Chapter NR 605

IDENTIFICATION AND LISTING OF HAZARDOUS WASTE

NR 605.01 Purpose. The purpose of this chapter is to establish criteria for identifying the characteristics of hazardous waste and to establish a list of solid wastes identified as hazardous based upon the use of the criteria, which shall be used by a solid waste generator, transporter or owner or operator of a solid waste treatment, storage or disposal facility to determine if the waste handled is a hazardous waste subject to regulation.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91.

NR 605.02 Applicability. This chapter identifies those solid wastes which are subject to regulation as hazardous waste under chs. NR 600 to 685. This chapter does not apply to metallic mining wastes resulting from a mining operation as defined in s. 144.81 (5), Stats., or polychlorinated biphenyls (PCBs) except where portions of this chapter are referenced in ch. NR 157.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91.

NR 605.03 Definitions. The definitions in s. NR 600.03 apply to this chapter.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91.

NR 605.04 Definition of hazardous waste. (1) A solid waste is a hazardous waste if:

(a) It is not excluded from regulation as a hazardous waste under s. NR 605.05 (1) to (1r); and

(b) It meets any of the following criteria:

1. It is listed in s. NR 605.09 and has not been excluded from the lists under s. NR 605.10.

2. It is a mixture of solid waste and one or more hazardous wastes listed in s. NR 605.09 and has not been excluded under s. NR 605.10; however, the following mixtures of solid wastes and hazardous wastes listed in s. NR 605.09 are not hazardous wastes, except by application of subd. 1. or 3., if the generator can demonstrate that the mixture consists of wastewater, the discharge of which is subject to regulation under ch. 147, Stats., including wastewater at facilities which have eliminated the discharge of wastewater, and:

a. One or more of the following spent solvents listed in s. NR 605.09 (2) (a), table II: carbon tetrachloride, tetrachloroethylene, trichloroethyl-

ene; if the maximum total weekly usage of these solvents, other than the amounts that may be demonstrated not to be discharged to wastewater, divided by the average weekly flow of wastewater into the headworks of the facility's wastewater treatment or pretreatment system does not exceed one part per million; or

b. One or more of the following spent solvents listed in s. NR 605.09 (2) (a), table II: methylene chloride, 1,1,1-trichloroethane, chlorobenzene, o-dichlorobenzene, cresols, cresylic acid, nitrobenzene, toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, spent chlorofluorocarbon solvents; if the maximum total weekly usage of these solvents, other than the amounts that may be demonstrated not to be discharged to wastewater, divided by the average weekly flow of wastewater into the headworks of the facility's wastewater treatment or pretreatment system does not exceed 25 parts per million; or

c. One of the following wastes listed in s. NR 605.09 (2) (b), table III: heat exchanger bundle cleaning sludge from the petroleum refining industry, hazardous waste no. K050; or

d. A discarded commercial chemical product, or chemical intermediate listed in s. NR 605.09 (3) (b), table IV or (c), table V, arising from minimal losses of these materials from manufacturing operations in which these materials are used as raw materials or are produced in the manufacturing process. For purposes of this paragraph, "minimal" losses include those from normal material handling operations, e.g. spills from the unloading or transfer of materials from bins or other containers, leaks from pipes, valves or other devices used to transfer materials; minor leaks of process equipment, storage tanks or containers; leaks from well-maintained pump packings and seals; sample purgings; relief device discharges; discharges from safety showers and rinsing and cleaning of personal safety equipment, and rinsate from empty containers or from containers that are rendered empty by that rinsing; or

e. Wastewater resulting from laboratory operations containing hazardous wastes listed in s. NR 605.09, tables I to V with the hazard code (t) if the annualized average flow of laboratory wastewater does not exceed one percent of total wastewater flow into the headworks of the facility's wastewater treatment or pretreatment system, or provided the wastes combined annualized average concentration does not exceed one part per million in the headworks of the facility's wastewater treatment or pretreatment facility. Toxic (T) wastes used in laboratories that are demonstrated not to be discharged to wastewater are not to be included in this calculation.

