

**Waste Stream Analysis
(Classification Protocol)
130 Liberty Street**

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TP-16 Rev 2

* This document is intended as a draft working document for the sole use of Deutsche Bank and its insurers in the matter of the 130 Liberty Street property (the Building). As such, the specific language and results contained herein will be modified, refined, and updated on an ongoing basis as further results and information are developed. Any opinions or exclusions expressed herein will be modified at the discretion of RJ Lee Group as warranted by additional information.

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1 OBJECTIVE

The objective of this specification is to provide guidelines for the proper waste classification of the contents at 130 Liberty Street (the Building). An ongoing effort has been pursued to classify waste according to applicable city, state, federal and scientifically justified analysis. This document is intended as a draft working document to be used during ongoing operations at the Building and will be updated as appropriate.

This protocol provides:

- 1) Basis for the classification of the building components by major category
- 2) Basis for the disposition criteria for each item
- 3) Definitions of the various regulatory issues relative to the classification

2 BUILDING INVENTORY

The attached inventory spreadsheet (Attachment A) provides a listing of all material currently found throughout the Building. The spreadsheet provides a breakdown of the inventory by major category, a disposal classification along with the basis used for the classification, and the current status of the individual items. As necessary in ongoing building operations, additional items may be added to this inventory when new information becomes available.

The basis used for the determination of the major categories, the disposition classification, and the status of the material is provided in the sections below. Each section corresponds to a column within Attachment A.

2.1 MAJOR WASTE CATEGORIES

All components of the Building have been grouped into one of 14 major waste categories. These categories are:

- Biological – category includes all food products remaining in kitchen and pantry areas, microwave ovens, cubicles, etc. Also includes plants, dry goods from storage areas and the contents of all vending machines.
- Building Structure – category includes all major structural components of the building along with internal tenant fit-out components. This category includes concrete floors, curtain wall, wall & ceiling systems and structural steel.
- Electrical Equipment – category includes a portion of the major building electrical equipment, equipment/system controllers, and miscellaneous office items.

- Electronics – category includes all computers and related peripherals, all personal electronics, and any other pieces of equipment that include printed circuit boards.
- Fill Material – category includes the earth fill located in the “ramp” area of the building.
- Fire System – category includes all fire extinguishers, fire hoses and smoke detectors.
- Freon Equipment – category includes all types of refrigerated equipment, i.e., refrigerators, soft drink vending machines, water coolers, soft drink and juice dispensing machines, etc.
- Furniture (Non Porous) – category includes all metal and Formica topped desks, metal and Formica topped credenzas, wood desks, credenzas, non upholstered wood chairs, cubicle desk assemblies, plastic chairs, filing cabinets.
- Furniture (Porous) – category includes all carpeting, fabric covered cubicle walls, and all upholstered furniture.
- Kitchen Equipment – category includes all equipment from the 4th floor kitchen, i.e., stoves, racks, mixing equipment, utensils, etc.
- Major Mechanical – category includes all the major mechanical equipment, the majority of which resides on the 5th, 40th and 41st floors. This category includes AC units, chillers, elevators, exchangers, fans, pumps etc.
- Network Equipment – category includes all IT equipment associated with the file servers communication equipment (this category may be considered a subset of the Electronics category).
- Other – category includes all miscellaneous items, i.e., office supplies, stationary, personal items, etc.
- Spent Cleaning Supplies – category includes all the waste generated during the remediation of the building and equipment.

2.2 DISPOSITION CLASSIFICATION

All components of the Building have been grouped into one of 10 disposal categories. These categories are:

- ACM – Asbestos Containing Material; classification includes all upholstered furniture, carpeting, fabric wall coverings, and fabric covered cubicle partitions. Material designated ACM is not considered hazardous but it is regulated by the Department of Transportation (DOT) for shipping and must be processed and secured in accordance with city, state and federal regulations.

