
PERMIT ATTACHMENT

APPENDIX XVI

RF-1 UNIT CLOSURE PLAN

This document was not altered from the April
2016 Application.

September 2018

APPENDIX XVI

RF-1 UNIT CLOSURE PLAN

FOR

SIEMENS INDUSTRY, INC.

PARKER REACTIVATION FACILITY

PARKER, ARIZONA

Revision 6
April 2012

APPENDIX XVI

RF-1 CLOSURE PLAN

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928-669-5758**

**April 2012
Revision 6**

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LIST OF ATTACHMENTS

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- 1 WASTE CODES
- 2 EPA INCINERATOR CLOSURE GUIDANCE
- 3 LIST OF CLOSURE COMPOUNDS OF CONCERN
4. RCRA FACILITY COST ESTIMATE

1.0 INTRODUCTION

The Siemens Industry, Inc. (SII) facility accepts spent activated carbon in containers (drums and bulk) from various customers. The spent activated carbon is identified as both hazardous and non-hazardous waste and is managed at the facility in the container storage area, five storage tanks (T1, T2, T5, T6, and T18), and ultimately in the carbon reactivation unit (RF-2). Previously, the spent activated carbon was reactivated using carbon reactivation unit (RF-1), which is now inactive.

The facility, including RF-1, began construction in 1991 and operations commenced in August 1992. The RF-1 unit treated spent activated carbon exclusively during the time of operation. The RF-1 unit was shut down, after wastes were removed, in June of 1996 to allow for the final construction phase and startup of RF-2 in July 1996 to full interim status capacity.

Currently RF-1 does not share any equipment with RF-2. With a few exceptions, all RF-1 equipment (which includes the reactivation furnace, APC equipment/piping, and fan) remains on site.

This Closure Plan covers only the partial closure activities associated with the inactive RF-1 unit. A separate RCRA Facility Closure Plan for the remainder of the SII facility has been prepared which covers activities related to the eventual closure of all other hazardous waste portions of the facility, including all hazardous waste management units (HWMUs) described in the facility's Part A application.

The contents of this RF-1 Closure Plan are based upon, and meet all the criteria set forth in 40 CFR Part 264, Subparts G and H. The goal of this plan is to achieve clean closure of the inactive RF-1 carbon reactivation unit. In short, this means that all hazardous wastes will be removed from the RF-1 unit, and that any releases at or from this unit will be remediated so that further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment. In the event clean closure cannot be achieved, the RF-1 components will be disposed as hazardous waste.

Activities associated with closure of the RF-1 unit will include decontamination of treatment equipment, evaluation of decontamination results (including sampling and analysis, as necessary) to ensure that decontamination is adequate, and certification of closure by the facility owner and/or operator and a registered professional engineer. The Closure Plan also includes a cost estimate and financial assurance mechanism for the closure activities. A Sampling and Analysis Plan (SAP) for closure activities, detailing the collection of samples, laboratory analysis, and interpretation of analytical results is included as a separate appendix to the RCRA Part B Permit Application.

1.1 SITE CONDITIONS

This section describes the existing environment at the location of the facility. Included is information on land features, geologic setting, soils, and water resources. The living resources described include wildlife, vegetation, ecosystems and adjacent agricultural resources. The

available cultural, historic and archeological information for the site is also discussed.

1.1.1 CLIMATE

The climate is typical of the Sonoran Desert Region. Winters are mild with minimum temperatures above freezing. The summers are long, hot, and dry with temperatures commonly exceeding 100°F. Average total precipitation is approximately 3.82 inches per year. Precipitation is sporadic, occurring mainly in the time intervals of July -September and December -February. The evaporation rate in this area is 86 inches per year.

1.1.2 WATER

1.1.2.1 Groundwater

Groundwater in the Parker area occurs as both confined and unconfined aquifers. Most of the wells are completed in the Colorado River gravels (alluvium), where unconfined or water table conditions prevail. The Miocene(?) Fanglelomerate (gravel deposits at base of mountains) and the lower part of the Bouse Formation contain confined aquifers (artesian). The (?) signifies the geological age is not certain. The city wells in Parker obtain most of their water from the Miocene(?) Fanglelomerate. Sources of recharge to the groundwater supply of the area are the Colorado River, precipitation, and underflow from areas bordering the Parker Valley.

In this area, a large amount of the groundwater is lost through evapotranspiration in the Parker area. Direct recharge from precipitation is limited. Loss of water from the Colorado River provides almost 50% of the recharge to the groundwater near Parker.

The groundwater level near Parker is approximately 350 feet. The depth to water in the areas bordering the flood plain ranges from 70 to 300 feet below the land surface.

The production from wells screened in the Colorado River alluvium comes from highly permeable beds of sand and gravel. The Colorado River gravel has the highest transmissivity of the water-bearing sediments in the area. Wells which penetrate sufficient thicknesses of the gravel may produce more than 100 gpm per foot of drawdown (specific capacity).

1.1.2.2 Water Quality

The chemical quality of the groundwater in the Parker area is generally related to the source and movement of the water. The chemical quality of the groundwater is influenced by evaporation, transpiration by native vegetation, former flooding of the river, irrigation developments, and to a marked degree, by the local geology. The groundwater beneath the flood plain is relatively poor in quality, except where irrigation water has entered the aquifer. The shallow groundwater in the non-irrigated part of the valley has twice the mineral content as the Colorado River water.

An explanation for the water composition of many of the wells can be understood by assuming that the groundwater originated as infiltration from the Colorado River associated with irrigation canals, field irrigation, or the river channel. The water composition has been changed by evaporation and concentration.

The results of chemical analyses of water from wells in T.9N.R.20W, near Parker, Arizona show the change. The chloride concentrations for these wells varies between 107 and 208 mg/liter. It is assumed the dissolved minerals now in the ground water must have come from the Colorado River.

1.1.3 GEOLOGY

1.1.3.1 Regional Physiography

The area has a hot, arid climate and is characterized by roughly parallel mountain ranges separated by alluvial basins. The elevation of the basins varies between sea level and 1000 feet. The Colorado River is the major stream in the area. The Colorado River flood plain is between three and nine miles wide. It is less than one mile wide near Parker, and increases to nine miles in the Parker Valley. The flood plain is that part of the Colorado River Valley that has been covered by floods of the Colorado River, prior to construction of Hoover Dam. The elevation of the flood plain near Parker is approximately 360 feet above sea level. The mountains are rugged and rise abruptly from the Colorado River or from alluvial slopes. The highest mountain summits in the region reach an average elevation of around 3300 feet. Between the flood plain and the mountains are piedmont slopes, which are dissected by washes from the mountains and, in a few exceptions, into adjacent and topographically distinct basins. The facility is located on relatively flat terrain (slopes 0-3 percent), and is outside the floodplain.

1.1.3.2 Regional Geology

The geologic units considered important to water resources development near the site are the Miocene(?) Fanglomerate, the Bouse Formation and the alluvium of the Colorado River and its tributaries.

The rocks of the mountains are relatively impermeable, and form the boundaries of the groundwater reservoirs. Interbasin water movement is limited by the impermeable bedrock and limited to groundwater movement in surface sediments, where intermittent surface drainage exits from a basin.

The bedrock includes all rocks older than the Miocene(?) Fanglomerate, and contains sedimentary, metamorphic, and igneous rocks. These Miocene beds are gravel deposits that have eroded from the mountains and filled the basins. The thickness of these beds varies widely across the basins. The Fanglomerate is a potentially important aquifer as near Parker, where wells with a yield of 15 gallons per minute per foot of drawdown have been developed in the Fanglomerate, (Metzger, et al, 1973).

Sediments at the site, identified from geologic maps, are Qe (Eolian Deposits, Holocene) and QTr (Old Fluvial Deposits). Samples taken at the site indicated that only the eolian windblown sand and silt (Qe) are present. The eolian sand is tan to light tan and fine to medium grained, occurring as a deposit on the surface throughout the area.

1.1.3.3 Soils

The descriptions and delineations of soils for the Colorado River Indian Reservation Soil Survey do not always correlate with those of adjacent soil survey maps. The differences are

related to differences in mapping intensity, extent of soils within the survey, change in knowledge about soils, and modifications in soil classification. The soil map shows that the soil present at the site is classified as Superstition series, which is a gravelly loamy fine sand that develops on zero to three percent slopes. Samples collected at the site show the same type of material. Chemical analyses of the soil samples revealed no evidence of any existing site contamination. Vegetation supported by Superstition soils is white bursage, creosotebush, turkshead and big gulleeta.

2.0 SCOPE OF CLOSURE PLAN

The scope of this Closure Plan includes the partial closure of carbon reactivation unit RF-1 and the ancillary equipment associated with carbon reactivation unit RF-1 that will not be utilized for further management of the spent activated carbon, as necessary. Specifically, the items associated with RF-1 to be closed include:

- RF-1 Furnace with Center Shaft and Rabble Arms;
- The Carbon Slurry Lines;
- Tank T-8 Overflow Line;
- Afterburner AB-1;
- Packed Tower Scrubber with Scrubber Packing;
- Induced Draft Fan;
- Spent Carbon Dewatering Screw; and
- Tank T-8.

Table 2-1 identifies the applicable equipment for partial closure. Each piece of equipment to be closed is described in more detail in later sections of this Closure Plan.

In accordance with 40 CFR 264.112(c), this Closure Plan will be reviewed and amended, if necessary, whenever one of the following occurs:

- There is a change in operating plans or facility design that affects the Closure Plan;
- There is a change in the expected year of partial closure; or
- In conducting partial closure activities, unexpected events require a modification of the approved Closure Plan.

If SII and/or EPA determine that the Closure Plan needs to be amended, SII will submit a notification for, or request for, a permit modification based on the classification of the modification. An amended Closure Plan will be submitted as part of the permit modification.

TABLE 2-1. EQUIPMENT/ITEMS FOR CLOSURE

Equipment/Item	Use or Purpose	Size/Design Capacity¹	Hazardous Waste Codes
Carbon Reactivation Unit RF-1 ²	Carbon Reactivation	9.25 foot diameter by 15 feet tall (Surface Area = 494 ft ²)	See Below ¹
RF-1 Carbon Slurry Lines (2) ²	Transfer of Carbon for Reactivation	45 feet by 3 inches	See Below ¹
Tank T-8 Overflow Line ²	Transfer of Water	145 feet by 6 inches	See Below ¹
RF-1 Afterburner AB-1 ²	Treatment of Vapors from Carbon Reactivation	14 feet by 8.33 feet by 8.5 feet (Surface Area = 992 ft ²)	See Below ¹
RF-1 Packed Tower Scrubber ²	Treatment of Vapors from Carbon Reactivation	3.5 foot diameter by 21.25 feet tall	See Below ¹
RF-1 Induced Draft Fan ²	Movement of Vapors from Carbon Reactivation	8.25 feet tall by 4.5 feet wide by 5.75 feet deep	See Below ¹
Tank T-8 ²	Transfer of Carbon for Reactivation	5 foot diameter by 12 feet tall (Surface Area = 228 ft ²)	See Below ¹
RF-1 Spent Carbon Dewatering Screw ²	Transfer of Carbon for Reactivation	4 foot diameter converging in 5 feet to 1 foot diameter for 7 feet	See Below ¹

¹ See Attachment 1 for applicable hazardous waste codes.

² RF-1 equipment includes interconnecting piping, ducts, pumps, valves, sumps, etc.

3.0 GENERAL FACILITY INFORMATION

The following is general information pertaining to the SII facility:

Facility Name: Siemens Industry, Inc.

Address: 2523 Mutahar Street
Parker, Arizona 85344

Facility Contact: Monte McCue, Director – Plant Operations

Telephone Number: (928) 669-5758

EPA ID Number: AZD 982 441 263

4.0 WASTE PHYSICAL PROPERTIES AND EQUIPMENT EVALUATION

This section of the Closure Plan provides a description of the waste streams managed at the RF-1 unit, and an evaluation of the equipment associated with the RF-1 carbon reactivation unit.

4.1 WASTE PHYSICAL PROPERTIES

The sole hazardous waste stream managed at the RF-1 unit consists of spent activated carbon. The waste codes associated with this waste stream are identified in Attachment 1.

This waste stream is a solid at ambient temperatures. Steam or water is normally used as the solvent for decontamination of equipment used for managing this waste stream.

4.2 EQUIPMENT EVALUATION

SII has evaluated the management of this waste stream for development of this Closure Plan. This evaluation defined the following equipment for consideration: (1) carbon reactivation unit RF-1; and (2) the ancillary equipment associated with carbon reactivation unit RF-1 that will not be utilized for further management of the spent activated carbon. The evaluation process is discussed in the following sections.

4.2.1 CARBON REACTIVATION UNIT RF-1 SUMMARY

The RF-1 carbon reactivation unit is constructed of steel and is approximately 9.25 feet in diameter by 15 feet tall in size (Internal Surface Area = approximately 494 ft²). The RF-1 carbon reactivation unit includes a center shaft with rabble arms to agitate the spent carbon. Containment for the carbon reactivation unit is provided and is constructed of reinforced concrete with perimeter dikes to prevent migration of spillage, leakage, or contaminated storm water. The containment has regularly been inspected by Siemens and is free of cracks and gaps, which will prevent migration of materials through the concrete. The containment is also utilized for Carbon Reactivation Unit RF-2 and is therefore not applicable to the scope of this closure. The containment will be closed as part of the “facility wide” closure.

4.2.2 CARBON SLURRY LINES SUMMARY

The Carbon Slurry Lines associated with RF-1 are two pipes constructed of carbon steel. Each line is approximately 45 feet long and 3 inches in diameter.

4.2.3 TANK T-8 OVERFLOW LINE SUMMARY

The Tank T-8 Overflow Line associated with RF-1 is one pipe constructed of carbon steel. The line is approximately 145 feet long and 6 inches in diameter.

4.2.4 AFTERBURNER AB-1

Afterburner AB-1 is constructed of steel and is approximately 14 feet by 8.33 feet by 8.5 feet tall in size (Internal Surface Area = approximately 992 ft²). There is no additional

equipment associated with Afterburner AB-1.

4.2.5 PACKED TOWER SCRUBBER WITH SCRUBBER PACKING

The Packed Tower Scrubber is constructed of reinforced fiberglass plastic and is approximately 3.5 feet in diameter by 21.25 feet tall in size. The Packed Tower Scrubber contains approximately 7 cubic yards of plastic scrubber packing.

4.2.6 INDUCED DRAFT FAN

The Induced Draft Fan is constructed of steel and is approximately 8.25 feet tall by 4.5 feet wide by 5.75 feet deep in size. There is no additional equipment associated with the Induced Draft Fan.

4.2.7 SPENT CARBON DEWATERING SCREW

The Spent Carbon Dewatering Screw is constructed of steel and is approximately 4 feet in diameter converging within 5 feet to 1 foot in diameter for another 7 feet in length. There is no additional equipment associated with the Spent Carbon Dewatering Screw.

4.2.8 TANK T-8

Tank T-8 was the spent carbon feed hopper for RF-1 reactivation furnace. It is constructed of stainless steel (316 SS) and is approximately 5 feet by 12 feet in size.

5.0 CLOSURE REQUIREMENTS

SII has prepared this Closure Plan in compliance with the 40 CFR 264 Subparts G, and X requirements. Closure shall be performed in such a manner as to:

- Minimize the need for further maintenance;
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous wastes, hazardous leachates, contaminated runoff, or hazardous waste decomposition products to the groundwater, surface water, or the atmosphere;
- Comply with the closure requirements of 40 CFR 264 Subpart G, including, but not limited to, the requirements of 40 CFR 264 Subpart X for the carbon reactivation unit; and
- Confirm that any structures left in place on site meet the performance standards established for site closure.