3. It exhibits any of the characteristics of hazardous waste identified in s. NR 605.08.

4. Except as provided in subd. 5, it is generated from the treatment, storage or disposal of a hazardous waste, including any sludge, spill residue, ash, emission control dust or leachate, and it is a waste which is listed under s. NR 605.09, contains a waste listed under s. NR 605.09, or is derived from a waste listed under s. NR 605.09, and it has not been excluded under s. NR 605.10.

5. It is a waste pickle liquor sludge derived from the lime stabilization treatment of spent pickle liquor from the iron and steel industry falling under the standard industrial classification (SIC) codes 331 and 332, and

the sludge exhibits one or more of the characteristics of hazardous waste identified in s. NR 605.08.

Note: If waste pickle liquor sludge derived from the lime stabilization treatment of spent pickle liquor from the iron and steel industry falling under SIC codes 331 and 332 does not display one or more of the characteristics of hazardous waste identified in s. NR 605.08, it is not a hazardous waste.

6. It is a mixture of nonhazardous solid waste and a hazardous waste that is listed in s. NR 605.09 solely because it exhibits one or more of the characteristics of hazardous waste identified in s. NR 605.08, unless the resultant mixture no longer exhibits any characteristic of hazardous waste identified in s. NR 605.08.

Note: The process of mixing a nonhazardous solid waste and a hazardous waste may require a license under ch. NR 680 for hazardous waste treatment.

(2) A solid waste which is not excluded from regulation under s. NR 605.05 (1) to (1r) becomes a hazardous waste when any of the following events occur:

(a) In the case of a waste listed in s. NR 605.09, when the waste first meets the listing description in s. NR 605.09.

(b) In the case of a mixture of solid waste and one or more listed hazardous wastes, when a hazardous waste listed in s. NR 605.09 is first added to the solid waste.

(c) In the case of any other solid waste, including a solid waste mixture, when the waste exhibits any of the characteristics identified in s. NR 605.08.

(3) A hazardous waste shall remain a hazardous waste unless and until it:

(a) No longer exhibits any of the characteristics of a hazardous waste identified in s. NR 605.08; or

Note: However, wastes that exhibit a characteristic at the point of generation may still be subject to the requirements of ch. NR 675 even if the wastes no longer exhibit a characteristic at the point of land disposal.

(b) In the case of a waste which is listed under s. NR 605.09, contains a waste listed under s. NR 605.09, or is derived from a waste listed under s. NR 605.09, the waste is excluded under s. NR 605.10.

(c) Is no longer a solid waste.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91.

NR 605.05 Exemptions. (1) EXEMPTIONS. The following materials are excluded from regulation as hazardous wastes:

(a) Household waste, including all of the following:

1. Waste that has been collected, transported, stored, treated, disposed, recovered or reused, except if the hazardous waste in this stream is separated and accumulated for later treatment, storage or disposal by a person other than a member of the household where the waste is generated.

2. Waste accumulated by a municipality for 5 days or less in a clean sweep program as defined in s. NR 187.03 (1). This exclusion for clean

sweep programs does not apply to the household waste upon its removal from the accumulation area for further management.

Note: The accumulation, treatment, storage and disposal of household wastes which are not excluded under this paragraph are subject to regulation under chs. NR 600 to 685.

(b) Waste that is treated, stored, disposed or otherwise managed by a resource recovery facility managing municipal solid waste, if such facility:

1. Receives and burns only:

a. Household waste, and

b. Solid waste from commercial or industrial sources that does not contain hazardous waste; and

2. Does not accept hazardous waste and the owner or operator of the facility has established contractual requirements or other appropriate notification or inspection procedures to assure that hazardous waste is not received at or burned in the facility.

(c) Cement kiln dust waste.

(d) Solid wastes generated by any of the following and which are returned to the soils as fertilizers:

1. The growing and harvesting of agricultural crops.

2. The raising of animals, including animal manures.

(e) Solid waste which consists of discarded wood or wood products which fail the test for the toxicity characteristic solely for arsenic and which is not a hazardous waste for any other reason, if the waste is generated by persons who utilize arsenical-treated wood and wood products for the intended end use of these materials.