Management of ACM depends on whether it is friable or non-friable; if it is non-friable, whether it is category I or II; if it is category I, whether it is C & D material. Definitions of asbestos are provided below.

Category I non-friable ACM – is defined as “...packings, gaskets, resilient floor covering & asphalt roofing...containing...asbestos...that ...cannot be crumbled...to powder by hand pressure.” Category I ACM is pliable (not brittle), breaks by tearing rather than fracturing, and does not easily release asbestos fibers upon breaking.

Category II non-friable ACM – is defined as “any material, excluding category I non-friable ACM, containing...asbestos...that...cannot be crumbled...to powder by hand pressure.” This includes rigid exterior siding & boards known by the trade name “transite”. Category II ACM is not pliable, breaks by fracturing rather than tearing, and does release some asbestos fiber upon breaking.

Friable ACM – is defined as “any material containing...asbestos...that ...can be crumbled...to a powder by hand pressure.” Common types of friable ACM include pipe insulation & sprayed on or tiled sound insulation materials. Friable ACM has little structural strength and contains asbestos fibers, which are readily released upon breaking.

Some Category I ACM may be disposed of as C & D material, however, due to the mixture of Category I and Category II ACM at the Building all material within this category will be disposed of as ACM.

- Clean Fill – classification includes inert solid material that is not hazardous, i.e. all constituents are below a “safe” level.
- C & D – classification includes non-hazardous construction and demolition materials along with building and office components that do not exhibit a **toxicity characteristic (TC)**. By volume, this category is expected to provide the largest quantity of material.
- C & D/REFRIG – classification includes non-hazardous construction and demolition materials containing refrigerant.
- HAZ – classification includes the majority of the IT and other electronic equipment. This disposal classification also includes components from other major categories that exhibit a Toxicity Characteristic (TC).
- RECYCLE – classification includes the building structure components such as anodized aluminum (curtain wall), glass (interior/exterior) and structural steel.
- TESTING – classification includes those items that were chosen for analytical testing at RJ Lee Group labs. These items will be submitted for TCLP Metals analysis. The items chosen for testing are from the electronics category. The testing is being conducted in an effort to determine if a general disposal classification may be used for all items within the category. A general decision tree has been adopted as a method to streamline the classification of electronics and is shown in Appendix 2.

- UNIVERSAL – classification currently covers fluorescent light tubes, mercury containing switches, and batteries. The EPA created the universal waste designation as a means to more efficiently handle certain categories of material. The regulations require recycling of the specified material (disposal is prohibited).
- UNKNOWN – disposal classification for items in this category has yet to be determined.
- WTC DUST – classification includes all fine debris generated from HEPA vacuuming (actual material and filters), the primary and secondary air filtration device (AFD) filters and the cloths used for wet wiping.

2.3 DISPOSITION BASIS

The disposition basis provides the regulatory basis for classification. The major categories are EPA, RCRA and TSCA.

- **EPA** – This basis is typically associated with the ACM and Universal classifications.

The EPA classified “Asbestos Containing Material” (ACM) as any material or product which contains more than 1 percent asbestos (40 CFR Part 763.83). This designation typically applies to material or products manufactured from asbestos. It also applies to dust if the dust is determined by an accredited inspector to be ACM.

Relative to the Building inventory (Attachment A), nothing within the building is expected to meet the EPA ACM criteria of 1% asbestos requiring subsequent disposal as ACM. However, with regard to carpeting (and by definition upholstered furniture, draperies and other fabric covered items, i.e., cubicle dividers, wall coverings, etc.) neither the EPA nor the Clean Air Act asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) specifically require the removal of asbestos-contaminated carpet.

The Army Corps of Engineers has guidelines that are clearer on asbestos-contaminated carpet. They specifically require that carpet be removed if contaminated with any level of asbestos, not just levels over 1%. The only abatement option is removal, not cleaning. Reference U.S. Army Corps of Engineers (1992) Asbestos Abatement Guideline Detail Sheets, Engineer Pamphlet 1110-1-11.