The closure of the RF-1 unit will be accomplished by:

- Decontaminating all contaminated equipment and associated structures to specified closure performance standards;
- Verifying whether equipment has been decontaminated successfully based on the intended disposition;
- Dismantling and removing equipment that has either been decontaminated successfully or will be disposed.

5.1 CLEAN CLOSURE PERFORMANCE STANDARDS

5.1.1

Process equipment includes such items as piping, pumps, valves, the carbon reactivation furnace vessels, interconnecting ductwork, and air pollution control equipment. Process equipment will be considered clean closed if the decontaminated surfaces meet the Clean Debris Surface Standard (40 CFR 268.45, Table 1, Section A.1.e).

In smaller equipment items, where surfaces are not amenable to thorough visual inspection, a sample of the final decontamination rinsate from each item (or batch of small equipment items) will be collected and analyzed for a set of selected contaminants of concern (COCs). Those analytical results will be compared to the analytical results of decontamination water before it is used. If the COC concentration of the final rinsate sample is equal to or less than the COC concentration of the unused decontamination water (with 95% confidence) the equipment will be confirmed to be decontaminated.

5.2 ALTERNATIVE TO MEETING CLEAN CLOSURE PERFORMANCE STANDARDS

For some or all of the items subject to closure, SII may choose to dismantle the item and dispose of it as hazardous waste or as hazardous debris at an appropriate TSDF. Disposal

in this manner may be done if decontamination efforts are not sufficient to satisfy the clean closure performance standards described above, or may be done instead of decontamination. In either of these cases, the removal of the contaminated item constitutes clean closure, rather than decontamination and evaluation against the performance standards described above.

6.0 CLOSURE ACTIVITIES

This section describes both the general and specific closure activities for the carbon reactivation unit RF-1.

6.1 GENERAL CLOSURE ACTIVITIES

The following sections of the Closure Plan are written from the perspective that third party contractors will perform the closure activities in conjunction with site personnel. The closure costs identified in Section 11.0 were developed based on the “worst case” scenario of only using contractors. SII may perform the closure activities using SII personnel (except for the Professional Engineer). In addition, the following sections are written assuming that metallic components can be scrapped rather than being disposed. The cost estimates include the cost of dismantling each major piece of equipment identified in Table 2-1, but do not include any credit which may be realized from the sale of scrap materials.

SII will utilize contractors to ensure that all activities are performed to minimize the need for future maintenance, maximize, to the extent necessary, the protection of human health and the environment, and eliminate post-closure escape of hazardous waste, hazardous constituents, contaminated run-off and/or hazardous waste decomposition products.

SII will utilize facility health and safety and waste management procedures to address the following items prior to initiating closure:

- (1) PPE and respiratory protection criteria;
- (2) Air monitoring methods and techniques;
- (3) Run-on/off controls for site activities;
- (4) Site safety meeting criteria and schedule;
- (5) Detailed site organization responsibilities;
- (6) Impermeable barrier techniques and materials to be used to protect non-closure affected areas;
- (7) Waste handling methods;
- (8) Site material storage scenarios to segregate hazardous and nonhazardous materials;
- (9) Fire protection mechanisms and techniques;
- (10) Site specific Contingency Plan to address potential response activities;
- (11) Proof of training and medical monitoring to satisfy OSHA compliance; and
- (12) Certification and permits for any subcontractor services (if necessary).

In general, the closure activities will be performed during daylight hours. Also, site activities will be scheduled to allow personnel to secure the closure areas before leaving each day. A 10 hour workday is anticipated.

In the event that specific closure activities do not allow a safe or effective shutdown and activities are required to be performed at night, SII will provide the necessary lighting and equipment to complete the work in a safe manner.

Contractors will perform all Confined Space activities pursuant to a Confined Space Entry program. Similar criteria are applicable for the Lock-Out/Tag-Out programs associated with confined space activities. The closure site boundary will be clearly delineated by barricades, signs, and other markers, as necessary, to ensure closure site security. Site security mechanisms will be installed at the end of each working day.

A site-specific Health and Safety Plan (HASP) will be developed by the contractor hired to perform the closure activities.

During the closure activities, utilities (i.e., electricity, water, steam, etc.) will be provided by SII. The closure cost estimate includes the costs for providing these utility services.

All debris and other miscellaneous materials will be collected and stored as necessary on a daily basis. No waste, hazardous or otherwise, will be left in the unit to be closed at closure completion. Site inspection will be performed to ensure that all hazardous waste and residuals are removed from the closure area to prevent any post-closure escape of hazardous waste, hazardous constituents, contaminated run-off, or hazardous waste decomposition products that could potentially affect groundwater, surface waters, or the atmosphere.

Site activities will be performed with the necessary barricades to prevent migration of hazardous waste during closure activities. This includes all site storage areas, temporary decontamination stations, etc. Potential prevention methods and equipment include:

- Silt fences;
- Straw boundary barricades; and
- Temporary decontamination stations, etc.

Spill response activities will be specified per the SII Contingency Plan. Berm construction will consist of the use of visqueen and/or HDPE liners placed on the containment pad nearest to the equipment, anchored by weights such as sand, oil dry, or other suitable materials. Lay down areas will include only the area within containment, and direct placement into the macroencapsulation debris roll-off boxes, where used. The macroencapsulation debris roll-off boxes will be placed in the vicinity of the equipment being dismantled.

Temporary barriers, liners, etc. will be utilized during closure activities to prevent contamination of soil or groundwater. Inspections will be performed to address potential contributions from closure activities. Evidence of potential contributions will initiate immediate corrective action activities.

An independent Registered Professional Engineer will confirm that all closure activities have been performed in accordance with the approved Closure Plan. This individual will be responsible for making site inspections, on an as needed basis, for confirmation of certification requirements. The engineer will ensure that all activities are being performed pursuant to the Closure Plan and in compliance with 40 CFR 264 Subparts G and X.

6.2 SPECIFIC CLOSURE ACTIVITIES

This section identifies the specific closure activities for the container storage area, the storage tanks and their associated ancillary equipment, and the carbon reactivation unit.

Decontamination activities during closure will include the following:

- Piping, pumps, valves, and other small equipment will be decontaminated and either sold for reuse, recycled, or disposed as nonhazardous waste, or transported offsite to an appropriate TSDF for disposal.
- Contaminated structures and associated equipment will be decontaminated, if possible, to achieve the closure performance standards if they are to be left on-site. As an option, contaminated structures and associated equipment that may not be decontaminated will be demolished and/or cut up, and transported offsite as a hazardous waste to an appropriate TSDF.
- All equipment, including mobile equipment and earth moving equipment that comes in contact with hazardous waste constituents during closure, will be decontaminated using detergent and water (or water alone), before leaving the contaminated area or removal from the facility.
- Any residues generated during decontamination activities will be handled in accordance with all applicable hazardous waste requirements of 40 CFR 261, 262, 263, and 268.34.
- Rinse water and wastewater generated during decontamination activities will be treated in the on-site wastewater treatment unit and discharged to the POTW.

Depending on the type and condition of each surface to be decontaminated, one or more of the following technologies will be utilized for decontamination:

- Physically scraping the surfaces with appropriate hand tools to remove attached materials;
- Rinsing with low-pressure water or a detergent/surfactant cleaning solution to remove scaling and surface debris;
- Hydroblasting and/or pressure washing with high-pressure water to scour the surface to remove contaminants and carry them away from the surface; or
- Steam cleaning to remove contaminants that cannot be adequately removed by other means.

Carbon Reactivation Unit RF-1 has been removed from service and is not utilized for further management of spent activated carbon. Therefore, the material remaining in the carbon reactivation unit is residual in nature. Decontamination and partial closure activities associated with the carbon reactivation unit will be limited to those surfaces that the waste stream contacted or potentially contacted. These will include the internals of the carbon reactivation unit.

Residuals potentially generated during decontamination activities may include drips, leaks, and spills. These will be collected in containers, liners, pads, and absorbent materials, as necessary, for any drips, leaks, or spills that occur. Any residuals generated will be cleaned up immediately to maintain site integrity. All residuals will be consolidated for off-site disposal as hazardous waste.

Operators and all other personnel involved in work activities will be equipped with the proper PPE during all closure activities. Personnel will be made aware of the proper PPE as well as the proper operating techniques of all pumps, trucks, blenders, etc. necessary to perform the activity prior to implementation. PPE will be collected in designated containers for off-site disposal.

The following closure activities associated with the decontamination of the carbon reactivation unit and associated equipment identified in Table 2-1 will be performed:

- Any remaining liquid and sludge will be removed from the carbon reactivation unit off gas treatment equipment using physical (e.g., pumping, etc.) means. Liquids will be treated in the in-house wastewater treatment system prior to being discharged to the POTW. Sludges will be placed into a roll-off box for macroencapsulation and disposal as hazardous debris;
- The carbon reactivation unit and downstream equipment will be purged of vapor and the carbon reactivation unit will be opened to allow access to personnel;
- Confined Space Entry procedures will be utilized;
- Lock-Out/Tag-Out procedures will be utilized;
- Contractors will enter the carbon reactivation unit and downstream equipment and remove any residual material (sludge, carbon, or slag) through physical means using hand tools;
- Scrubber packing will be physically removed and placed in a roll-off box for macroencapsulation for disposal as hazardous debris;
- Residual sludge, activated carbon, and slag should be minimal based on experience with periodic maintenance of the unit, and will be placed into roll-off boxes for macroencapsulation, or a 55-gallon drum of incinerables for off-site disposal;
- The refractory in the RF-1 furnace, afterburner, and connecting ductwork will be removed using hand tools and placed into a roll-off box for disposal as hazardous debris using macroencapsulation;
- Pressure washing and/or steam will be used to remove any remaining contamination until the carbon reactivation unit and downstream equipment meets the closure performance standards. Decontamination fluids will be collected and treated through the in-house wastewater treatment system prior to discharge to the POTW;
- For small equipment items that are not amenable to thorough visual inspection, a sample of the final rinsate will be collected and analyzed for confirmation that the performance standards have been met.

Upon completion of the decontamination activities, the carbon reactivation unit and associated equipment will be inspected to ensure the internals meet the closure

performance standards. The outside of each equipment item and surrounding areas will also be inspected (and decontaminated, if necessary).

Once the carbon reactivation unit and associated equipment have been determined to be cleaned, equipment will be dismantled. Metallic items will be scrapped. Fiberglass, plastic, and other non-metallic components will be disposed of as non-hazardous debris. Packed scrubber internals will be macroencapsulated and disposed of as hazardous debris.

The following miscellaneous decontamination items will be considered during the carbon reactivation unit closure activities:

- Disposable tools (i.e., brushes, etc.) and PPE will be collected in a designated area for off-site disposal as hazardous waste; and
- Non-disposable tools (i.e., wrenches, etc.) will be decontaminated with detergent and water (or water alone), prior to leaving the closure area.

7.0 SAMPLING AND ANALYSIS

SII has utilized the EPA Guidance Document “Draft of Guidance of Incinerator Closure” (June 29, 1990) in the preparation of this Closure Plan. A copy of this guidance is presented in Attachment 2. It is suggested by USEPA to utilize the techniques discussed in this document to clean close all combustion related facilities. In this document, EPA recommends (in the section entitled “Approach to Incinerator Closure”) operating the thermal equipment at or above minimum permit temperatures for a period of four hours to remove organic contaminants from the system. The guidance also suggests using a water rinse to remove residual inorganic contaminants to decontaminate equipment. Prior to taking the RF-1 unit out of service, it was operated at temperature, without treating spent activated carbon, to remove organic contaminants.

As described in detail in Section 6.0, decontaminated surfaces will be visually examined to determine if the Clean Debris Surface Standard of 40 CFR 268.45 Table 1, Section A is met. For equipment and other items that are not amenable to a thorough visual inspection, samples of the final rinse for each piece or batch of equipment/items will be obtained for comparison to the decontamination standards. A summary list of the samples to be obtained is provided as Table 7-1. The samples will be obtained in accordance with a site specific “Sampling and Analysis Plan” (SAP) contained in a separate appendix to the RCRA Part B Permit Application. In addition, the samples will be handled and analyzed in accordance with site specific “Quality Assurance Objectives” which are addressed in the SAP. The SAP identifies items such as the appropriate sample containers, sampling techniques, sample preservation, chain-of-custody procedures, specific analytical procedures, and detailed QA/QC procedures, etc. General information for sample analysis and QA/QC is provided with this closure plan.

Each of the samples identified in Table 7-1 will be analyzed for a set of selected Compounds of Concern (COCs) that will be used to assess the decontamination of equipment/items. Based on a review of the waste codes received at the site (Attachment 1) and the constituents associated with those codes, SII has selected COCs for closure purposes.

Those selections include metals, halogenated volatile organics, aromatic and unsaturated volatile organics, nonhalogenated volatile organics, halogenated and nonhalogenated semivolatile organics, polyaromatic compounds, phenolic compounds, nitriles, nitrogen and phosphorous containing pesticides, and organochlorine and other organohalide pesticides. The closure COCs are listed in Attachment 3.

TABLE 7-1. SAMPLES FOR CLOSURE CERTIFICATION

ITEM	ESTIMATED NUMBER OF SAMPLES TO BE OBTAINED	ANALYSES
Carbon Reactivation Unit		
Equipment rinsate (RF-1 furnace and afterburner)	2 (1 small equipment batch for each RF-1 furnace/ afterburner, and APCD/Fan/Stack)	Metals ¹
Equipment rinsate (Tank T-8)	1	Metals ¹ , Organics ²
Un-used decontamination water	3	Metals ¹ , Organics ²

Sample analyses:

¹ Metals by SW-846 Methods 6010 and 7470, for the target metal analytes listed in Attachment 3.

² Organics by SW-846 Methods 8260, 8270, and 8141 for the compounds listed in Attachment 3.

In all cases, the latest version of the analytical methods will be used.

For equipment or other items that cannot be adequately inspected or may not meet the Clean Debris Surface Standard of 40 CFR 268.45 Table 1, Section A, a sample of the final rinsate from the decontamination process associated with each piece of equipment/item will be collected, and the analytical results for the metal and organic COCs will be compared to the analysis of unused decontamination water.

Equipment/items meeting the clean closure performance standards defined in Section 5.0 of this document will be deemed to be clean and can be removed from RCRA Subtitle C regulation. For equipment/items not meeting the clean closure performance standards, the facility will perform additional decontamination (i.e., repeat the decontamination as specified for that piece of equipment/item) and re-evaluate the decontaminated equipment/item against the clean closure performance standards.

If, after a number of attempts are made to decontaminate equipment/items and the clean closure performance standards are not met, the facility will dispose of the equipment/item off-site as hazardous waste.

Rather than decontaminating equipment/items, the facility may alternatively elect to ship the piece of equipment/item offsite for treatment/disposal as a hazardous waste. This would remove the equipment/item from the site. Therefore no threat to human health or the environment would be applicable for that piece of equipment at the facility. This decision would be based on the size and geometry of the equipment/item, the cost of treatment and/or disposal, the cost of further decontamination, etc.