(f) Polychlorinated biphenyls (PCBs) regulated under ch. NR 157.

(g) Fly ash waste, bottom ash waste, slag waste and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels.

(h) Drilling fluids, produced waters, and other wastes associated with the exploration, development or production of crude oil, natural gas or geothermal energy.

(i) Wastes which fail the test for the toxicity characteristic because chromium is present or are listed in s. NR 605.09 due to the presence of chromium, which do not fail the test for the toxicity characteristic for any other constituent or are not listed due to the presence of any other constituent, and which do not fail the test for any other characteristic, if it is shown by a waste generator or waste generators that:

1. The chromium in the waste is exclusively, or nearly exclusively, trivalent chromium; and

2. The waste is generated from an industrial process which used trivalent chromium exclusively, or nearly exclusively, and the process does not generate hexavalent chromium; and

3. The waste is typically and frequently managed in non-oxidizing environments.

(j) Specific wastes which meet the standard in par. (i), as long as they do not fail the test for the toxicity characteristic, and do not fail the test for any other characteristic are:

1. Chrome (blue) trimmings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.

2. Chrome (blue) shavings generated by the following subcategories of the leather tanning and finishing industry; hair pulp/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.

3. Buffing dust generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; and through-the-blue.

4. Sewer screenings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.

5. Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.

6. Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; and through-the-blue.

7. Waste scrap leather from the leather tanning industry, the shoe manufacturing industry and other leather product manufacturing industries.

8. Wastewater treatment sludges from the production of titanium dioxide pigment using chromium-bearing ores by the chloride process.

(k) Mining overburden returned to the mine site.

(l) Solid waste from the extraction, beneficiation and processing of ores and minerals, including coal, phosphate rock and the overburden from the mining of uranium ore.

(m) Until September 30, 1990, bottom ash waste, fly ash waste, slag waste and flue gas emission control waste generated from the combustion of municipal solid waste. After September 30, 1990, bottom ash waste, fly ash waste, slag waste and flue gas emission control waste generated from the combustion of municipal solid waste at a facility approved by the department under s. NR 502.14.

(n) By-products exhibiting a characteristic of hazardous waste that are reclaimed and complies with subs. (1m) and (1r).

Note: This exclusion does not apply to listed by-products included in s. NR 605.09.

(o) Domestic sewage.

(p) Any mixture of domestic sewage and other wastes that passes through a sewer system to a publicly owned treatment works for treatment. "Domestic sewage" means untreated sanitary wastes that pass through a sewer system.

(q) Petroleum contaminated media and debris that fail the test for the toxicity characteristic of s. NR 605.08 (5) for any one or more of the hazardous waste codes D018 to D043 and are subject to the corrective action regulations under 40 CFR 280, July 1, 1990.

Note: The publication containing the CFR references may be obtained from:

The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

(r) Used oil that exhibits one or more of the characteristics of hazardous waste but is recycled in some other manner than being burned for energy recovery.

(s) Used chlorofluorocarbon refrigerants from totally enclosed heat transfer equipment, including mobile air conditioning systems, mobile refrigeration and commercial and industrial air conditioning and refrigeration systems that use chlorofluorocarbons as the heat transfer fluid in a refrigeration cycle, provided the refrigerant is reclaimed for further use.

(1h) The following hazardous wastes are not subject to the requirements of chs. NR 610 to 685 when they are recycled and if the generator complies with subs. (1m) and (1r):

(a) Scrap metal that is legitimately recovered or reclaimed.

(b) Industrial ethyl alcohol that is legitimately recovered or reclaimed, except that:

1. A person initiating a shipment for legitimate recovery or reclamation in a foreign country, and any intermediary arranging for the shipment, shall comply with the requirements applicable to a primary exporter in s. NR 615.12 (1) (intro.), (1t) (a) to (d), (f) and (g) and (1u) to (1z), export the materials only upon consent of the receiving country and conforming with the EPA acknowledgment of consent, and provide a copy of the EPA acknowledgment of consent for the shipment to the transporter transporting the shipment for export;

2. Transporters transporting a shipment for export may not accept a shipment if the transporter knows the shipment does not conform to the EPA acknowledgment of consent, shall ensure that a copy of the EPA acknowledgment of consent accompanies the shipment and shall ensure that it is delivered to the facility designated by the person initiating the shipment.