- **RCRA** – Resource Conservation and Recovery Act. This basis is typically associated with the Hazardous and C&D classifications.

The hazardous classification is based upon EPA guidelines. The EPA decided the characteristics of hazardous waste should be detectable by using a standardized test method or by applying general knowledge of the waste’s properties. Given these criteria, EPA established four hazardous waste characteristics:

- Ignitability

- Corrosivity
- Reactivity
- Toxicity

The Subtitle C program is designed to manage hazardous waste from cradle to grave. The Uniform Hazardous Waste Manifest (Form 8700-22) plays a crucial part in this management system. The manifest allows all parties involved in hazardous waste management (e.g., generators, transporters, TSDFs, EPA, state agencies) to track the movement of hazardous waste from the point of generation to the point of ultimate treatment, storage, or disposal.

- **TSCA – Toxic Substances Control Act.** This basis is typically associated with the Hazardous classification, primarily any possible PCB containing equipment. The Toxic Substances Control Act (TSCA) was enacted in 1976, and subsequently banned the production of PCBs in the United States. The specific regulations governing the use and disposal of PCBs are found in Volume 40 Code of Federal Regulations (CFR) Part 761. Also, generators of PCB-containing wastes may be subject to notification and liability provisions under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) also known as “Superfund”. A generator of PCB-containing waste could be liable in any subsequent Superfund cleanup. Therefore, high temperature incineration is the preferred method of disposal because it destroys PCBs, removing them from the waste stream permanently and removing the potential for future CERCLA liability.

2.4 STATUS

The **Status** column within Attachment A provides information relative to the “Readiness for Disposal”. The options are:

- Ready for Disposal – this option is assigned when the disposition classification has been determined.
- Testing in Progress – this option is assigned to those items that have been picked for further testing by RJLG labs. The testing is to determine the classification by means of TCLP metals analysis.

3 ANALYTICAL METHODS

Various analytical methods were employed to determine the disposal classification of the building contents. A summary of these methods has been included in the appendices of this protocol. For individual classifications the following test procedures were followed.

- **ACM (Asbestos Containing Material)**

D 6480-99 Standard Test Method for Wipe Sampling of Surfaces, Indirect Preparation of Analysis for Asbestos Structure Number Concentration by Transmission Electron Microscopy.

D 5755-02 Standard Test Method for Microvacuum Sampling and Indirect Analysis of Asbestos by Transmission Electron Microscopy for Asbestos Structure Number Concentration.

D 5756-02 Standard Test Method of Microvacuum Sampling and Indirect Analysis of Samples by Transmission Electron Microscopy for Asbestos Mass Concentration.

D 6281-98 Standard Test Method for Airborne Asbestos Concentration in Ambient and Indoor Atmospheres as Determined by Transmission Electron Microscopy Direct Transfer (TEM).

D 1368-02 Standard Practice for Visual Inspection of Asbestos Abatement Projects.

- **Clean Fill**

EPA waste characterization tests were conducted on the fill located in the “ramp” area of 130 Liberty. Various analytical methods were used to analyze for totals (metals, semivolts, PCBs, dioxin) and TCLP parameters. Characteristics such as reactivity, corrosivity and ignitability were also evaluated.

- **Haz (Hazardous Waste Material)**

The EPA developed the **toxicity characteristic (TC)** to identify wastes likely to leach dangerous concentrations of toxic chemicals (and metals) into groundwater (the majority of the building components are characterized in this manner). Appendix 1 lists the contaminants and concentrations levels for Toxicity Characteristic.