8.0 CLOSURE SCHEDULE

The closure activities, as necessary, are scheduled to be performed in general accordance with the following schedule:

Task	Days
Notification of Closure to Regulatory Agency	0 (initiating period)
A. Preparation of Closure Bid Package	7 days (calendar)
B. Submission and Contractor Review	7 days
C. Site Visit for Contractors	7 days
D. Contractor Bid Package Preparation/Submittal	14 days
E. Contractor Award/Contract/Notice to Proceed	7 days
F. Contractor Mobilization	14 days
G. Closure Activity Implementation	60 days
i. Carbon Reactivation Unit RF-1 Decontamination (30 days)	
ii. Ancillary Equipment Decontamination (30 days)	
H. Obtain Sample Results	30 days
I. Force Majeure	14 days
J. Schedule Contingency	<u>20</u>
	<u>days</u>
TOTAL	180 days (calendar)
TOTAL ALLOWED TIME	180 days

This schedule will be utilized for the closure of the carbon reactivation unit RF-1 and associated ancillary equipment. Certain activities may be conducted concurrently. The facility will notify EPA of the intent to initiate closure as specified in Section 9.0.

9.0 CLOSURE ACTIVITY NOTIFICATION

SII will notify the EPA in writing at least 60 days prior to the date that SII expects to initiate closure of the RF-1 unit. SII will complete all closure activities within 180 days of initiating closure in accordance with the approved Closure Plan. An extension may be requested if SII determines that additional time will be necessary to complete closure.

10.0 CERTIFICATION OF CLOSURE

In accordance with the requirements of 40 CFR 264.115, within sixty (60) days of completing closure, SII will notify the EPA, by registered mail, that closure activities have been completed in compliance with the specifications of the approved Closure Plan by submission of a Certification of Closure.

The Certification of Closure will include signatures from the SII Owner/Operator and the independent Registered Professional Engineer. SII will retain documentation necessary to support the independent Registered Professional Engineer's certification. Support documentation will be submitted to the EPA on request.

Financial assurance documentation will be retained by SII until the EPA has officially released SII from the financial assurance requirements for Final Closure as required by 40 CFR 264.143(i) and SII confirms receipt of this release. In addition, upon receipt of this release, SII will consider the carbon reactivation unit RF-1 closed and all permit requirements identified in the RCRA permit related to RF-1 and its associated equipment will cease to apply.

11.0 CLOSURE COST ESTIMATE

The cost estimate for performing the above closure activities pertaining to the carbon reactivation unit RF-1 is included as Attachment 4 of this Closure Plan.

Note: Analytical costs have been estimated on the following basis:

Metals (excluding Hg) \$200/analysis

Mercury \$45/analysis

Volatile organics \$195/analysis

Semivolatile organics \$370/analysis

Nitrogen and phosphorous pesticides \$200/analysis

12.0 FINANCIAL ASSURANCE

The financial assurance mechanism currently in effect for closing the entire facility is included as Appendix XVIII of the RCRA Part B Permit Application.

ATTACHMENT 1

WASTE CODES

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	WASTE DESCRIPTION
D001	A SOLID WASTE THAT EXHIBITS THE CHARACTERISTIC OF IGNITABILITY
D004	ARSENIC
D005	BARIUM
D006	CADMIUM
D007	CHROMIUM
D008	LEAD
D009	MERCURY
D010	SELENIUM
D011	SILVER
D012	ENDRIN
D013	LINDANE
D014	METHOXYCHLOR
D015	TOXAPHENE
D016	2,4-D
D017	2,4,5-(SILVEX)
D018	BENZENE
D019	CARBON TETRACHLORIDE
D020	CHLORDANE
D021	CHLOROBENZENE
D022	CHLOROFORM
D023	O-CRESOL
D024	M-CRESOL
D025	P-CRESOL
D026	CRESOL
D027	1,4-DICHLOROBENZENE
D028	1,2-DICHLOROETHANE
D029	1,1-DICHLOROETHYLENE
D030	2,4-DITROTOLUENE
D031	HEPTACHLOR (AND ITS EPOXIDE)
D032	HEXACHLOROBENZENE
D033	HEXACHLOROBUTADIENE
D034	HEXACHLOROETHANE
D035	METHYL ETHYL KETONE
D036	NITROBENZENE
D037	PENTRACHLOROPHENOL

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
D038	PYRIDINE
D039	TETRACHLOROETHYLENE
D040	TRICHLOROETHYLENE
D041	2,4,5-TRICHLOROPHENOL
D042	2,4,6-TRICHLOROPHENOL
D043	VINYL CHLORIDE
F001	SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, CHLORINATED FLUOROCARBONS; AND MIXTURES/BLENDS CONTAINING A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) BEFORE USE OF ONE OR MORE OF THE ABOVE SOLVENTS OR SOLVENTS LISTED IN F002, F004 AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF SPENT SOLVENTS AND MIXTURES
F002	TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLOROETHANE; AND MIXTURES/BLENDS CONTAINING A TOTAL OF 10% OR MORE (BY VOLUME) BEFORE USE OF ONE OR MORE OF THE ABOVE SOLVENTS OR SOLVENTS LISTED IN F002, F004 AND F005 AND STILL BOTTOMS FROM RECOVERY OF SPENT SOLVENTS AND MIXTURES
F003	XYLENE, ACETONE ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANANE, METHANOL; MIXTURES/BLENDS OF ABOVE; AND 10% OR MORE (BY VOLUME) OF F001, F002, F004, F005; AND STILL BOTTOMS FROM RECOVERY OF SPENT SOLVENTS
F004	CRESOLS AND CRESYLIC ACID, NOTROBENZENE; SOLVENT MIXTURES/BLENDS OF 10% OR MORE BEFORE USE OF ONE OR MORE OF ABOVE OR F001, F002, F005; STILL BOTTOMS FROM RECOVERY OF SPENT SOLVENTS
F005	TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, 2-NITROPROPANE; MIXTURES/BLENDS OF 10% OR MORE (BY VOLUME) OF ABOVE OR SOLVENTS LISTED IN F001, F002, F004 AND STILL BOTTOMS FROM RECOVERY OF SOLVENTS
F006	WASTEWATER TREATMENT SLUDGES FROM ELECTROPLATING OPERATIONS EXCEPT FROM SULFURIC ACID ANODIZING OF ALUMINUM; TIN PLATING ON CARBON STEEL; ZINC PLATING ON CARBON STEEL; ALUMINUM, ZINC ALUMINUM PLATING ON CARBON STEEL; CLEANING/STRIPPING ASSOCIATED WITH TIN, ZINC AND ALUMINUM PLATING ON CARBON STEEL; AND CHEMICAL ETCHING AND MILLING OF ALUMINUM
F012	QUENCHING WASTEWATER TREATMENT SLUDGES FROM METAL HEAT TREATING OPERATIONS WHERE CYANIDES ARE USED
F019	WASTEWATER TREATMENT SLUDGES FROM CHEMICAL CONVERSION COATING OF ALUMINUM EXCEPT ZIRCONIUM PHOSPHATING IN ALUMINUM CAN WASHING

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	WASTE DESCRIPTION
F025	CONDENSED LIGHT ENDS, SPENT FILTERS AND AIDS, SPENT DESICCANT WASTES FROM PRODUCTION OF CERTAIN CHLORINATED ALIPHATIC HYDROCARBONS (HAVING CARBON CHAIN LENGTHS RANGING FROM 1-5 WITH VARYING AMOUNTS AND POSITIONS OF CHLORINE SUBSTITUTION) BY FREE RADICAL CATALYZED PROCESSES.
F035	WASTEWATERS, PROCESS RESIDUALS, PRESERVATIVE DRIPPAGE, AND SPENT FORMULATIONS FROM WOOD PRESERVING PROCESS GENERATED AT PLANTS THAT USE INORGANIC PRESERVATIVES CONTAINING ARSENIC OR CHROMIUM. DOES NOT INCLUDE K001 BOTTOM SEDIMENT SLUDGE FROM TREATMENT OF WASTEWATER FROM WOOD PRESERVING PROCESSES USING CREOSOTE AND/OR PENTACHLOROPHENOL
F037	PETROLEUM REFINERY PRIMARY OIL/WATER/SOLIDS SEPARATION SLUDGE. SLUDGE FROM GRAVITATIONAL SEPARATION OF OIL/WATER/SOLIDS DURING STORAGE OR TREATMENT OF PROCESS WASTEWATERS AND OILY COOLING WASTEWATERS FROM PETROLEUM REFINERIES. (OIL/WATER/SOLIDS SEPARATORS; TANKS AND IMPOUNDMENTS; DITCHES/CONVEYANCES; SUMPS; STORMWATER UNITS. SLUDGES FROM NON-CONTACT ONCE-THROUGH COOLING WATERS, SLUDGES FROM AGGRESSIVE BIOLOGICAL TREATMENT UNITS, K051 WASTES
F038	PETROLEUM REFINERY SECONDARY (EMULSIFIED) OIL/WATER/SOLIDS SEPARATION SLUDGE-ANY SLUDGE AND/OR FLOAT GENERATED FROM THE PHYSICAL AND/OR CHEMICAL SEPARATION OF OIL/WATER/SOLIDS IN PROCESS WASTEWATERS AND OILY COOLING WASTEWATERS FROM PETROLEUM REFINERIES. SUCH WASTES INCLUDE, BUT ARE NOT LIMITED TO, ALL SLUDGES AND FLOATS GENERATED IN: INDUCED AIR FLOTATION (IAF) UNITS, TANKS AND IMPOUNDMENTS, AND ALL SLUDGES GENERATED IN DAF UNITS. SLUDGES GENERATED IN STORMWATER UNITS THAT DO NOT RECEIVE DRY WEATHER FLOW, SLUDGES GENERATED FROM NON-CONTACT ONCE-THROUGH COOLING WATERS SEGREGATED FOR TREATMENT FROM OTHER PROCESS OR OILY COOLING WATERS, SLUDGES AND FLOATS GENERATED IN AGGRESSIVE BIOLOGICAL TREATMENT UNITS (INCLUDING SLUDGES AND FLOATS GENERATED IN ONE OR MORE ADDITIONAL UNITS AFTER WASTEWATERS HAVE BEEN TREATED IN AGGRESSIVE BIOLOGICAL TREATMENT UNITS) AND F037, K048, AND K051 WASTES ARE NOT INCLUDED IN THIS LISTING.
F039	LEACHATE FROM DISPOSAL OF MORE THAN ONE RESTRICTED WASTE (HAZARDOUS UNDER SUBPART D; RESULTING FROM THE DISPOSAL OF ONE OR MORE OF EPA HAZARDOUS WASTES: F020, F021, F022, F026, F027, AND/OR F028)
K001	WASTEWATER TREATMENT SLUDGE BOTTOM SEDIMENT THAT USE CREOSOTE AND/OR PENTACHLOROPHENOL
K002	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF CHROME YELLOW AND ORANGE PIGMENTS
K003	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF MOLYBDATE ORANGE PIGMENTS
K004	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF ZINC YELLOW PIGMENTS

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	WASTE DESCRIPTION
K005	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF CHROME GREEN PIGMENTS
K006	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF CHROME OXIDE GREEN PIGMENTS (ANHYDROUS AND HYDRATED)
K007	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF IRON BLUE PIGMENTS
K008	OVEN RESIDUE FROM PRODUCTION OF CHROME OXIDE GREEN PIGMENTS
K009	DISTILLATION BOTTOMS FROM THE PRODUCTION OF ACETALDEHYDE FROM ETHYLENE
K010	DISTILLATION SIDE CUTS FROM PRODUCTION OF ACETALDEHYDE FROM ETHYLENE
K014	VICINALS FROM THE PURIFICATION OF TOLUENEDIAMINE IN THE PRODUCTION OF TOLUENEDIAMINE VIA THE HYDROGENATION OF DINITROTOLUENE
K015	STILL BOTTOMS FROM DISTILLATION OF BENZYL CHLORIDE
K016	HEAVY ENDS OR DISTILLATION RESIDUES FROM PRODUCTION OF CARBON TETRACHLORIDE
K017	HEAVY ENDS (STILL BOTTOMS) FROM PURIFICATION COLUMN IN PRODUCTION OF EPICHLOROHYDRIN
K018	HEAVY ENDS FROM FRACTIONATION COLUMN IN ETHYL CHLORIDE PRODUCTION
K019	HEAVY ENDS FORM THE DISTILLATION OF ETHYLENE DICHLORIDE IN ETHYLENE DICHLORIDE PRODUCTION
K020	HEAVY ENDS FROM DISTILLATION OF VINYL CHLORIDE IN VINYL CHLORIDE MONOMER PRODUCTION
K022	DISTILLATION BOTTOM TARS FROM PRODUCTION OF PHENOL/ACETONE FROM CUMENE
K023	DISTILLATION LIGHT ENDS FROM PRODUCTION OF PHTHALIC ANHYDRIDE FROM NAPHTHALENE
K024	DISTILLATION BOTTOMS FROM PRODUCTION OF PHTHALIC ANHYDRIDE FROM NAPHTHALENE
K025	DISTILLATION BOTTOMS FROM THE PRODUCTION OF NITROBENZENE BY THE NITRATION OF BENZENE
K026	STRIPPING STILL TAILS FROM PRODUCTION OF METHY ETHYL PYRIDINES
K029	WASTE FROM PRODUCT STEAM STRIPPER IN PRODUCTION OF 1,1,1-TRICHLOROETHANE
K030	COLUMN BOTTOMS OR HEAVY ENDS FROM COMBINED PRODUCTION OF TRICHLOROETHYLENE AND PERCHLOROETHYLENE
K031	BY-PRODUCT SALTS GENERATED IN PRODUCTION OF MSMA AND CACODYLIC ACID
K032	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF CHLORDANE
K033	WASTEWATER TREATMENT AND SCRUB WATER FROM CHLORINATION OF CYCLOPENTADIENE IN PRODUCTION OF CHLORDANE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	WASTE DESCRIPTION
K034	FILTER SOLIDS FROM FILTRATION OF HEXACHLOROCYCLOPENTADIENE IN PRODUCTION OF CHLORDANE
K035	WASTEWATER TREATMENT SLUDGES GENERATED IN PRODUCTION OF CREOSOTE
K036	STILL BOTTOMS FROM TOLUENE RECLAMATION DISTILLATION IN PRODUCTION OF DISULFOTON
K037	WASTEWATER TREATMENT SLUDGES FROM PRODUCTION DISULFOTON
K038	WASTEWATER FROM WASHING AND STRIPPING OF PHORATE PRODUCTION
K039	FILTER CAKE FROM FILTRATIN OF DIETHYLPHOSPHORODITHIOIC ACID IN PRODUCTION OF PHORATE
K040	WASTEWATER TREATMENT SLUDGE FROM PRODUCTION OF PHORATE
K041	WASTEWATER TREATMENT SLUDGE FORM PRODUCTION OF TOXAPHENE
K042	HEAVY ENDS OR DISTILLATION RESIDUES FROM DISTILLATION OF TETRACHLOROBENZENE IN PRODUCTION OF 2,4,5-T
K046	WASTEWATER TREATMENT SLUDGES FROM THE MANUFACTURING, FORMULATION AND LOADING OF LEAD-BASED INITIATING COMPOUNDS.
K048	DISSOLVED AIR FLOTATION FLOAT FROM PETROLEUM REFINING INDUSTRY
K049	SLOP OIL EMULSION SOLIDS FROM PETROLEUM REFINING INDUSTRY
K050	HEAT EXCHANGER BUNDLE CLEANING SLUDGE FROM PETROLEUM REFINING INDUSTRY
K051	API SEPARATOR SLUDGE FROM PETROLEUM REFINING INDUSTRY
K052	TANK BOTTOMS (LEADED) FROM PETROLEUM REFINING INDUSTRY
K061	EMISSION CONTROL DUST/SLUDGE FROM PRIMARY PRODUCTION OF STEEL IN ELECTRIC FURNACES
K064	ACID PLANT BLOWDOWN SLURRY/SLUDGE RESULTING FROM THE THICKENING OF BLOWDOWN SLURRY FROM PRIMARY COPPER PRODUCTION
K065	SURFACE IMPOUNDMENT SOLIDS CONTAINED IN AND DREDGED FROM SURFACE IMPOUNDMENTS AT PRIMARY LEAD SMELTING FACILITIES.
K066	SLUDGE FROM TREATMENT OF PROCESS WASTEWATER AND/OR ACID PLANT BLOWDOWN FROM PRIMARY ZINC PRODUCTION
K071	BRINE PURIFICATION MUDS FROM MERCURY CELL PROCESS IN CHLORINE PRODUCTION WHERE SEPARATELY PREPURIFIED BRINE IS NOT USED
K073	CHLORINATED HYDROCARBON WASTE FROM PURIFICAITON STEP OF THE DIAPHRAGM CELL PROCESS USING GRAPHITE ANODES IN CHLORINE PRODUCTION
K083	DISTILLATION BOTTOMS FROM ANILINE PRODUCTION
K084	WASTEWATER TREATMENT SLUDGES GENERATED DURING PRODUCTION OF VETERINARY PHARMACEUTICALS FROM ARSENIC OR ORGANO-ARSENIC COMPOUNDS
K085	DISTILLATION OR FRACTIONATION COLUMN BOTTOMS FROM PRODUCTION OF CHLOROBENZENES