(1m) Generators of wastes that are excluded under subs. (1) (l) and (1h) shall demonstrate, at the department's request, compliance with the terms of the exclusions by providing the following information:

(a) The name, location and address of the recycling facility;

(b) A description of the waste, hazardous waste number and waste quantity;

(c) A detailed description of the recycling process and how the waste is used as an ingredient in the process;

(d) A demonstration that there is a market or disposition of the waste; and

Note: An example of a demonstration of a market or disposition would be a contract showing the recycling facility uses the recyclable waste material as an ingredient in a production process.

(e) Documentation that the recycling facility has the necessary equipment to conduct the recycling activity.

(1r) The exclusions included in subs. (1) (l) and (1h) do not apply to wastes that are used in a manner constituting disposal or speculatively accumulated. Wastes that are used in a manner constituting disposal or speculatively accumulated are hazardous waste and shall be managed in accordance with all the requirements of chs. NR 600 to 685.

(2) GENERATION OF WASTE IN PRODUCT OR RAW MATERIAL UNITS. A hazardous waste which is generated in a product or raw material storage tank, a product or raw material vehicle, railroad freight car, vessel, a product or raw material pipeline, or in a manufacturing process unit or an associated non-waste-treatment manufacturing unit, is not subject to regulation under chs. NR 600 to 685 until it exits the unit in which it was generated, unless the unit is a surface impoundment or unless the hazardous waste remains in the unit more than 90 days after the unit ceases to be operated for manufacturing, or for storage or transportation of product or raw materials. In accordance with s. NR 615.05 (4) (a) 4., the date upon which each period of accumulation begins after the unit ceases to be operated for manufacturing, or for storage or transportation of product or raw materials, shall be clearly marked and visible for inspection on each unit.

(3) SAMPLES. (a) Except as provided in par. (b), a sample of solid waste or a sample of water, soil or air which is collected for the sole purpose of testing to determine its characteristics or composition is not subject to regulation under chs. NR 600 to 685 when the sample is being:

1. Transported to a laboratory for the purpose of testing;

2. Transported back to the sample collector after testing;

3. Stored by the sample collector before transport to a laboratory for testing;

4. Stored in a laboratory before testing;

5. Stored in a laboratory after testing but before it is returned to the sample collector; or

6. Stored temporarily in the laboratory after testing for a specific purpose.

Note: An example of a specific purpose would be storage until conclusion of a court case or enforcement action where further testing of the sample may be necessary.

(b) In order to qualify for the exemption in par. (a) 1. and 2., a sample collector shipping samples to a laboratory and a laboratory returning samples to a sample collector shall:

1. Comply with DOT, U.S. postal service (USPS) or any other applicable shipping requirements; or

2. Comply with the following requirements, if the sample collector determines that DOT, USPS or other shipping requirements do not apply to the shipment of the sample:

a. Assure that the following information accompanies the sample: the sample collector's name, mailing address and telephone number; the laboratory name, address and telephone number; the quantity of the sample; the date of shipment; and a description of the sample; and

b. Package the sample so that it does not leak, spill or vaporize from its packaging.

(c) This exemption does not apply if the laboratory determines that the waste is hazardous but the laboratory no longer meets any of the conditions stated in par. (a).

(4) TREATABILITY STUDIES SAMPLES. Except as provided in sub. (4h), persons who generate or collect samples for the purpose of conducting treatability studies are not subject to any requirement of chs. NR 610 to 699 when:

(a) The sample is being collected and prepared for transportation by the generator or sample collector;

(b) The sample is being accumulated or stored by the generator or sample collector prior to transportation to a laboratory or testing facility;

(c) The sample is being transported to the laboratory or testing facility for the purpose of conducting a treatability study; or

(d) The sample shipment is accompanied by a manifest, according to the requirements of s. NR 615.08.