The following provides a concise definition of the TCLP procedure. This was presented in a paper entitled “**End-of-Life Computer and Electronics Recovery Policy Options for the Mid-Atlantic States**”

“A key element for defining whether a discarded item is hazardous or not is the Toxicity Characterization Leaching Procedure (TCLP). In a nutshell, the TCLP procedure is intended to simulate a 20-year decomposition process in a landfill. A sample of the item in question is ground into fine particles and then subjected to a weak acid. The mixture is then filtered and analyzed for evidence of heavy metals and other toxic substances. Using tables that define regulatory thresholds for concentrations of the items found, the relative hazardousness of the item in question is then determined. For computers and other electronics, the most hazardous substances identified are lead, cadmium and mercury. The most significant sources of these items are monitors (lead-based CRT screens), TVs, mercury switches, lighting products and batteries. This report is of course only concerned with computer and TV related waste.”

- **WTC Dust**

Bulk and lift samples of the dust that had been dispersed as a result of the WTC collapse were analyzed using multiple microscopy techniques. For sample characterization **Scanning Electron Microscopy coupled with Energy Dispersive X-ray Spectroscopy (SEM/EDS)** along with

Polarized Light Microscopy (PLM) using point counting method in accordance with NYS ELAP 198.1 method were utilized. A total of 100 particles were evaluated from each sample at magnification ranging from 250X to 5000X. Particles were classified based on elemental composition and particle morphology.

WTC Dust was also characterized as an ACM “non-hazardous waste” in accordance with 40 CFR part 261. Based on these findings, the material can be disposed of without precautions beyond the restrictions applicable to friable asbestos containing material. However, given the unique nature of the WTC dust (finely divided, high surface area, alkaline, contaminant laden), the material will be encapsulated prior to disposal. By encapsulating the waste, the potential to leach chemicals (e.g., dioxins, metals) and to liberate fibers into the environment during handling and storage will be substantially reduced or eliminated.

4 DISPOSAL/HANDLING PROCEDURES

All waste components from the Building have been assigned disposal procedures relevant to the waste classification type. These procedures are as follows:

- Asbestos Containing Material (ACM) is to be double bagged in 6-mil poly bags, affix OSHA required warning label to bag and placed into trailer designated for ACM.
- Clean Fill is to be loaded into trucks and hauled to land fill.
- Construction and Demolition (C&D) debris is to be HEPA vacuumed and wet wiped, smaller items are to be double bagged in 6-mil poly bags, larger items sprayed with an encapsulating solvent and placed into trailer designated for C&D. Larger items are to be rendered useless by crushing or compacting at disposal facility.
- Construction and Demolition debris containing refrigerant will have refrigerant removed by a licensed refrigerant removal service, HEPA vacuumed and wet wiped, doors removed (if any), sprayed with an encapsulating solvent and placed into trailer designated for C&D. Items are to be rendered useless by crushing or compacting at disposal facility.
- Hazardous Material (HAZ) is to be HEPA vacuumed, double bagged in 6-mil poly bags, labeled as “Hazardous Waste” along with manifest number generator’s name and address and placed into trailer designated for Hazardous Material. The Subtitle C program is designed to manage hazardous waste from cradle to grave. The Uniform Hazardous Waste Manifest (Form 8700-22) plays a crucial part in this management system. The manifest allows all parties involved in hazardous waste management (e.g., generators, transporters, TSDFs, EPA, state agencies) to track the movement of hazardous waste from the point of generation to the point of ultimate Treatment, Storage, or Disposal Facility (TSDF).
- Recyclable Material (RECYCLE) is to be segregated into similar material types and sent to appropriate recyclers.

- Universal Wastes (UNIVERSAL) are to be HEPA vacuumed and wet wiped, shrink wrapped, segregated into similar component types and placed into trailers for appropriate recycler type.
- WTC DUST is to be double bagged in 6-mil poly bags, labeled as "WTC Dust" and placed into trailer designated for WTC Dust.

There are a number of unique wastes that reside in the Building including, but not limited to documents, medical wastes, pressurized cylinders and PCB containing equipment. The disposal procedures for these items are a variation of the previously mentioned procedures. The exact procedure is tailored to meet the specific type of waste component.