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	WASTE DESCRIPTION
K086	SOLVENT WASHES AND SLUDGES, CAUSTIC WASHES AND SLUDGES, OR WATER WASHES AND SLUDGES FROM CLEANING TUBS AND EQUIPMENT USED IN FORMULATION OF INK FROM PIGMENTS, DRIERS, SOAPS, STABILIZERS CONTAINING CHROMIUM AND LEAD
K087	DECANTER TANK TAR SLUGE FROM COKING
K088	SPENT POTLINERS FROM PRIMARY ALUMINUM REDUCTION
K090	EMISSION CONTROL DUST OR SLUDGE FROM FERROCHROMIUMSILICON PRODUCTION
K091	EMISSION CONTROL DUST OR SLUDGE FROM FERROCHROMIUM PRODUCTION
K093	DISTILLAION LIGHT ENDS FROM PRODUCTION OF PHTHALIC ANHYDRIDE FROM ORTHO-XYLENE
K094	DISTILLATION BOTTOMS FROM PRODUCTION OF PHTHALIC ANHYDRIDE FROM ORTHO-XYLENE
K095	DISTILLAION BOTTOMS FROM PRODUCTION OF 1,1,1-TRICHLOROETHANE
K096	HEAVY ENDS FROM HEAVY ENDS COLUMN FROM PRODUCTION OF 1,1,1-TRICHLOROETHANE
K097	VACUUM STRIPPER DISCHARGE FROM CHLORDANE CHLORINATOR IN PRODUCTION OF CHLORDANE
K098	UNTREATED PROCESS WASTEWATER FROM PRODUCTION OF TOXAPHENE
K100	WASTE LEACHING SOLUTION FROM ACID LEACHING OF EMISSION CONTROL DUST/SLUDGE FROM SECONDARY LEAD SMELTING
K101	DISTILLATION TAR RESIDUES FROM DISTILLATIONOF ANILINE-BASED COMPOUNDS IN PRODUCTION OF VETERINARY PHARMACEUTICALS FROM ARSENIC OR ORGANO-ARSENIC COMPOUNDS
K102	RESIDUE FROM USE OF ACTIVATED CARBON FOR DECOLORIZATION IN PRODUCTION OF VETERINARY PHARMACEUTICALS FRO ARSENIC OR ORGANO-ARSENIC COMPOUNDS
K103	PROCESS RESIDUES FROM ANILINE EXTRACTION FROM PRODUCTIONOF ANILINE
K104	COMBINED WASTEWATER STREAMS GENERATED FROM NITROBENZENE/ANILINE PRODUCTION
K105	SEPARATED AQUEOUS STREAM FROM THE REACTOR PRODUCT WASHING STEP IN PRODUCTION OF CHLOROBENZENES
K106	WASTEWATER TREATMENT SLUDGE FROM MERCURY CELL PROCESS IN CHLORINE PRODUCTION
K112	REACTION BY-PRODUCT WATER FROM THE DRYING COLUMN IN PRODUCTION OF TOLUENEDIAMINE VIA HYDROGENATION OF DINITROTOLUENE
K113	CONDENSED LIQUID LIGHT ENDS FROM THE PURIFICATIONOF TOLUENEDIAMINE IN PRODUCTION OF TOLUENEDIAMINE VIA HYDROGENATION OF DINITROTOLUENE
K114	VICINALS FROM PURIFICAITON OF TOLUENEDIAMINE IN PRODUCTION OF TOLUENEDIAMINE VIA HYDROGENATION OF DINITROTOLUENE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	WASTE DESCRIPTION
K115	HEAVY ENDS FROM THE PURIFICATION OF TOLUENEDIAMINE IN PRODUCTION OF TOLUENEDIAMINE VIA HYDROGENATION OF DINITROTOLUENE
K116	ORGANIC CONDENSATE FROM SOLVENT RECOVERY COLUMN IN PRODUCTION OF TOLUENE DIISOCYANATE VIA PHOSGENATION OF TOLUENEDIAMINE
K117	WASTEWATER FROM THE REACTOR VENT GAS SCRUBBER IN PRODUCTION OF ETHYLENE DIBROMIDE VIA BROMINATION OF ETHENE
K118	SPENT ADSORBENT SOLIDS FROM PURIFICATION OF ETHYLENE DIBROMIDE IN PRODUCTION OF ETHYLENE DIBROMIDE VIA BROMINATION OF ETHENE
K125	FILTRATION, EVAPORATION, AND CENTRIFUGATION SOLIDS FROM THE PRODUCTION OF ETHYLENEBISDITHIOCARBAMIC ACID AND ITS SALTS.
K126	BAGHOUSE DUST AND FLOOR SWEEPINGS IN MILLING AND PACKAGING OPERATIONS FROM PRODUCTION OR FORMULATION OF ETHYLENE BIS DITHIOCARBAMIC ACID AND ITS SALTS
P001	2H-1-BENZOPYRAN-2-ONE, 4-HYDROXY-3-(3-OXO-1-PHENYLBUTYL)-, & SALTS, WHEN PRESENT AT CONCENTRATIONS GREATER THAN 0.3% WARFARIN, & SALTS, WHEN PRESENT AT CONCENTRAIONS GREATER THAN 0.3%
P002	ACETAMINE, N-(AMINOTHIOXOMETHYL); Also known as 1-ACETYL-2-THIOUREA
P003	ACROLEIN; Also known as 2-PROPENAL
P004	ALDRIN; Also known as 1,4,5,8-DIMETHANONAPHTHALENE, 1,2,3,4,10,10-HEXA-CHLORO-1,4,4A,5,8,8A,-HEXAHYDRO, (ALPHA, 4ALPHA, 4 ABETA, 5 ALPHA, 8ALPHA, 8ABETA)-
P005	ALLYL ALCOHOL; Also known as 2-PROPEN-1-OL
P007	5-(AMINOMETHYL)-3-ISOXAZOLOL; Also known as 3(2H)-ISOXAZOLONE, 5-(AMINOMETHYL)-
P008	4-AMINOPYRIDINE; Also known as 4-PYRIDINAMINE
P010	ARSENIC ACID H_3ASO_4
P011	ARSENIC OXIDE AS_2O_5 ; Also known as ARSENIC PENTOXIDE
P012	ARSENIC OXIDE AS_2O_3 ; Also known as ARSENIC TRIOXIDE
P013	BARIUM CYANIDE
P014	BENZENETHIOL; Also known as THIOPHENOL
P015	BERYLLIUM
P016	DICHLOROMETHYL ETHER; Also known as METHANE, OXYBIS[CHLORO-
P017	BROMOACETONE; Also known as 2-PROPANONE, 1-BROMO-
P018	BRUCINE
P020	DIOSEB; Also known as PHENOL, 2-(1-METHYLPROPYL)-4,6-DINITRO-
P021	CALCIUM CYANIDE; Also known as CALCIUM CYANIDE $Ca(CN)_2$
P022	CARBON DISULFIDE
P023	ACETALDEHYDE, CHLORO-; Also known as CHLOROACETALDEHYDE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
P024	BENZENAMINE, 4-CHLORO-; Also known as P-CHLORANILINE
P026	1-(O-CHLOROPHENYL)THIOUREA; Also known as THIOUREA, (2-CHLOROPHENYL)-
P027	PROPANENITRILE, 3-CHLORO-; Also known as 3-CHLOROPROPIONITRILE
P028	BENZENE, (CHLOROMETHYL)-; Also known as BENZYL CHLORIDE
P029	COPPER CYANIDE; Also known as COPPER CYANIDE CU(CN)
P030	CYANIDES (SOLUBLE CYANIDE SALTS), NOT OTHERWISE SPECIFIED
P031	CYANOGEN; Also known as ETHANEDINITRILE
P033	CYANOGEN CHLORIDE; Also known as CYANOGEN CHLORIDE (CN)CL
P034	2-CYCLOHEXYL-4,6-DINITROPHENOL; Also known as PHENOL, 2-CYCLOHEXYL-4,6-DINITRO-
P036	ARSONOUS DICHLORIDE, PHENYL-; Also known as DICHLOROPHENYLARSINE
P037	DIELDRIN; Also known as 2,7:3,6-DIMETHANONAPHTH[2,3-B]OXIRENE, 3,4,5,6,9,9-HEXACHLORO-1A,2,2A,3,6,6A,7,7A-OCTAHYDRO-, (1AALPHA, 2BETS, 2AALPHA, 3BETAK, 6BETA, 6AALPHA, 7BETA, 7AALPHA)-
P038	ARSINE, DIETHYL-; Also known as DIETHYLARSINE
P039	PHOSPHORODITHIOIC ACID, O,O-DIETHYL S-[2-(ETHYLTHIO)ETHYL]ESTER; Also known as DISULFOTON
P040	O,O-DIETHYL O-PYRAZINYL PHOSPHOROTHIOATE; Also known as PHOSPHOROTHIOIC ACID, O, O-DIMETHYL O-(4 NITROPHENYL) ESTER
P041	PHOSPHORIC ACID, DIETHYL 4-NITROPHENYL ESTER; Also known as DIETHYL-P-NITROPHENYL PHOSPHATE
P042	1,2-BENZENEDIOL, 4-[HYDROXY-2-(METHYLAMINO)ETHYL]-,(R)-; Also known as EPINEPHRINE
P043	DIISOPROPYLFLUOROPHOSPHATE (DFP); Also known as PHOSPHOROFLUORIDIC ACID, BIS (1-METHYLETHYL)ESTER
P044	DIMETHOATE; Also known as PHOSPHORODITHIOIC ACID,O, O-DIMETHYL S-[2-(METHYLAMINO)-2-OXOETHYL]ESTER
P045	2-BUTANONE, 3, 3-DIMETHYL-1-(METHYITHIO)-,O-[METHYLOAMINO)CARBONYL]OXIME; Also known as THIOFANOX
P046	BENZENEETHANAMINE, ALPHA,ALPHA-DIMETHYL-; Also known as ALPHA,ALPHA-DIMETHYLPHENETHYLAMINE
P047	4,6-DINITRO-O-CRESOL, & SALTS; Also known as PHENOL,2-METHYL-4,6-DINITRO-, & SALTS
P048	2,4-DINITROPHENOL; Also known as PHENOL, 2,4-DINITRO-
P049	DITHIOBIURET; Also known as THIOIMIDODICARBONIC DIAMIDE [H ₂ N)C(S)] ₂ NH
P050	ENDOSULFAN; Also known as 6M9-METHANO-2,4,3-BENZODIOXATHIEPIN, 6,7,8,9,10,1K0-HEXACHLORO-1,5,5A,6,9,9I-HEXAHYDRO-,3-OXIDE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
P051	2,7:3,6-DIMETHANONAPHTH [2,3-B]OXIRENE, 3,4,5,6,9,9-HEXACHLORO-1A,2,2A,3,6,6A,7,7A-OCTAHYDRO-, (1AALPHA, 2BETA, 2ABETA, 3ALPHA, 6ALPHA, 6ABETA, 7BETA, 7AALPHA)-, & METABOLITES; Also known as ENDRIN; Also known as ENDRIN, & METABOLITES
P054	AZIRIDINE; Also known as ETHYLENEIMINE
P056	FLUORINE
P057	ACETAMIDE, 2-FLUORO-; Also known as FLUOROACETAMIDE
P058	ACETIC ACID, FLUORO-,SODIUM SALT; Also known as FLUOROACETIC ACIDE, SODIUM SALT
P059	HEPTACHLOR; Also known as 4,7-METHANO-1H-INDENE, 1,4,5,6,7,8,-HEPTACHLORO-3A,4,7,7A-TETRAHYDRO-
P060	1,4,5,8-DIMETHANONAPHTHALENE,1,2,3,4,10,10-HEXA- CHLORO-1,4,4A,5,7,8,8A-HEXAHYDRO-(1ALPHA, 4ALPHA, 4ABETA, 5BETA,8BETA,8ABETA)-; Also known as ISODRIN
P062	HEXAETHYL TETRAPHOSPHATE; Also known as TETRAPHOSPHORIC ACID, HEXAETHYL ESTER
P063	HYDROCYANIC ACID; Also known as HYDROGEN CYANIDE
P064	METHANE, ISOCYANATO-
P066	ETHANIMIDOTHIOIC ACID, N-[[[(METHYLAMINO)CARBONYL]OXY]-, METHYL ESTER; Also known as METHOMYL
P067	AZINIDINE, 2-METHYL; Also known as 1,2-PROPYLENIMINE
P068	HYDRAZINE, METHYL-; Also known as METHYL HYDRAZINE
P069	2-METHYLLACTONITRILE; Also known as PROPANENITRILE, 2-HYDROXY-2-METHYL-
P070	ALDICARB; Also known as PROPANAL, 2-METHYL-2-(METHYLTHIO)-, O-[(METHYLAMINO)CARBONYL]OXIME
P071	METHYL PARATHION; Also known as PHOSPHOROTHIOIC ACID, O, O,-DIMETHYL O-(4-NITROPHENYL)ESTER
P072	ALPHA-NAPHTHYLTHIOUREA; Also known as THIOUREA, 1-NAPHTHALENYL-
P073	NICKEL CARBONYL; Also known as NICKEL CARBONYL NI(CO) ₄ , (T-4)-
P074	NICKEL CYANIDE; Also known as NICKEL CYNAIDE NI(CN) ₂
P075	NICOTINE, & SALTS; Also known as PYRIDINE, 3-(1-METHYL-2-PYRROLIDINYL)-, (S)-, & SALTS
P077	BENZENAMINE, 4-NITRO-; Also known as P-NITROANILINE
P078	NITROGEN DIOXIDE; Also known as NITROGEN OXIDE NO ₂
P082	METHANAMINE, N-METHYL-N-NITROSO-; Also known as N-NITROSODIMETHYLAMINE
P084	N-NITROSOMETHYLVINYLAMINE; Also known as VINYLAMINE, N-METHYL-N-NITROSO-
P085	DIPHOSPHORAMIDE, OCTAMETHYL-; Also known as OCTAMETHYLPYROPHOSPHORAMIDE
P087	OSMIUM OXIDE OSO ₄ , (T-4)-; Also known as OSMIUM TETROXIDE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
P088	ENDOTHALL; Also known as 7-OXABICYCLO[2.2.1]HEPTANE-2,3-DICARBOXYLIC ACID
P089	PARATHION; Also known as PHOSPHORIC ACID, O,O-DIETHYL O-(4-NITROPHENYL)ESTER
P092	MERCURY, (ACETATO-O)PHENYL-; Also known as PHENYLMERCURY ACETATE
P093	PHENYLTHIOUREA; Also known as THIOUREA, PHENYL-
P094	PHORATE; Also known as PHOSPHORODITHIOIC ACID, O,O-DIETHYL; Also known as S-[ETHYLTHIO)METHYL] ESTER
P095	CARBONIC DICHLORIDE; Also known as PHOSGENE
P096	HYDROGEN PHOSPHIDE; Also known as PHOSPHINE
P097	FAMPHUR; Also known as PHOSPHOTHIOIC ACID, O-[4-[(DIMETHYLAMINO)SULFONYL]PHENYL] O,O-DIMETHYL ESTER
P098	POTASSIUM CYANIDE
P099	ARGENTATE(1-), BIS(CYANO-C)-, POTASSIUM; Also known as POTASSIUM SILVER CYANIDE
P101	ETHYL CYANIDE; Also known as PROPANENITRILE
P102	PROPARGYL ALCOHOL; Also known as 1-PROPYN-1-OL
P103	SELENOUREA
P104	SILVER CYANIDE
P105	SODIUM AZIDE
P108	STRYCHNIDIN-10-ONE, & SALTS; Also known as STRYCHNINE, & SALTS
P109	TETRAETHYLDITHIOPYROPHOSPHATE; Also known as THIODIPHOSPHIRIC ACID, TETRAETHYL ESTER
P110	TETRAETHYL LEAD
P113	THALLIUM OXIDE TL ₂ O ₃
P114	THALLIUM(L) SELENITE
P115	THALLIUM(L) SULFATE
P116	THIOSEMICARBAZIDE
P118	TRICHLOROMETHANETHIOL
P119	VANADIC ACID, AMMONIUM SALT
P120	VANADIUM PENTOXIDE
P121	ZINC CYANIDE
P123	TOXAPHENE
U001	ACETALDEHYDE (I); Also known as ETHANAL (I)
U002	ACETONE (I); Also known as 2-PROPANONE (I)
U003	ACETONITRILE (I,T)
U004	ACETONITRILE (I,T)

