measurements from air samples or bioassay samples to allow NRC staff to conclude that the licensee's program to determine internal exposure will comply with 10 CFR 20.1101(b), 20.1201(a)(1), (d) and (e), 20.1204 and 20.1502(b).

8.1.4 External Exposure Determination

NRC staff has reviewed the information in the "Health and Safety Program During Decommissioning" section of the DP and the "Health and Safety Plan for Site Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.3.1.4 (External Exposure Determination). Based on this review, NRC staff has determined that the licensee has provided sufficient information on methods to measure or calculate the external dose of a worker to allow NRC staff to conclude that the licensee's program to determine external exposure will comply with the requirements of 10 CFR 20.1101(b), 20.1201(c), 20.1203, 20.1501(a)(2)(i) and (c), 20.1502(a) and 20.1601.

8.1.5 Summation of Internal and External Exposures

NRC staff has reviewed the information in the "Health and Safety Program During Decommissioning" section of the DP and the "Health and Safety Plan for Site Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.3.1.5 (Summation of Internal and External Exposures). Based on this review, NRC staff has determined that the licensee has provided sufficient information to conclude that the licensee's program for summation of internal and external exposures will comply with the requirements of 10 CFR 20.1202, 20.1208(c)(1) and (2) and 20.2106.

8.1.6 Contamination Control Program

NRC staff has reviewed the information in the "Health and Safety Program During Decommissioning" section of the DP and the "Health and Safety Plan for Site Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.3.1.6 (Contamination Control Program). Based on this review, NRC staff has determined that the licensee has provided sufficient information to control contamination on skin, on protective and personal clothing, on fixed and removable contamination on work surfaces, on transport vehicles, on equipment, and on packages to allow NRC staff to conclude that the licensee's contamination control program will comply with 10 CFR 20.1501(a), 20.1702, 20.1906(b), (d), and (f).

8.1.7 Instrumentation Program

NRC staff has reviewed the information in the "Facility Radiation Surveys" section of the DP and the "Health and Safety Plan for Site Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.3.1.7 (Instrumentation Program). Based on this review, NRC staff has determined that the licensee has provided sufficient information on the sensitivity and the calibration of instruments and equipment to be used to make quantitative measurements of ionizing radiation during surveys to allow NRC staff to conclude that the licensee's instrumentation program will comply with 10 CFR 20.1501(b) and (c).

8.2 Nuclear Criticality Safety

NRC staff has reviewed the information in the "Nuclear Critical Safety" section of the DP according to the definition of Special Nuclear Material found in 10 CFR 70.4. Based on this review, NRC staff has determined that the licensee has provided sufficient information to conclude that the radionucides identified at the site will not trigger or sustain a critical reaction.

8.3 Health Physics Audits and Recordkeeping Program

NRC staff has reviewed the information in the "Quality Assurance Program" section of the DP and the "Health and the "Quality Assurance Project Plan for Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.3.3 (Health Physics Audits, Inspections, and Recordkeeping Program). Based on this review, NRC staff has determined that the licensee has provided sufficient information to allow NRC staff to conclude that the licensee's executive management and radiation safety officer audit and recordkeeping program can be conducted safely and in accordance with NRC requirements.

9. ENVIRONMENTAL MONITORING AND CONTROL PROGRAM

NRC staff has reviewed the information in the "Environmental Monitoring and Control Program" section of the DP according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.4 (Environmental Monitoring and Control Program). Based on this review, NRC staff

has determined that the licensee has provided sufficient information on its environmental ALARA evaluation program, effluent monitoring program, and effluent control program to allow NRC staff to conclude that the licensee will comply with 10 CFR Part 20.

10. RADIOACTIVE WASTE MANAGEMENT PROGRAM

NRC staff has reviewed the information in the "Radioactive Waste Management Program" section of the DP according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.5 (Radioactive Waste Management Program). Based on this review, NRC staff has determined that the licensee's programs for the management of radioactive waste generated during decommissioning operations ensure that the waste will be managed in accordance with NRC requirements and in a manner that is protective of the public health and safety.

11. QUALITY ASSURANCE PROGRAM

NRC staff has reviewed the information in the "Quality Assurance Program" section of the DP and the "Quality Assurance Project Plan for Decommissioning Activities" according to the Consolidated NMSS Decommissioning Guidance, Volume 1, Section 17.6 (Quality Assurance Program). Based on this review, NRC staff has determined that the licensee's Quality Assurance Program is sufficient to ensure that information submitted to support the decommissioning of its facility should be of sufficient quality to allow the staff to determine if the licensee's planned decommissioning activities can be conducted in accordance with NRC requirements.