(4h) The exemption in sub. (4) is applicable to samples of hazardous waste being collected and shipped for the purpose of conducting treatability studies if:

(a) The generator or sample collector uses in treatability studies no more than 1000 kg of any non-acute hazardous waste, 1 kg of acute hazardous waste, or 250 kg of soils, water or debris contaminated with acute hazardous waste for each process being evaluated for each generated waste stream;

(b) The mass of each sample shipment does not exceed 1000 kg of non-acute hazardous waste, 1 kg of acute hazardous waste or 250 kg of soils, water or debris contaminated with acute hazardous waste;

(c) The sample is packaged so that it does not leak, spill or vaporize from its package during shipment and meet the following requirements:

1. The transportation of each sample shipment complies with ch. NR 620, U.S. Department of Transportation (DOT), U.S. Postal Service (USPS) and any other applicable shipping requirement;

2. If the DOT, USPS or other shipping requirements do not apply to the shipment of the sample, the following information must accompany the sample:

a. The name, mailing address and telephone number of the originator of the sample;

b. The name, address and telephone number of the facility that will perform the treatability study;

c. The quantity of the sample;

d. The date of shipment; and

e. A description of the sample, including its EPA hazardous waste number.

(d) The sample is shipped to a laboratory or testing facility which:

1. Is exempt under sub. (5);

2. Has an operating license, interim license, variance or waiver from the department;

3. Is shipped to an out-of-state laboratory or facility that has an applicable exemption, operating license, interim license, variance or waiver which has been granted by EPA or an authorized state; and

(e) The generator or sample collector maintains the following records for a period ending 3 years after completion of the treatability study:

1. Copies of the manifest and any other required shipping documents;

2. A copy of the contract with the facility conducting the treatability study; and

3. Documentation showing:

a. The amount of waste shipped under this exemption;

b. The name, address and EPA identification number of the laboratory or testing facility that received the waste;

c. The date that the shipment was made; and

d. Whether or not unused samples and residues were returned to the generator.

(f) The generator reports the information required under par. (e) 3. in its annual report.

(4p) (a) The department may grant requests, on a case-by-case basis, for quantity limits in excess of those specified in sub. (4h) (a), for up to an additional 500 kg of non-acute hazardous waste, 1 kg of acute hazardous waste and 250 kg of soils, water and debris contaminated with acute hazardous waste, to conduct further treatability study evaluation when:

1. There has been an equipment or mechanical failure during the conduct of a treatability study;

2. There is a need to verify the results of a previously conducted treatability study;

3. There is a need to study and analyze alternative techniques within a previously evaluated treatment process; or

4. There is a need to do further evaluation of an ongoing treatability study to determine final specifications for treatment.

(b) The additional quantities allowed are subject to all the provisions in sub. (4) and (4h) (b) to (f).

(c) The generator or sample collector shall apply to the department and provide the following information:

1. The reason why the generator or sample collector requires an additional quantity of sample for the treatability study evaluation and the amount needed;

2. Documentation accounting for all samples of hazardous waste from the waste stream which have been sent for or undergone treatability studies including;

a. The date each previous sample from the waste stream was shipped;

b. The quantity of each previous shipment;

c. The laboratory or testing facility to which it was shipped;

d. What treatability study processes were conducted on each sample shipped, and

e. A summary of the results of each treatability study.

3. A description of the technical modifications or change in specification that shall be evaluated and the expected results;

4. If further study is being required due to equipment or mechanical failure, information concerning the reason for the failure or breakdown and what procedures or equipment improvements have been made to protect against further breakdowns; and

5. Other information that the department considers necessary.

(5) SAMPLES UNDERGOING TREATABILITY STUDIES AT LABORATORIES AND TESTING FACILITIES. Samples undergoing treatability studies and the laboratory or testing facility conducting treatability studies, to the extent the facilities are not otherwise subject to the requirements of chs. NR 600 to NR 685, are not subject to any requirement of chs. NR 600 to NR 685 if the conditions of pars. (a) to (k) are met. A mobile treatment unit may qualify as a testing facility subject to pars. (a) to (k). Where a group of mobile treatment units are located at the same site, the limitations specified in pars. (a) to (k) apply to the entire group of mobile treatment units collectively as if the group were one mobile treatment unit.