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
U005	2, ACETYLAMINOFLUORENE; Also known as ACETAMIDE, N-9H-FLUOREN-2-YL-
U007	ACRYLAMIDE; Also known as 2-PROPENAMIDE
U008	ACRYLIC ACID (I); Also known as 2-PROPENOIC ACID (I)
U009	ACRYLONITRILE; Also known as 2-PROPENENITRILE
U010	AZIRINO[2',3':3,4]PYRROLO[1,2-a]INDOLE-4,7-DIONE,6-AMINO-8- [[[(AMINOCARBONYL)OXY]METHYL]-1,1a,2,8,8a,8b-HEXAHYDRO-8a-METHOXY-5- METHYL-, [1aS-(1AALPHA, 8BETA, 8AALPHA, 8BALPHA)]-; Also known as MITOMYCIN C
U011	AMITROLE; Also known as 1H-1,2,-TRIAZOL-3-AMINE
U012	ANILINE (I,T); Also known as BENZENAMINE (I,T)
U014	AURAMINE; Also known as BENZENAMINE, 4,4'-CARBONIMIDOYLBIS[N,N-DIMETHYL-
U015	AZASERINE; Also known as L-SERINE, DIAZOACETATE (ESTER)
U016	BENZ[C]ACRIDINE
U017	BENZAL CHLORIDE; Also known as BENZENE,(DICHLOROMETHYL)-
U018	BENZ[A]ANTHRACENE
U019	BENZENE (I,T)
U022	BENZO[A]PYRENE
U024	DICHLOROMETHOXY ETHANE; Also known as ETHANE, 1,1'-[METHYLENEBIS(OXY)]BIS[2-CHLORO-
U025	DICHLOROETHYL ETHER; Also known as ETHANE,1,1'-OXYBIS[2-CHLORO-
U026	CHLORNAPHAZIN; Also known as NAPHTHALENAMINE, N,N'-BIS(2-CHLOROETHYL)-
U027	DICHLOROISOPROPYL ETHER; Also known as PROPANE, 2,2'-OXYBIS[2-CHLORO-
U028	1,2-BENZENEDICARBOXYLIC ACID, BIS(2-ETHYLHEXYL) ESTER; Also known as DIETHYLHEXYL PHTHALATE
U029	METHANE, BROMO-; Also known as METHYL BROMIDE
U030	BENZENE, 1-BROMO-4-PHENOXY-; Also known as 4-BROMOPHENYL PHENYL ETHER
U031	1-BUTANOL (I); Also known as N-BUTYL ALCOHOL (I)
U032	CHROMIC ACID H ₂ CRO ₄ , CALCIUM SALT; Also known as CALCIUM CHROMATE
U034	CHLORAL; Also known as ACETALDEHYDE, TRICHLORO-
U035	CHLORAMBUCIL; Also known as BENZENE BUTANOIC ACID, 4-[BIS(2- CHLOROETHYL)AMINO]-
U036	CHLORDANE, ALPHA & GAMMA ISOMERS; Also known as 4,7-METHANO-1H-INDENE, 1,2,4,5,6,7,8,8-OCTACHLORO-2,3,3A,4,7,7A-HEXAHYDRO-
U037	CHLOROBENZENE; Also known as BENZENE, CHLORO-
U038	CHLOROBENZILATE; Also known as BENZENEACETIC ACID, 4-CHLORO-ALPHA- (4-CHLOROPHENYL)-ALPHA-HYDROXY-, ETHYL ESTER
U039	P-CHLORO-M-CRESOL; Also known as PHENOL, 4-CHLORO-3-METHYL-
U041	EPICHLOROHYDRIN; Also known as OXIRANE, (CHLOROMETHYL)-

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
U042	2-CHLOROETHYL VINYL ETHER; Also known as ETHENE, (2-CHLOROETHOXY)-
U043	VINYL CHLORIDE; Also known as ETHENE, CHLORO-
U044	CHLOROFORM; Also known as METHANE, TRICHLORO-
U045	METHANE, CHLORO- (I,T); Also known as METHYL CHLORIDE (I,T)
U046	CHLOROMETHYL METHYL ETHER; Also known as METHANE, CHLOROMETHOXY-
U047	BETA-CHLORONAPHTHALENE; Also known as NAPHTHALENE, 2-CHLORO-
U048	O-CHLOROPHENOL; Also known as PHENOL, 2-CHLORO-
U049	4-CHLORO-O-TOLUIDINE, HYDROCHLORIDE; Also known as BENZENAMINE, 4-CHLORO-2-METHYL, HYDROCHLORIDE
U050	CHRYSENE
U051	CREOSOTE
U052	CRESOL (CRESYLIC ACID); Also known as PHENOL, METHYL-
U053	CROTONALDEHYDE; Also known as 2-BUTENAL
U055	CUMENE (I); Also known as BENZENE, (1-METHYLETHYL)- (I)
U056	BENZENE, HEXAHYDRO- (I); Also known as CYCLOHEXANE (I)
U057	CYCLOHEXANONE (I)
U058	CYCLOPHOSPHAMIDE; Also known as 2H-1,3,2-OXAZAPHOSPHORIN-2-AMINE, N,N-BIS (2-CHLOROETHYL)TETRAHYDRO-, 2- OXIDE
U059	DAUNOMYCIN; Also known as 5,12-NAPHTHACENEDIONE, 8-ACETYL-10-[(3-AMINO-2,3,6-TRIDEOXY)-ALPHS-L-LYXO- HEXOPYRANOSY)OXY]-7,8,9,10-TETRAHYDRO-6,8,11-TRIHYDROXY-1-METHOXY-, (8S-CIS)-
U060	DDD; Also known as BENZENE, 1,1'-(2,2-DICHLOROETHYLIDENE)BIS[4-CHLORO-
U061	DDT; Also known as BENZENE, 1,1'-(2,2,2-TRICHLOROETHYLIDENT)BIS[4-CHLORO-
U062	DIALATE; Also known as CARBAMOTHIOIC ACID, BIS(1-METHYLETHYL)-, S-(2,3-DICHLORO-2-PROPENYL) ESTER
U063	DIBENZ[A,H]ANTHRACENE
U064	DIBENZO[A,I]PYRENE; Also known as BENZO[RST]PENTAPHENE
U066	1,2-DIBROMO-3-CHLOROPROPANE; Also known as PROPANE, 1,2-DIBROMO-3- CHLORO-
U067	ETHANE, 1,2-DIBROMO-; Also known as ETHYLENE DIBROMIDE
U068	METHANE, DIBROMO-; Also known as METHYLENE BROMIDE
U069	DIBUTYL PHTHALATE; Also known as 1,2-BENZENEDICARBOXYLIC ACID, DIBUTYL ESTER
U070	o-DICHLOROBENZENE; Also known as BENZENE, 1,2-DICHLORO-
U071	m-DICHLOROBENZENE; Also known as BENZENE, 1,3-DICHLORO-
U072	p-DICHLOROBENZENE; Also known as BENZENE, 1,4-DICHLORO-

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
U073	3,3'-DICHLOROBENZIDINE; Also known as [1,1'-BIPHENYL]-4,4'-DIAMINE, 3,3'DICHLORO-
U074	1,4-DICHLORO-2-BUTENE (I,T); Also known as 2-BUTENE, 1,4-DICHLORO- (I,T)
U075	DICHLORODIFLUOROMETHANE; Also known as METHANE, DICHLORODIFLUORO-
U076	ETHANE, 1,1-DICHLORO-; Also known as ETHYLIDENE DICHLORIDE
U077	ETHANE, 1,2-DICHLORO-; Also known as ETHYLENE DIBROMIDE
U078	1,1-DICHLOROETHYLENE; Also known as ETHENE, 1,1-DICHLORO-
U079	1,2-DICHLOROETHYLENE; Also known as ETHENE, 1,2-DICHLORO-, (E)
U080	METHANE, DICHLORO-; Also known as METHYLENE CHLORIDE
U081	2,4-DICHLOROPHENOL; Also known as PHENOL, 2,4-DICHLORO-
U082	2,6-DICHLOROPHENOL; Also known as PHENOL, 2,6-DICHLORO-
U083	PROPANE, 1,2-DICHLORO-; Also known as PROPYLENE DICHLORIDE
U084	1,3-DICHLOROPROPENE; Also known as 1-PROPENE, 1,3-DICHLORO-
U085	1,2:3,4--DIEPOXYBUTANE (I,T); Also known as 2,2'-BIOXIRANE
U086	N,N'-DIETHYLHYDRAZINE; Also known as HYDRAZINE, 1,2,-DIETHYL-
U087	O,O-DIETHYL S-METHYL DITHIOPHOSPHATE; Also known as PHOSPHORODITHIOIC ACID, O,O-DIETHYL S-METHYL ESTER
U088	DIETHYL PHTHALATE; Also known 1,2-BENZENEDICARBOXYLIC ACID, DIETHYL ESTER
U089	DIETHYLSTILBESTEROL; Also known as PHENOL, 4,4'-(1,2-DIETHYL-1,2-ETHENEDIYL)BIS-, (E)
U090	DIHYDROSAFROLE; Also known as 1,3-BENZODIOXOLE, 5-PROPYL-
U091	3,3'-DIMETHOXYBENZIDINE; Also known as [1,1'-BIPHENYL]-4,4'-DIAMINE, 3,3'DIMETHOXY-
U092	DIMETHYLAMINE (I); Also known as METHANAMINE, N-METHYL- (I)
U093	BENZENAMINE, N,N-DIMETHYL-4-(PHENYLAZO)-; Also known as P-DIMETHYLAMINOAZOBENZENE
U094	BENZ[A]ANTHRACENE, 7,12-DIMETHYL-; Also known as 7,12-DIMETHYLBENZ[A]ANTHRACENE
U095	3,3'-DIMETHYLBENZIDINE; Also known as [1,1'-BIPHENYL]-4,4'-DIAMINE, 3,3'DIMETHYL-
U097	DIMETHYLCARBAMOYL CHLORIDE; Also known as CARBAMIC CHLORIDE, DIMETHYL-
U098	1,1-DIMETHYLHYDRAZINE; Also known as HYDRAZINE, 1,1-DIMETHYL-
U099	1,2-DIMETHYLHYDRAZINE; Also known as HYDRAZINE, 1,2,-DIMETHYL-
U101	2,4-DIMETHYLPHENOL; Also known as PHENOL, 2,4-DIMETHYL-
U102	DIMETHYL PHTHALATE; Also known as 1,2-BENZENEDICARBOXYLIC ACID, DIMETHYL ESTER
U103	DIMETHYL SULFATE; Also known as SULFURIC ACID, DIMETHYL ESTER