12. FACILITY RADIATION SURVEYS

12.1 Release Criteria

NRC staff has reviewed the information in the "Dose Modeling Evaluations" section of the DP according to the Consolidated NMSS Decommissioning Guidance, Volume 2, Section 4.1 (Release Criteria). Based on this review, NRC staff has determined that the licensee has sufficiently summarized the DCGLs and area factors used for survey design to demonstrate compliance with the radiological criteria for license termination.

12.2 Characterization Surveys

NRC staff has reviewed the information in the "Radiological Status of the Facility" section of the DP according to the Consolidated NMSS Decommissioning Guidance, Volume 2, Section 4.2 (Characterization Surveys). This review has determined that the radiological characterization of the site is adequate to permit planning for a remediation that will be effective and will not endanger the remediation workers and to demonstrate that it is unlikely that significant quantities of residual radioactivity have not gone undetected.

12.3 Final Status Survey Design

NRC staff has reviewed the information in the "Facility Radiation Surveys" section of the DP according to the Consolidated NMSS Decommissioning Guidance, Volume 2, Section 4.4 (Final Status Survey Design). Based on this review, NRC staff has determined that the licensee's final status survey design is adequate to demonstrate compliance with the radiological criteria for license termination.

13. FINANCIAL ASSURANCE

The staff concluded that the licensee appears to have sufficient financial assurance to cover the estimated cost to complete the decommissioning activities described in the DP.

STATE CONSULTATION

The Michigan Department of Environmental Quality was notified on October 27, 2005, of the proposed license amendment to incorporate the Plans into the license and it did not object.

CONCLUSIONS

Based on the considerations discussed above, NRC staff concludes that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed decommissioning activities; and (2) such activities will be conducted in compliance with NRC regulations.

REFERENCES

1. NRC Materials License No. SUC-1565.

2. S.C. Holdings, Inc., Letter dated November 26, 2003, "Submittal of the Decommissioning Plan SCA Hartley & Hartley Landfill Site, Kawkawlin Township, Michigan NRC Materials License No. SUC-1565, Docket No. 40-9022." [ADAMS Accession No. ML033450337]

3. NRC, Letter dated October 14, 2004, "The Nuclear Regulatory Commission's Request for Additional Information (RAI) with Regard to the Decommissioning Plan, for the S.C. Holdings, Inc. Hartley and Hartley Landfill Site, Kawkawlin, Michigan." [ADAMS Accession No. ML042670354]

4. S.C. Holdings, Inc., Letter dated May 9, 2005, "Response to RAI SCA, Hartley & Hartley Landfill Site, Kawkawlin Township, Michigan NRC Source License SUC-1565." [ADAMS Accession No. ML051380221]

5. NRC, Letter dated October 28, 2005, "Request for Additional Information (RAI) with Regard to the Decommissioning Plan, for the S.C. Holdings, Inc. Hartley and Hartley Landfill Site, Kawkawlin, Michigan." [ADAMS Accession No. ML052900502]

6. S.C. Holdings, Inc., Letter dated December 8, 2005, "Response to Second Request for Additional Information SCA, Hartley & Hartley Landfill Site, Kawkawlin Township, Michigan NRC Source License SUC-1565." [ADAMS Accession No. ML053480161]

7. S.C. Holdings, Inc., Letter dated September 15, 2005, "Submittal of the Quality Assurance Project Plan and the Health and Safety Plan for Site Decommissioning SCA Hartley & Hartley Landfill Site, Kawkawlin Township, Michigan NRC Source License SUC-1565." [ADAMS Accession No. ML052640183]

8. NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, August 2003.

9. NUREG-1757, Volume 1, Rev 1, Consolidated NMSS Decommissioning Guidance, Decommissioning Process for Materials Licensees, Final Report, September 2003.

10. NUREG-1757, Volume 2, “Consolidated NMSS Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria.” September, 2003.

11. Title 10 Code of Federal Regulations, Part 20, Subpart E, “Radiological Criteria for License Termination.”

12. Earth Tech, Inc. 2003. Remedial Investigation Report. SCA/Hartley & Hartley LandifII, Bay County, Michigan, prepared for SCA Services, Inc. October 2001.

13. MDNR, 2004. Letter dated August 27, 2004, Response to RAI - Tobico Marsh State Game Area Site and Submission of Additional Information Relative to the Decommissioning Plan.

14. NRC, 2002. NMSS Decommissioning Standard Review Plan (NUREG-1727). Division of Waste Management, Office of Nuclear Material Safety and Safeguards U.S. Nuclear Regulatory Commission Washington, DC; September 2002.

15. NRC, 2003. Consolidated NMSS Decommissioning Guidance. NUREG-1757, Volume 2, September 2003. Office of Nuclear Material Safety and Safeguards. Washington, DC.

16. Oak Ridge Associated Universities (ORAU), 1985. Radiological survey of the SCA Chemical Services, Inc., Landfill Site, Bay City, Michigan, July 1985.