(a) No less than 45 days before conducting treatability studies, the facility shall notify the department, in writing, that it intends to conduct treatability studies under this subsection.

(b) The laboratory or testing facility conducting the treatability study shall have an EPA identification number.

(c) No more than a total of 250 kg of "as received" hazardous waste is subject to initiation of treatment in all treatability studies in any single

day. "As received" waste refers to the waste as received in the shipment from the generator or sample collector.

(d) The quantity of "as received" hazardous waste stored at the facility for the purpose of evaluation in treatability studies does not exceed 1000 kg, the total of which may include 500 kg of soils, water or debris contaminated with acute hazardous waste or 1 kg of acute hazardous waste. This quantity limitation does not include:

1. Treatability study residues; and

2. Treatment materials, including nonhazardous solid waste, added to "as received" hazardous waste.

(e) No more than 90 days have elapsed since the treatability study for the sample was completed, or no more than one year has elapsed since the generator or sample collector shipped the sample to the laboratory or testing facility, whichever date first occurs.

(f) The treatability study does not involve the placement of hazardous waste on the land or open burning of hazardous waste.

(g) The facility maintains records for 3 years following completion of each study that show compliance with the treatment rate limits and the storage time and quantity limits. The following specific information shall be included for each treatability study conducted:

1. The name, address and EPA identification number of the generator or sample collector of each waste sample;

2. The date the shipment was received;

3. The quantity of waste accepted;

4. The quantity of "as received" waste in storage each day;

5. The date the treatment study was initiated and the amount of "as received" waste introduced to treatment each day;

6. The date the treatability study was conducted;

7. The date any unused sample or residues generated from the treatability study were returned to the generator or sample collector or, if sent to a designated facility, the name of the facility and the EPA identification number.

(h) The facility keeps, on-site, a copy of the treatability study contract and shipping papers associated with the transport of treatability study samples to and from the facility for a period ending 3 years from the completion date for each treatability study.

(i) The facility prepares and submits a report to the department by March 15 of each year that estimates the number of studies and amount of waste expected to be used in treatability studies during the current year and includes the following information for the previous calendar year:

1. The name, address and EPA identification number of the facility conducting the treatability studies;

2. The types, by process, of treatability studies conducted;

3. The names and addresses of persons for whom studies have been conducted, including their EPA identification numbers;

4. The total quantity of waste in storage each day;

5. The quantity and types of waste subjected to treatability studies;

6. When each treatability study was conducted;

7. The final disposition of residues and unused sample from each treatability study.

(j) The facility determines whether any unused sample or residues generated by the treatability study are hazardous waste under s. NR 605.07 and, if so, are subject to chs. NR 600 to 685, unless the residues and unused samples are returned to the sample originator under the sub. (4), (4h) or (4p) exemption.

(k) The facility notifies the department, by letter, when the facility is no longer planning to conduct any treatability studies at the site.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91; cr. (1) (a) 13., Register, May, 1992, No. 437, eff. 6-1-92; correction made under s. 13.93 (2m) (b) 1, Stats., Register, August, 1992, No. 440; am. (1) (e), (i) (intro.), (j) (intro.) and (p), (4) (c), cr. (1) (q), (r) and (s), Register, August, 1992, No. 440, eff. 9-1-92.

NR 605.06 Residues of hazardous waste in empty containers. (1) Any hazardous waste that is remaining in either an empty container or an inner liner removed from an empty container, that meet the criteria in sub. (3), (4) or (5), is not subject to regulation under chs. NR 600 to 685.

(2) Any hazardous waste in either a container that is not empty or an inner liner removed from a container that is not empty, as specified in sub. (3) to (5), is subject to regulation under chs. NR 600 to 685.