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
U105	2,4-DINITROTOLUENE; Also known as BENZENE, 1-METHYL-2,4-DINITRO-
U106	2,6-DINITROTOLUENE; Also known as BENZENE, 2-METHYL-1,3-DINITRO-
U107	DI-N-OCTYL PHTHALATE; Also known as 1,2-BENZENEDICARBOXYLIC ACID, DIOCTYL ESTER
U108	1,4-DIETHYLENEOXIDE; Also known as 1,4-DIOXANE
U109	1,2-DIPHENYLHYDRAZINE; Also known as HYDRAZINE, 1,2-DIPHENYL-
U110	DIPROPYLAMINE (I); Also known as 1-PROPANAMINE, N-PROPYL- (I)
U111	DI-N-PROPYLNITROSAMINE; Also known as 1-PROPANAMINE, N-NITROSO-N-PROPYL-
U112	ACETIC ACID ETHYL ESTER (I); Also known as ETHYL ACETATE (I)
U113	ETHYL ACRYLATE (I); Also known as 2-PROPENOIC ACID, ETHYL ESTER (I)
U114	ETHYLENEBISDITHIOCARBAMIC ACID, SALTS & ESTERS; Also known as CARBAMODITHIOIC ACID, 1,2- ETHANEDIYLBIS-, SALTS & ESTERS
U115	ETHYLENE OXIDE (I,T); Also known as OXIRANE (I,T)
U116	ETHYLENETHIOUREA; Also known as 2-IMIDAZOLIDINETHIONE
U117	ETHANE, 1,1'-OXYBIS-(I); Also known as ETHYL ETHER (I)
U118	ETHYL METHACRYLATE; Also known as 2-PROPENOIC ACID, 2-METHYL-, ETHYL ESTER
U119	ETHYL METHANESULFONATE; Also known as METHANESULFONIC ACID, ETHYL ESTER
U120	FLUORANTHENE
U121	TRICHLOROMONOFUOROMETHANE; Also known as METHANE, TRICHLOROFLUORO-
U122	FORMALDEHYDE
U124	FURAN (I); Also known as FURFURAN (I)
U125	2-FURANCARBOXALDEHYDE (I); Also known as FURFURAL (I)
U126	GLYCIDYLALDEHYDE; Also known as OXIRANECARBOXYALDEHYDE
U127	HEXACHLOROBENZENE; Also known as BENZENE, HEXACHLORO-
U128	HEXACHLOROBUTADIENE; Also known as 1,3-BUTADIENE, 1,1,2,3,4,4-HEXACHLORO-
U129	LINDANE; Also known as CYCLOHEXANE, 1,2,3,4,5,6- HEXACHLORO-, (1ALPHA, 2ALPHA, 3BETA, 4ALPHA, 5ALPHA, 6BETA)-
U130	HEXACHLOROCYCLOPENTADIENE; Also known 1,3-CYCLOPENTADIENE, 1,2,3,4,5,5-HEXACHLORO-
U131	HEXACHLOROETHANE; Also known as ETHANE, HEXACHLORO-
U132	HEXACHLOROPHENE; Also known as PHENOL, 2,2'-METHYLENEBIS[3,4,6-TRICHLORO-
U135	HYDROGEN SULFIDE; Also known HYDROGEN SULFIDE H ₂ S
U136	ARSINIC ACID, DIMETHYL-; Also known as CACODYLIC ACID
U137	INDENO[1,2,3-CD]PYRENE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	WASTE DESCRIPTION
U138	METHANE, IODO-; Also known as METHYL IODIDE
U140	ISOBUTYL ALCOHOL, (I,T); Also known as 1-PROPANOL, 2-METHYL-, (I,T)
U141	ISOSAFROLE; Also known as 1,3-BENZODIOXOLE, 5-(1-PROPENYL)-
U142	KEPONE; Also known as 1,3,4-METHENO-2H-CYCLOBUTA[CD]PENTALEN-2-ONE, 1,1A,3,3A,4,5,5A,5B,6- DECACHLOROOCCTAHYDRO-
U143	LASIOCARPINE; Also known as 2-BUTENOIC ACID, 2-METHYL-, 7-[2,3-DIHYDROXY-2-(1-METHOXYETHYL)-3-METHYL-1- OXOBUTOXY]METHYL]-2,3,5,6A-TETRAHYDRO-1H-PYRROLIZIN-1-YL ESTER,[1S-1ALPHA(Z),7(2S*,3R*),7AALPHA]]-
U144	ACETIC ACID, LEAD(2+) SALT; Also known as LEAD ACETATE
U145	LEAD PHOSPHATE; PHOSPHORIC ACID, LEAD(2+) SALT (2:3)
U146	LEAD, BIS(ACETATO-O) TETRAHYDROXYTRI-; Also known as LEAD SUBACETATE
U147	MALEIC ANHYDRIDE; Also known as 2,5-FURANDIONE
U148	MALEIC HYDRAZIDE; Also known as 3,6-PYRIDAZINEDIONE, 1,2-DIHYDRO-
U149	MALONONITRILE; Also known as PROPANEDINITRILE
U150	MELPHALAN; Also known as L-PHENYLALANINE, 4-[BIS(2-CHLOROETHYL)AMINO]-
U151	MERCYR
U152	METHACRYLONITRILE (I,T); Also known as 2-PROPENENITRILW, 2-METHYL- (I,T)
U153	METHANETHIOL (I,T); Also known as THIOMETHANOL (I,T)
U154	METHANOL (I); Also known as METHYL ALCOHOL (I)
U155	METHAPYRILENE; Also known 1,2-ETHANEDIAMINE, N,N- DIMETHYL-N'-W-PYRIDINYL-N'-(2- THIENYLMETHYL)-
U156	METHYL CHLOROCARBONATE (I,T); Also known CARBONCHLORIDIC ACID, METHYL ESTER (I,T)
U157	BENZ[I]JACEANTHRYLENE, 1,2-DIHYDRO-3-METHYL-; Also known as 3-METHYLCHOLANTHRENE
U158	BENZENAMINE, 4,4'METHYLENEBIS[2-CHLORO-; Also known as 4,4'-METHYLENEBIS(2-CHLOROANILINE)
U159	METHYL ETHYL KETONE (MEK) (I,T); Also known as 2-BUTANONE (I,T)
U161	METHYL ISOBUTYL KETONE (I); Also known as 4-METHYL-2-PENTANONE (I) and PENTANOL, 4-METHYL-
U162	METHYL METHACRYLATE (I,T); Also known as 2-PROPENOIC ACID, 2-METHYL-, METHYL ESTER (I,T)
U163	MNNG; Also known as GUANIDINE, N-METHYL-N'-NITRO-N- NITROSO-
U164	METHYLTHIOURACIL; Also known as 4(1H)-PYRIMIDINONE, 2,3-DIHYDRO-6-METHYL-2-THIOXO-
U165	NAPHTHALENE
U166	1,4-NAPHTHALENEDIONE; Also known as 1,4-NAPHTHOQUINONE

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
U167	1-NAPHTHALENAMINE; Also known as ALPHA-NAPHTHYLAMINE
U168	2-NAPHTHALENAMINE; Also known as BETA-NAPHTHYLAMINE
U169	NITROBENZENE (I,T); Also known as BENZENE, NITRO-
U170	P-NITROPHENOL; Also known as PHENOL, 4-NITRO
U171	2-NITROPROPANE (I,T); Also known as PROPANE, 2-NITRO (I,T)
U172	N-NITROSODI-N-BUTYLAMINE; Also known as 1-BUTANAMINE, N-BUTYL-N-NITROSO-
U173	N-NITROSODIETHANOLAMINE; Also known as ETHANOL, 2,2'-(NITROSOIMINO)BIS-
U174	N-NITROSODIETHYLAMINE; Also known as ETHANAMINE, N-ETHYL-N-NITROSO-
U176	N-NITROSO-N-ETHYLUREA; Also known as UREA, N-ETHYL-N-NITROSO-
U177	N-NITROSO-N-METHYLUREA; Also known as UREA, N-METHYL-N-NITROSO-
U178	N-NITROSO-N-METHYLURETHANE; Also known as CARBAMIC ACID, METHYLNITROSO-,ETHYL ESTER
U179	N-NITROSOPIPERIDINE; Also known as PIPERIDINE, 1-NITROSO-
U180	N-NITROSOPYRROLIDINE; Also known as PYRROLIDINE, 1-NITROSO-
U181	BENZENAMINE, 2-METHYL-5-NITRO-; Also known as 5-NITRO-O-TOLUIDINE
U182	PARALDEHYDE; Also known as 1,3,5-TRIOXANE, 2,4,6- TRIMETHYL-
U183	PENTACHLOROBENZENE; Also known as BENZENE, PENTACHLORO-
U184	PENTACHLOROETHANE; Also known as ETHANE, PENTACHLORO-
U185	PENTACHLORONITROBENZENE (PCNB); Also known as BENZENE, PENTACHLORONITRO-
U186	1,3-PENTADIENE (I); Also known as 1-METHYLBUTADIENE (I)
U187	ACETAMIDE, N-(4-ETHOXYPHENYL)-; Also known as PHENACETIN
U188	PHENOL
U190	PHTHALIC ANHYDRIDE; Also known as 1,3-ISOBENZOFURANDIONE
U191	2-PICOLINE; Also known as PYRIDINE, 2-METHYL-
U192	BENZAMIDE,3,5-DICHLORO-N-(1,1-DIMETHYL-2-PROPYNYL)-; Also known as PRONAMIDE
U193	1,3-PROPANE SULTONE; Also known as 1,2-OXATHIOLANE, 2,2-DIOXIDE
U194	1-PROPANAMINE (I,T); Also known as N-PROPYLAMINE (I,T)
U196	PYRIDINE
U197	P-BENZOQUINONE; Also known as 2,5-CYCLOHEXADIENE-1,4-DIONE
U200	RESERPINE; Also known as YOHIMBAN-16-CARBOXYLIC ACID, 11,17-DIMETHOXY-18- [(3,4,5-TRIMETHOXYBENZOYL)OXY]-, METHYL ESTER, (3BETA, 16BETA, 17ALPHA, 18BETA, 20ALPHA)-
U201	RESORCINOL; Also known as 1,3-BENZENEDIOL
U202	SACCHARIN, & SALTS; Also known as 1,2-BENZISOTHIAZOL-3(2H)-ONE, 1,1-DIOXIDE, & SALTS

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY

EPA WASTE CODE	WASTE DESCRIPTION
U203	SAFROLE; Also known as 1,3-BENZODIOXOLE, 5-(2- PROPENYL)-
U204	SELENIOUS ACID; Also known as SELENIUM DIOXIDE
U206	STREPTOZOTOCIN; Also known as GLUCOPYRANOSE, 2-DEOXY-2-(3-METHYL-3-NITROSOUREIDO)-, D-D-GLUCOSE, 2- DEOXY-2-[[[(METHYLNITROSOAMINO)-CARBONYL]AMINO]-
U207	1,2,4,5-TETRACHLOROBENZENE; Also known as BENZENE, 1,2,4,5-TETRACHLORO-
U208	1,1,1,2-TETRACHLOROETHANE; Also known as ETHANE, 1,1,1,2-TETRACHLORO-
U209	1,1,2,2-TETRACHLOROETHANE; Also known as ETHANE, 1,1,2,2-TETRACHLORO-
U210	TETRACHLOROETHYLENE; Also known as ETHENE, TETRACHLORO-
U211	CARBON TETRACHLORIDE; Also known as METHANE, TETRACHLORO-
U213	TETRAHYDROFURAN (I); Also known as FURAN, TETRAHYDRO-(I)
U214	ACETIC ACID, THALLIUM(1+) SALT; Also known as THALLIUM(I) ACETATE
U215	THALLIUM(I) CARBONATE; Also known as CARBONIC ACID, DITHALLIUM(1+) SALT
U216	THALLIUM(I) CHLORIDE; Also known as THALLIUM CHLORIDE TLCL
U217	THALLIUM(I) NITRATE; Also known as NITRIC ACID, THALLIUM(1+) SALT
U218	THIOACETAMIDE; Also known as ETHANETHIOAMIDE
U219	THIOUREA
U220	TOLUENE; Also known as BENZENE, METHYL-
U221	TOLUENEDIAMINE; Also known as BENZENEDIAMINE, AR-METHYL-
U222	BENZENAMINE, 2-METHYL-, Also known as HYDROCHLORIDE O-TOLUIDINE HYDROCHLORIDE
U225	BROMOFORM; Also known as METHANE, TRIBROMO-
U226	ETHANE, 1,1,1-TRICHLORO-; Also known as METHYL CHLOROFORM
U227	1,1,2-TRICHLOROETHANE; Also known as ETHANE, 1,1,2-TRICHLORO-
U228	TRICHLOROETHYLENE; Also known as ETHENE, TRICHLORO-
U235	TRIS(2,3-DIBROMOPROPYL) PHOSPHATE; Also known as 1-PROPANOL, 2,3-DIBROMO-, PHOSPHATE (3:1)
U236	TRYPAN BLUE; Also known as 2,7-NAPHTHALENEDISULFONIC ACID, 3,3'-[(3,3'-DIMETHYL[1,1'- BIPHENYL]-4,4'- DIYL)BIS(AZO)BIS[5-AMINO-4-HYDROXY]-, TETRASODIUM SALT
U237	URACIL MUSTARD; Also known as 2,4-(1H,3H)-PYRIMIDINEDIONE, 5-[BIS(2-CHLOROETHYL)AMINO]-
U238	CARBAMIC ACID, ETHYL ESTER; Also known as ETHYL CARBAMATE (URETHANE)
U239	XYLENE (I); Also known as BENZENE, DIMETHYL- (I,T)
U240	ACETIC ACID, 92,4-DICHLOROPHENOXY)-, SALTS & ESTERS; Also known as 2,4-D, SALTS & ESTERS
U243	HEXACHLOROPROPENE; Also known as 1-PROPENE, 1,1,2,3,3,3- HEXACHLORO-

ATTACHMENT 1 -- HAZARDOUS WASTES RECEIVED AT THE PARKER FACILITY	
EPA WASTE CODE	WASTE DESCRIPTION
U244	THIOPEROXYDICARBONIC DIAMIDE $[(H_2N)C(S)]_2S_2$, TETRAMETHYL-; Also known as THIRAM
U246	CYANOGEN BROMIDE $(CN)Br$
U247	BENZENE, 1,1'(2,2,2-TRICHLOROETHYLIDENE)BIS[4-METHOXY-; Also known as METHOXYCHLOR
U248	WARFARIN, & SALTS, WHEN PRESENT AT CONCENTRATIONS OF 0.3% OR LESS; Also known as 2H-1-BENZOPYRAN-2-ONE, 4- HYDROXY-3-(3-OXO-1-PHENYL-BUTYL)-, & SALTS, WHEN PRESENT AT CONCENTRATIONS OF 0.3% OR LESS
U249	ZINC PHOSPHIDE Zn_3P_2 WHEN PRESENT AT CONCENTRATIONS OF 10% OR LESS
U328	BENZENAMINE, 2-METHYL-; Also known as o-TOLUIDINE
U353	BENZENAMINE, 4-METHYL-; Also known as p-TOLUIDINE
U359	ETHANOL, 2-ETHOXY-; Also known as ETHYLENE GLYCOL MONOETHYL ETHER

ATTACHMENT 2

EPA INCINERATOR CLOSURE GUIDANCE



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Draft Guidance on Incinerator Closure

FROM: Lionel Vega, Chemical Engineer
Alternative Technology Section

TO: Addressees

Attached is the draft guidance on incinerator closure for your review and comment. As described in the agenda, I will be asking for your comments on this eight-page draft guidance in our workgroup meeting scheduled for November 7-9 in Denver, Colorado.

Attachment

Addressees:

Stephen Yee, Region I	Larry Johnson, ORD
John Brogard, Region II	Joe McSorley, ORD
Gary Gross, Region III	C.C. Lee, ORD
Betty Willis, Region IV	Donald Oberacker, ORD
Glen May, Region IV	George Huffman, ORD
Hugh Hazen, Region IV	Justice Manning, ORD
Y.J. Kim, Region V	Bob Mouringham, ORD
Mardi Kleve, Region V	
Stan Burger, Region VI	
Joe Galbraith, Region VII	
Nat Mlullo, Region VIII	
Larry Bowerman, Region IX	
Cathy Massimino, Region X	

cc: Lionel Vega
Sonya Sasseville
Bob Holloway
Shiva Garg
Dwight Hlustick
Kate Anderson, OWPE
Charles Perry, OWPE
Winston Lue, OTS
Cristina Gaines, OWEP

Printed on Recycled Paper

DRAFT OF GUIDANCE OF INCINERATOR CLOSURE

Draft Final Report

For U.S. Environmental Protection Agency

Submitted by:

**Midwest Research Institute
5109 Leesburg Pike
Suite 414
Falls Church, Virginia**

**EPA Contract No. 68-01-7310
Work Assignment 134
MRI Project No. 8962-34**

June 29, 1990

PREFACE

This draft document was prepared by Midwest Research Institute (MRI) for the U.S. Environmental Protection Agency (EPA) under subcontract to NUS Corporation on EPA Contract No. 68-01-7310. The document was developed by Bruce Boomer.

MIDWEST RESEARCH INSTITUTE



Andrea C. Hall, Ph.D.
Program Manager

June 29, 1990

DRAFT
GUIDANCE ON CLOSURE PROCEDURES FOR
HAZARDOUS WASTE INCINERATOR FACILITIES

INTRODUCTION

This memo provides RCRA permit writers with recommended procedures for the incinerator-specific portion of a closure plan. Owners and operators of a hazardous waste incinerator facility must develop a plan for closing the facility and must keep the plan on file at the facility until closure is completed and certified. The closure plan is a required portion of a RCRA Part B permit application and is thus subject to the approval of RCRA permit writers.

This memo addresses closure of the incinerator and ancillary equipment. Issues addressed below include initial decontamination and burnout of any residual organic contamination, further decontamination methods, confirmatory sampling methods, and criteria for closure certification. This memo does not address tank closure or other general facility closure requirements such as the cleanup of any spills or contaminated soils.

Typically, the closure of a permitted RCRA incinerator is not an issue with significant environmental impact. If the facility had been operating in compliance with permit conditions prior to closure, the amount and extent of residual contamination within the incinerator and ancillary equipment is expected to be minimal; the recommendations discussed in this memo address this expectation of minimal contamination.