5 APPENDICES

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Appendix 1 Section 261.24 Toxicity Characteristic

[Code of Federal Regulations]

[Title 40, Volume 22]

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[Page 58]

TITLE 40--PROTECTION OF ENVIRONMENT
CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY (CONTINUED)
PART 261--IDENTIFICATION AND LISTING OF HAZARDOUS WASTE--Table of Contents
Subpart C--Characteristics of Hazardous Waste
Sec. 261.24 Toxicity characteristic.

(a) A solid waste (except manufactured gas plant waste) exhibits the characteristic of toxicity if, using the Toxicity Characteristic Leaching Procedure, test Method 1311 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA Publication SW-846, as incorporated by reference in Sec. 260.11 of this chapter, the extract from a representative sample of the waste contains any of the contaminants listed in Table 1 at the concentration equal to or greater than the respective value given in that table. Where the waste contains less than 0.5 percent filterable solids, the waste itself, after filtering using the methodology outlined in Method 1311, is considered to be the extract for the purpose of this section.

(b) A solid waste that exhibits the characteristic of toxicity has the EPA Hazardous Waste Number specified in Table I which corresponds to the toxic contaminant causing it to be hazardous.

Table 1--Maximum Concentration of Contaminants for the Toxicity Characteristic

EPA HW No. (1)	Contaminant	CAS No. (2)	Regulatory Level (mg/L)
D004	Arsenic	7440-38-2	5.0
D005	Barium	7440-39-3	100.0
D018	Benzene	71-43-2	0.5
D006	Cadmium	7440-43-9	1.0
D019	Carbon tetrachloride	56-23-5	0.5
D020	Chlordane	57-74-9	0.03
D021	Chlorobenzene	108-90-7	100.0
D022	Chloroform	67-66-3	6.0
D007	Chromium	7440-47-3	5.0
D023	o-Cresol	95-48-7 (4)	200.0
D024	m-Cresol	108-39-4 (4)	200.0
D025	p-Cresol	106-44-5 (4)	200.0
D026	Cresol	(4)	200.0
D016	2,4-D	94-75-7	10.0
D027	1,4-Dichlorobenzene	106-46-7	7.5
D028	1,2-Dichloroethane	107-06-2	0.5
D029	1,1-Dichloroethylene	75-35-4	0.7

D030	2,4-Dinitrotoluene	121-14-2 (3)	0.13
D012	Endrin	72-20-8	0.02
D031	Heptachlor (and its epoxide).	76-44-8	0.008
D032	Hexachlorobenzene	118-74-1 (3)	0.13
D033	Hexachlorobutadiene	87-68-3	0.5
D034	Hexachloroethane	67-72-1	3.0
D008	Lead	7439-92-1	5.0
D013	Lindane	58-89-9	0.4
D009	Mercury	7439-97-6	0.2
D014	Methoxychlor	72-43-5	10.0
D035	Methyl ethyl ketone	78-93-3	200.0
D036	Nitrobenzene	98-95-3	2.0
D037	Pentachlorophenol	87-86-5	100.0
D038	Pyridine	110-86-1 (3)	5.0
D010	Selenium	7782-49-2	1.0
D011	Silver	7440-22-4	5.0
D039	Tetrachloroethylene	127-18-4	0.7
D015	Toxaphene	8001-35-2	0.5
D040	Trichloroethylene	79-01-6	0.5
D041	2,4,5-Trichlorophenol	95-95-4	400.0
D042	2,4,6-Trichlorophenol	88-06-2	2.0
D017	2,4,5-TP (Silvex)	93-72-1	1.0
D043	Vinyl chloride	75-01-4	0.2

Notes

(1) Hazardous waste number.

(2) Chemical abstracts service number.

(3) Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.

(4) If o-, m-, and p-Cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/l.

[55 FR 11862, Mar. 29, 1990, as amended at 55 FR 22684, June 1, 1990; 55 FR 26987, June 29, 1990; 58 FR 46049, Aug. 31, 1993; 67 FR 11254, Mar. 13, 2002]

Appendix 2 Decision Tree for Classification of Electronic Components