EPA PRECEDENT

An issue associated with incinerator closure is defining an "acceptable" level of residual contamination to allow material previously in contact with hazardous wastes to be recycled or disposed as a nonhazardous waste. In a letter to Mr. Thomas Jorling dated June 19, 1989, Jonathan Cannon, Acting Assistant Administrator of EPA (see Attachment 1), noted that contaminated environmental media must be managed as if they were hazardous until they no longer contain the listed wastes. Options mentioned in the letter include: (1) delisting, (2) removing the contamination by treatment, or (3) decontamination to an acceptable minimal level of contamination. The letter notes that for the third option, EPA is investigating de minimus levels for hazardous constituents, below which materials (such as contaminated environmental media) would no longer have to be managed as hazardous wastes.

The sections below provide a closure approach for potentially contaminated incinerator media that involves, to some extent, options number two and three above.

APPROACH TO INCINERATOR CLOSURE

Residual contamination of environmental concern within an incineration system will result from the organic and metals content of the wastes fed to the incinerator. The following steps (summarized in Table 1) provide a basis for organic decontamination and determination of residual metal contamination.) The first step of incinerator closure involves the incineration of all existing hazardous waste inventories and proper treatment, disposal, or removal of residual wastes such as incinerator ash, scrubber effluents, and baghouse ash. For most facilities, this step effectively removes the most significant source of residual contamination for closure.

The second step involves the active decontamination of waste feed mechanisms by use of chemical and/or physical action. This step may be coordinated with affiliated storage tank or drum closure activities, which parallel and inter-relate to incinerator closure.

During the second step, feed mechanisms (e.g., liquid/sludge feed lines, solid feed mechanisms) are rinsed with kerosene or other appropriate solvents to remove surface contaminants. Table 2 provides a general guide to the solubility of several contaminant categories in water, dilute acids, dilute bases, and organic solvents. Feed mechanisms also may be scrubbed or scraped using brushes, scrapers, or sponges and water-compatible solvent cleaning solutions. All rinsate is to be collected and incinerated prior to step 3.

The third step is a burnout of any residual organic contamination within the incinerator. Following the completion of step 2, the incinerator will be operated with only auxiliary fuel for an appropriate time period not less than 4 hr, maintaining at least the minimum temperature specified in the permit for each combustion chamber. This is expected to combust any remaining organic contaminants within the incinerator system.

After the completion of step 3, the incinerator and its ancillary equipment may be considered to be organically decontaminated. Organic contamination is not expected downstream from the combustion chambers (e.g., air pollution control devices). However, residual contamination with metals remains a concern. Step 4 addresses the decontamination and wipe sampling of incinerator components in regard to metals. The following are examples of components of concern:

- Feed mechanisms (piping, pumps, conveyors, etc.);
- Refractory of combustion chambers;
- Gas ducts;
- Ash handling system;
- Internal surfaces of air pollution control equipment; and,
- Stack.

(Excluded from the decontamination procedures are fabric filter bags and scrubber packing materials which can be disposed as hazardous wastes.)

The recommendations for step 4 include:

- Optional rinse/scrub of above equipment with detergent;
- Wipe sampling (minimum 10 locations scattered throughout above).

The optional rinse/scrub may involve a combination of both physical and chemical means to remove contaminants. As previously discussed for step 2, individual components (detached as appropriate) may be scrubbed or scraped using brushes, scrapers or sponges, and water-compatible solvent cleaning solutions. Contaminants may be removed with a water or solvent rinse using pressurized or gravity flow, or using steam jets. On metal surfaces, pressurized cleaning may present problems with metals etching compounding the effective removal of contaminants. In addition, caution should be exercised to ensure that pressurized or steam cleaning sprays/emissions are appropriately contained (i.e., curtains, enclosures, or spray booths may be necessary to reduce or eliminate cross-contamination).

Wipe sampling will involve sampling surfaces exposed to either hazardous wastes or the exhaust gases/residuals derived from waste incineration in the above equipment. Samples are collected by applying deionized water or a detergent (e.g., household liquid cleaner) to a piece of 11-cm diameter filter paper (e.g., Whatman 40 ashless, Whatman "50" smear tabs, or equivalent) or gauze pad. This moistened filter paper or gauze pad is used to thoroughly swab a 100-cm² area, as can be measured by a sampling template.

The use of a template can assist the sampler in the collection of a 100-cm² sample. Different templates may be used for the variously shaped areas which must be sampled (e.g., a 10 cm x 10 cm square). When a template is used, it should be thoroughly cleaned between samples to prevent contamination of subsequent samples by the template.

The wipes and the liquid used to wet the wipes should be tested for residual metals before use in taking samples from the incinerator. The wipe samples should be stored in precleaned glass jars and stored no longer than the allowable holding times stated in SW-846. Samples will be digested and analyzed for As, Be, Cd, Cr, Sb, Ba, Hg, Pb, Tl, and Ag (the metals regulated in incinerator emissions). Samples can be composited if desired, but compositing reduces opportunities for identifying localized contamination areas. At least one blank sample per sampling day must be prepared. Wiping only gives an indication of surface contamination which can easily be removed. Incinerator components with a large amount of strongly entrained

residuals might need to be scraped with a paint scraper and the scrapings analyzed. Criteria for acceptable levels of residual contamination are discussed below.

As an alternative to step 4, an incinerator owner may elect to dispose all incineration equipment as a hazardous waste.

CERTIFICATION OF ADEQUATE CLOSURE

The effectiveness of the closure decontamination process for organic contamination may be estimated by visual observation of any discolorations, stains, or gross pockets of apparent organic solids. This visual assessment is anticipated to be a suitable measure of possible organic contamination when followed by a rinse or cleanup of the affected areas with an appropriate solvent.

Effectiveness of metals decontamination may be determined by wipe sampling (as previously discussed), or by analyzing rinsate for contaminants left in the solvent solution. However, analysis of rinsate should be evaluated with regards to the total amount of rinsate in contact with the total area of the incinerator surfaces. Rinsate values could be elevated due to a leaching effect on the metallic surfaces of the incinerator. Evidence of elevated levels of contaminants in the wipe samples (as discussed below) suggest that additional cleaning and rinsing is necessary. Elevated contaminate concentrations also may indicate that an alternative contaminate removal method (e.g., sand-blasting, surface sealing, etc.) is necessary to remove or permanently contain contaminants.

Until EPA develops de minimus levels for the metals of concern, a suggested guide is to compare the results of incinerator wipe sampling with background levels as indicated by taking wipe samples of exterior building surfaces on or near the incineration site. This wipe sample should reflect background ambient air quality, including the impact of local mineralogy. An incinerator wipe sample that demonstrates a surface concentration at least 100 times greater than the background value for any metal should serve as an indicator that additional decontamination is needed prior to closure. Failure

to meet the criteria would require a repeat of the optional rinse/scrub of equipment (in step 4) followed by a repeat of wipe sampling; disposal of contaminated material as a hazardous waste is another alternative. Care should be taken in selecting areas for background sampling since such materials as painted surfaces and stainless steel may contain significant levels of some of the analytes.

The incinerator owner/operator will submit full documentation of the closure process to the permitting agency to receive certification of closure. A report should be submitted to the Agency describing each step of closure activities and the results of wipe sampling. Certification will allow the owner/operator to recycle the incinerator materials or dispose of the materials as a nonhazardous waste. Alternatively, closure certification may note the adequate disposal of incinerator equipment as a hazardous waste.

DELAY OF CLOSURE

The above approach assumes that the incineration facility is being closed and dismantled. If a facility is being closed as a RCRA facility but will either continue to operate as a nonhazardous waste facility or remain intact in storage for indefinite future operation, step 4 above could be delayed until dismantling occurs. However, the incineration facility will be subject to RCRA security requirements and, ultimately, RCRA closure requirements.

Table 1. SUMMARY OF RCRA INCINERATOR CLOSURE RECOMMENDATIONS

Step 1	Incineration of all remaining waste feeds and removal of all ash and scrubber effluent wastes
Step 2	Flush waste feed lines and mechanisms with kerosene or an equivalent solvent and incinerate rinsate
Step 3	Operate incinerator for at least 4 hr at the minimum permitted temperature with auxiliary fuel only, to provide burnout of any organic residues
Step 4	Optional decontamination of incinerator components with detergent, followed by mandatory wipe sampling of surfaces potentially contaminated with toxic metals (additional decontamination and wipe sampling would be conducted if needed)
Step 5	Certification of adequate closure based upon analytical results

Table 2. GENERAL GUIDE TO SOLUBILITY OF CONTAMINANTS
IN FOUR SOLVENT TYPES

Solvent	Soluble contaminants
Water	Low-chain hydrocarbons. Soluble inorganic compounds. Salts. Some organic acids and other polar compounds.
Aqueous Detergents	Many water soluble contaminants and insoluble particulates.
Dilute Acids	Basic (caustic) compounds. Amines. Hydrazines.
Dilute Bases For example: -detergent -soap	Acidic compounds. Phenols. Thiols. Some nitro and sulfonic compounds.
Organic Solvents For example: -alcohols -ethers -ketones -aromatics -straight-chain alkanes (e.g., hexane) -common petroleum products (e.g., fuel oil, kerosene) -chlorinated solvents	Many nonpolar or polar organic compounds.

Attachment 1

THIS LETTER WAS REKEYED TO BE ELECTRONICALLY AVAILABLE



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

June 19, 1989

Mr. Thomas C. Jorling
Commissioner
Department of Environmental Conservation
State of New York
Albany, New York 12233-1010

Dear Mr. Jorling:

I am writing in response to your letter of May 5, 1989, in which you ask numerous questions concerning the regulatory status, under the Resource Conservation and Recovery Act (RCRA), of environmental media (ground water, soil, and sediment) contaminated with RCRA-listed hazardous waste.

As you point out in your letter, it is correct that the Agency's "contained-in" interpretation is that contaminated environmental media must be managed as if they were hazardous wastes until they no longer contain the listed waste, or are delisted. This leads to the critical question of when an environmental medium contaminated by listed hazardous waste ceases to be a listed hazardous waste. In your letter, you discuss three possible answers (based on previous EPA positions and documents) which you believe address this question, and request the Agency to clarify its interpretation. Each of these is discussed below.

The first possible answer you cite would be that the contaminated media would be a hazardous waste unless and until it is delisted, based on the "mixture" and "derived-from" rules. As you correctly state in your letter, a waste that meets a listing description due to the application of either of these rules remains a listed hazardous waste until it is delisted. However, these two rules do not pertain to contaminated environmental media. Unlike our regulations, contaminated media are not considered solid wastes in the sense of being abandoned, recycled, or inherently waste-like as those terms are defined in the regulations. Therefore, contaminated environmental media cannot be considered a hazardous waste via the "mixture" rule (i.e., to have a hazardous waste mixture, a hazardous waste must be mixed with a solid waste per 40 CFR 261.3(a)(2)(iv)). Similarly, the "derived" from" rule does not apply to contaminated media. Our basis for stating that contaminated environmental media must be managed as hazardous wastes is that they "contain" listed hazardous waste. These environmental media must be managed as hazardous waste because, and only as long as, they "contain" a listed hazardous waste, (i.e., until decontaminated).

The second possibility you mention is that environmental media contaminated with a RCRA listed waste no longer have to be managed as a hazardous waste if the hazardous constituents are completely removed by treatment. This is consistent with the Agency's "contained-in" interpretation and represents the Agency's current policy.

THIS LETTER WAS REKEYED TO BE ELECTRONICALLY AVAILABLE

The third possibility you discuss comes from Sylvia Lawrence's January 24, 1989, memorandum that you cited in your letter. This memorandum indicates that OSW has not issued any definitive guidance as to when, or at what levels, environmental media contaminated with listed hazardous waste are no longer considered to contain that hazardous waste. It also states that until such definitive guidance is issued, the Regions may determine these levels on a case-specific basis. Where this determination involves an authorized State, such as New York, our policy is that the State may also make such a determination.

Related to such a determination, you ask whether a risk assessment approach that addressed the public health and environmental impacts of hazardous constituents remaining in treatment residuals would be acceptable. This approach would be acceptable for contaminated media provided you assumed a direct exposure scenario, but would not be acceptable for "derived-from" wastes under our current rules. Additionally, consistent with the statute, you could substitute more stringent standards or criteria for contaminated environmental media than those recommended by the Federal EPA if you determined it to be appropriate.

The Agency is currently involved in a rulemaking effort directed at setting de minimis levels for hazardous constituents below which eligible listed wastes, treatment residuals from those wastes, and environmental media contaminated with those listed wastes would no longer have to be managed as hazardous wastes. This approach being contemplated in the De Minimis program would be similar to that used in the proposed RCRA Clean Closure Guidance in terms of the exposure scenario (direct ingestion), the management scenario (not in a waste management unit), and the levels (primarily health-based).

Your final question related to whether the "remove and decontaminate" procedure set forth in the March 19, 1987 Federal Register preamble to the conforming regulations on closing surface impoundments applies when making complete removal determinations for soil. These procedures do apply when one chooses to clean close a hazardous waste surface impoundment by removing the waste. The preamble language states that the Agency interprets the term "remove" and "decontaminate" to mean removal of all wastes, liners, and/or leachate (including ground water) that pose a substantial present or potential threat to human health or the environment (52 FR 8706). Further discussion of these requirements is provided in a clarification notice published on March 28, 1988, (53 FR 1144) and in OSWER Policy Directive # 9476.00-18 on demonstrating equivalence of Part 265 clean closure with Part 264 requirements (copy enclosed).

I hope that this response will be helpful to you in establishing and implementing New York's hazardous waste policies on related issues. Should you have additional questions, please contact Bob Dellinger, Chief of the Waste Characterization Branch at (202) 475-8551.

Sincerely yours,

(original letter was signed by a
representative of Jonathan Cannon)
Jonathan Z. Cannon
Acting Assistant Administrator

ATTACHMENT 3

LIST OF CLOSURE COMPOUNDS OF CONCERN

List of Closure Compounds of Concern

CAS Number	Name	Description	Analysis
100-41-4	Ethylbenzene	Ethylbenzene	8260
100-42-5	Styrene	Styrene	8260
103-65-1	n-propylbenzene	n-propylbenzene	8260
105-67-9	2,4-Dimethylphenol	2,4-Dimethylphenol	8270
106-44-5	4-Methylphenol	4-Methylphenol	8270
106-46-7	1,4, -dichlorobenzene	1,4,-dichlorobenzene	8270
106-93-4	1,2,dibromoethane	Ethylene Dibromide (EDB)	8260
107-06-2	1,2,dichloroethane	EDC	8260
107-13-1	acrylonitrile	acrylonitrile	8260
108-05-4	vinyl acetate	vinyl acetate	8260
108-88-3	Toluene	Toluene	8260
108-90-7	Chlorobenzene	Chlorobenzene	8260
108-95-2	Phenol	Phenol	8270
109-99-9	tetrahydrofuran	tetrahydrofuran	8260
111-44-4	Bis(2-chloroethyl)ether	Bis(2-chloroethyl)ether	8270
117-81-7	bis (2-ethylhexyl) phthalate	bis (2-ethylhexyl) phthalate	8270
120-12-7	Anthracene	Anthracene	8270
120-82-1	1,2,4-Trichlorobenzene	1,2,4-Trichlorobenzene	8270
123-91-1	1,4-Dioxane	1,4-Dioxane	8270
124-48-1	Dibromochloromethane	Dibromochloromethane	8260
127-18-4	Tetrachloroethylene	PCE	8260
131-11-3	Demethyl phthalate	Demethyl phthalate	8270
132-64-9	Dibenzofuran	Dibenzofuran	8270
1330-20-7	Xylene	xylene	8260
1912-24-9	Atrazine	2-chloro-4-(ethylamino)-6-(isopropylamino)-	8141
121-75-5	Malathion	Malathion	8141
206-44-0	Fluoranthene	Fluoranthene	8270
208-96-8	Acenaphthylene	Acenaphthylene	8270
218-01-9	Chrysene	Chrysene	8270
309-00-2	Aldrin	Aldrin	8270
319-84-6	Alpha-BHC	Alpha-Hexachlorocyclohexane	8270
78-59-1	Isophorone	Isophorone	8270
51-28-5	2,4,Dinitrophenol	2,4,-Dinitrophenol	8270
541-73-1	1,3-dichlorobenzene	1,3-dichlorobenzene	8270
56-23-5	Carbon Tetrachloride	Carbon Tetrachloride	8260
56-55-3	Benz(a)anthracene	1	8270
57-74-9	Chlordane	Chlordane	8270
58-89-9	Lindane	Lindane	8270
591-78-6	2-Hexanone	2-Hexanone	8260
62-53-3	Aniline	Aniline	8270
67-64-1	acetone	acetone	8260
67-66-3	Chloroform	Chloroform	8260
71-43-2	Benzene	Benzene	8260
71-55-6	1,1,1trichloroethane	1,1,1trichloroethane	8260
72-20-8	Endrin	Endrin	8270
72-43-5	Methoxychlor	Methoxychlor	8270
72-54-8	4,4'-DDD		8270
7429-90-5	Aluminum	Fume or Dust Only	6010

List of Closure Compounds of Concern

CAS Number	Name	Description	Analysis
7439-92-1	Lead	Lead	6010
7439-96-5	Manganese	Manganese	6010
7439-97-6	Mercury	Mercury	7470
7440-02-0	Nickel	Nickel	6010
7440-22-4	Silver	Silver	6010
7440-36-0	Antimony	Antimony	6010
7440-38-2	Arsenic	Arsenic	6010
7440-39-3	Barium	barium	6010
7440-41-7	Beryllium	Beryllium	6010
7440-43-9	Cadmium	Cadmium	6010
7440-46-4	Copper	Copper	6010
7440-47-3	Chromium	Chromium	6010
7440-48-4	Cobalt	Cobalt	6010
7440-62-2	Vanadium	Vanadium	6010
7440-66-6	Zinc	Zinc	6010
74-83-9	Bromomethane	Bromomethane	8260
74-87-3	chloromethane	methyl chloride	8260
75-00-3	chloroethane	chloroethane	8260
75-09-2	Methylene chloride	Methylene Chloride	8260
75-15-0	Carbon Disulfide	Carbon Disulfide	8260
75-25-2	Bromoform	Bromoform	8260
75-27-4	Bromodichloromethane	Bromodichloromethane	8260
75-34-3	1,1dichlorethane	1,1,dichloroethane	8260
75-35-4	1,1dichloroethene	1,1dichloroethene	8260
75-69-4	Trichlorofluoromethane		8260
75-71-8	Dichlorodifluoromethane	Dichlorodifluoromethane	8260
76-13-1	Freon 113	Freon 113	8260
129-00-0	Pyrene	Pyrene	8270
76-44-8	Heptachlor	Heptachlor	8270
78-87-5	1,2,dichloropropane	1,2,dichloropropane	8260
78-93-3	Methyl ethyl ketone	MEK	8260
79-00-5	1,1,2-Trichloroethane	1,1,2-Trichloroethane	8260
79-01-6	Trichloroethylene	TCE	8260
79-34-5	1,1,2,2,-Tetrachloroethane	1,1,2,2,-Tetrachloroethane	8260
8001-35-2	Toxaphene	Toxaphene	8270
80-62-6	Methyl methacrylate	Methyl methacrylate	8260
82870-81-3	Thallium	Thallium	6010
83-32-9	Acenaphthene	Acenaphthene	8270
84-66-2	Diethylphthalate	Diethylphthalate	8270
84-74-2	Dibutyl Phthalate	Dibutyl Phthalate	8270
85-01-8	Phenanthrene	Phenanthrene	8270
86-73-7	Fluorene	Fluorene	8270
87-68-3	1,3 - Hexachlorobutadiene	1,3-Hexachlorobutadiene	8270
87-86-5	Pentachlorophenol	PCP	8270
88-74-4	2-Nitroaniline	2-Nitroaniline	8270
91-20-3	Naphthalene		8270
91-57-6	2-Methylnaphthalene	2-Methylnaphthalene	8270
95-47-6	o-Xylene	o-Xylene	8260

List of Closure Compounds of Concern

CAS Number	Name	Description	Analysis
95-48-7	2-Methylphenol	2-Methylphenol	8270
95-50-1	1,2, dichlorobenzene	1,2 dichlorobenzene	8270
95-63-6	1,2,4,trimethylbenzene	1,2,4,trimethylbenzene	8260
96-18-4	1,2,3,trichloropropane	1,2,3,trichloropropane	8260
98-86-2	Acetophenone	Acetophenone	8270
98-95-3	Nitrobenzene	Nitrobenzene	8270
99-09-2	3-Nitroaniline	3-Nitroaniline	8270

ATTACHMENT 4

RF-1 CLOSURE COST ESTIMATE

RF-1 Closure Cost Estimate

Date: April 2012

Item/Activity	Number	Units	Cost per unit	Associated Item/Activity Cost
CARBON REACTIVATION UNIT CLOSURE COSTS				
Removal of residuals (sludge, activated carbon, slag) 1 unit x 16 hours/unit x \$30/hour x 3 Persons	48	manhours	\$30	\$1,440
Disposal of residuals drums 2 x 55 gal drums x \$1,000/drum	2	drums	\$1,000	\$2,000
RF-1 refractory removal (1 unit x 40 hours x \$50/hr x 3 persons)	120	manhours	\$50	\$6,000
Disposal of refractory (\$500/yd x 20 yd/macro box x 3 boxes)	60	yards	\$500	\$30,000
Carbon reactivation unit decontamination (1 equipment item x 16 hours/item x \$50/hour x 3 persons)	48	manhours	\$50	\$2,400
Rental of decontamination equipment 5 days x \$100/day	5	days	\$100	\$500
Disposal of rinsate at POTW	1	disposal	\$1,000	\$1,000
One sample of rinsate (plus MS/MSD for QC) will be required for 1 small equipment batch at \$1,010/sample (1 batch x 3 samples, metals & organic COCs)	3	samples	\$1,010	\$3,030
Rental of vacuum truck 1 truck x 2 days x \$500/day	2	days	\$500	\$1,000
Disassembly of carbon reactivation unit RF-1 (80 manhours x \$50/hr)	80	manhours	\$50	\$4,000
Rental of 70 Ton Crane (Crane @ \$200/hr and Rigger @\$55/hr) 40 hours @ \$255/hour (includes 1 hour mobilization/1 hour demobilization)	40	hours	\$255	\$10,200
Shipment of disassembled carbon reactivation unit offsite for scrap metal (1 load x \$565/load)	1	truck loads	\$565	\$565
Supervision and management (includes PPE and incidentals) 40 hours x \$50/hour	40	manhours	\$50	\$2,000
				\$64,135
AFTERBURNER (AB-1) UNIT CLOSURE COST				
Removal of residuals (sludge, activated carbon, slag) 1 unit x 40 hours/unit x \$30/hour x 3 Persons	120	manhours	\$30	\$3,600
Disposal of residuals drums 2 x 55 gal drums x \$1,000/drum	2	drums	\$1,000	\$2,000
AB-1 afterburner refractory removal (1 unit x 16 hours x \$50/hr x 3 persons)	120	manhours	\$50	\$6,000
Disposal of refractory (\$500/yd x 20 yd/macro box x 2 boxes)	40	yards	\$500	\$20,000
Afterburner decontamination (1 equipment item x 16 hours/item x \$50/hour x 3 persons)	48	manhours	\$50	\$2,400
Rental of decontamination equipment 2 days x \$100/day	2	days	\$100	\$200
Disposal of rinsate at POTW	1	disposal	\$1,000	\$1,000
One sample of rinsate (plus MS/MSD for QC) will be required for 1 small equipment batch at \$1,010/sample (1 batch x 3 samples, metals & organic COCs)	3	samples	\$1,010	\$3,030
Rental of vacuum truck 1 truck x 2 days x \$500/day	2	days	\$500	\$1,000
Disassembly of carbon reactivation unit (RF-2, afterburner, Quench/Venturi, Packed Bed scrubber, WESP, ID Fan, Stack) (80 manhours x \$50/hr)	80	manhours	\$50	\$4,000
Rental of 70 Ton Crane (Crane @ \$200/hr and Rigger @\$55/hr) 40 hours @ \$255/hour (includes 1 hour mobilization/1 hour demobilization)	40	hours	\$255	\$10,200
Shipment of disassembled carbon reactivation unit offsite for scrap metal (1 load x \$565/load)	1	truck loads	\$565	\$565
Supervision and management (includes PPE and incidentals) 40 hours x \$50/hour	40	manhours	\$50	\$2,000
				\$55,995
CARBON SLURRY LINES CLOSURE COSTS				
Removal of Lines 16 hours x \$30/hour x 2 persons	32	manhours	\$30	\$960
Rental of 70 Ton Crane (Crane @ \$200/hr and Rigger @\$55/hr) 4 hours @ \$255/hour (includes 1 hour mobilization/1 hour demobilization)	4	hours	\$255	\$1,020
Disposal of lines (macroencapsulation) \$500/yard x 20 yards/box x 0.33 Boxes	6.666667	yards	\$500	\$3,333
Transportation 700 Miles x \$2.75/mile x 0.33 boxes	0.33	loads	\$1,925	\$635
				\$5,949

RF-1 Closure Cost Estimate

Date: April 2012

Item/Activity	Number	Units	Cost per unit	Associated Item/Activity Cost
TANK T-8 OVERFLOW LINE CLOSURE COSTS				
Removal of Line 16 hours x \$30/hour x 2 persons	32	manhours	\$30	\$960
Rental of 70 Ton Crane (Crane @ \$200/hr and Rigger @\$55/hr) 8 hours @ \$255/hour (includes 1 hour mobilization/1 hour demobilization)	8	hours	\$255	\$2,040
Disposal of lines (macroencapsulation) \$500/yard x 20 yards/box x 0.33 Boxes	6.666667	yards	\$500	\$3,333
Transportation 700 Miles x \$2.75/mile x 0.33 boxes	0.33	loads	\$1,925	\$635
				\$6,969
TANK T-8 CLOSURE COSTS				
Removal of residuals (sludge, activated carbon) 1 unit x 16 hours/unit x \$30/hour x 3 Persons	48	manhours	\$30	\$1,440
Disposal of residuals drums 2 x 55 gal drums x \$1,000/drum	2	drums	\$1,000	\$2,000
Tank decontamination 1 tanks x 16 hours/tank x \$30/hour x 3 people	16	manhours	\$30	\$480
Rental of decontamination equipment 2 days x \$100/day	2	days	\$100	\$200
Decontamination of tank containment 24 man hours x \$30/hour	24	manhours	\$30	\$720
Disposal of rinsate at POTW	1	disposal	\$1,000	\$1,000
One sample of rinsate (plus MS/MSD for QC) will be required for 1 small equipment batch at \$1,010/sample (1 batch x 3 samples, metals & organic COCs)	3	samples	\$1,010	\$3,030
Disassembly of tanks (80 manhours/tank x \$50/hr x 5 tanks)	400	manhours	\$50	\$20,000
Shipment of tanks offsite for scrap metal (5 loads x \$565/load)	5	truck loads	\$565	\$2,825
Supervision and management (includes PPE and incidentals) 40 hours x \$50/hour	40	manhours	\$50	\$2,000
				\$33,695
PACKED TOWER SCRUBBER AND SCRUBBER PACKING CLOSURE COSTS				
Removal of residuals (any residual liquids) 1 unit x 16 hours/unit x \$30/hour x 3 Persons	48	manhours	\$30	\$1,440
Disposal of Residuals Drum 1 x 55 gallon drums @ \$1,000/drum	1	drums	\$1,000	\$1,000
Removal of Scrubber Packing 1 unit x 16 hours/unit x \$30/hour x 3 Persons	48	manhours	\$30	\$1,440
Removal of and Demolition of Packed Tower 40 hours/unit x \$30/hour x 3 Persons	120	manhours	\$30	\$3,600
Rental of 70 Ton Crane (Crane @ \$200/hr and Rigger @\$55/hr) 8 hours @ \$255/hour (includes 1 hour mobilization/1 hour demobilization)	8	hours	\$255	\$2,040
Disposal of Scrubber, Packing, PPE, etc. (macroencapsulation) \$500/yard x 20 yards/box x 0.5 Boxes	10	yards	\$500	\$5,000
Transportation 700 Miles x \$2.75/mile x 0.5 boxes	0.5	loads	\$1,925	\$963
				\$15,483
INDUCED DRAFT FAN CLOSURE COSTS				
Removal of Fan 16 hours x \$30/hour x 2	16	manhours	\$30	\$480
Rental of 70 Ton Crane (Crane @ \$200/hr and Rigger @\$55/hr) 4 hours @ \$255/hour (includes 1 hour mobilization/1 hour demobilization)	4	hours	\$255	\$1,020
Disposal of Fan, PPE, etc. (macroencapsulation) \$500/yard x 20 yards/box x 0.5 Boxes	10	yards	\$500	\$5,000
Transportation 700 Miles x \$2.75/mile x 0.5 boxes	0.5	loads	\$1,925	\$963
				\$7,463
SPENT CARBON DEWATERING SCREW CLOSURE COSTS				
Removal of Screw 16 hours x \$30/hour x 2	16	manhours	\$30	\$480
Rental of 70 Ton Crane (Crane @ \$200/hr and Rigger @\$55/hr) 4 hours @ \$255/hour (includes 1 hour mobilization/1 hour demobilization)	4	hours	\$255	\$1,020
Disposal of Screw, PPE, etc. (macroencapsulation) \$500/yard x 20 yards/box x 0.33 Boxes	6.666667	yards	\$500	\$3,333
Transportation 700 Miles x \$2.75/mile x 0.33 boxes	0.33	loads	\$1,925	\$635
				\$5,469

RF-1 Closure Cost Estimate

Date: April 2012

Item/Activity	Number	Units	Cost per unit	Associated Item/Activity Cost
UN-USED DECONTAMINATION WATER				
3 samples of un-used decontamination water (plus MS/MSD for QC)				
\$1,010/sample (5 samples, metals & organic COCs)	5	samples	\$1,010	\$5,050
				\$5,050
SCRAP METAL HANDLING COSTS				
Removal of Scrap Metal and Hauling for Recycling				
\$1,500/trip x 2 trips	2	loads	\$1,500	\$3,000
				\$3,000
SAMPLING LABOR				
5 Sampling events x 8 hr/event x \$30/hr	40	manhours	\$30	\$1,200
				\$1,200
PROFESSIONAL ENGINEER CERTIFICATION AND REPORT				
Professional Engineer certification and report	1	report	\$4,000	\$4,000
				\$4,000
Subtotal Closure Costs (All RF-1 Activities)				\$208,406
Project Management, Engineering, Planning (10%)				\$20,841
Estimated Total Closure Costs (No Contingency)				\$229,246
Contingency (10%)				\$22,926
GRAND TOTAL CLOSURE COST ESTIMATE				\$252,172