(3) A container or an inner liner removed from a container that has held any hazardous waste, except a waste that is a compressed gas or that is listed as an acute hazardous waste in s. NR 605.09 (2) (a), table II or (b), table III, or identified in table IV of s. NR 605.09 (3) (b), is empty if all wastes have been removed that can be removed using the practices commonly employed to remove materials from that type of container; and

Note: Examples of commonly employed practices would be pouring, pumping and aspirating

(a) No more than 2.5 centimeters (one inch) of residue remains on the bottom of the container or inner liner, or

(b) No more than 3% by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 110 gallons in size, or

(c) No more than 0.3% by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 110 gallons in size.

(4) A container that has held a hazardous waste that is a compressed gas is empty when the pressure in the container approaches atmospheric pressure.

(5) A container or an inner liner removed from a container that has held an acute hazardous waste listed in s. NR 605.09 (2) (a), table II or (b), table III, or identified in s. NR 605.09 (3) (b), table IV is empty if:

(a) The container or inner liner has been triple rinsed using a solvent capable of removing the commercial chemical product or manufacturing chemical intermediate;

(b) The container or inner liner has been cleaned by another method that has been shown in the scientific literature, or by tests conducted by the generator, to achieve equivalent removal; or

(c) In the case of a container, the inner liner, that prevented contact of the commercial chemical product or manufacturing chemical intermediate with the container, has been removed.

Note: Empty containers and rinsate from the cleaning or reconditioning of empty containers are regulated as solid waste under chs. NR 500 to 522. In addition, any rinsate from the cleaning or reconditioning of empty containers as specified in this section is subject to regulation as a hazardous waste under chs. NR 600 to 695 if it exhibits any of the characteristics in s. NR 605.08.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91.

NR 605.07 Criteria for identifying the characteristics of hazardous waste and for listing hazardous waste. (1) CRITERIA FOR IDENTIFYING THE CHARACTERISTICS OF HAZARDOUS WASTE. The department shall identify and define a characteristic of hazardous waste only upon determining that:

(a) A solid waste that exhibits the characteristic may:

1. Cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

2. Pose a substantial present or potential hazard to human health or the environment when it is improperly treated, stored, transported, disposed of or otherwise managed; and

(b) The characteristic may be:

1. Measured by an available standardized test method which is reasonably within the capability of generators of solid waste or private sector laboratories that are available to serve generators of solid waste; or

2. Reasonably detected by generators of solid waste through their knowledge of their waste.

(2) CRITERIA FOR LISTING HAZARDOUS WASTE. (a) The department shall list a solid waste as a hazardous waste under s. NR 605.09 only upon determining that the solid waste meets one of the following criteria:

1. It exhibits any of the characteristics of hazardous waste identified in s. NR 605.08.

2. It has been found to be fatal to humans in low doses or, in the absence of data on human toxicity, it has been shown to have an oral LD50 toxicity measured in rats of less than 50 milligrams per kilogram, an inhalation LC50 toxicity measured in rats of less than 2 milligrams per liter, or a dermal LD50 toxicity measured in rabbits of less than 200 milligrams per kilogram or is otherwise capable of causing or significantly contributing to an increase in serious irreversible, or incapacitating reversible, illness.

3. It contains any of the hazardous constituents listed in Appendix IV unless, after considering any of the following factors, the department concludes that the waste is not capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed or otherwise managed:

a. The nature of the toxicity presented by the constituent.

b. The concentrations of the constituent in the waste.

c. The potential of the constituent or any toxic degradation product of the constituent to migrate from the waste into the environment under the types of improper management considered in subpar. g.

d. The persistence of the constituent or any toxic degradation product of the constituent.

e. The potential for the constituent or any toxic degradation product of the constituent to degrade into non-harmful constituents and the rate of degradation.

f. The degree to which the constituent or any degradation product of the constituent bioaccumulates in ecosystems.

g. The plausible types of improper management to which the waste could be subjected.

h. The quantities of the waste generated at individual generation sites or on a regional or statewide basis.

i. The nature and severity of the human health and environmental damage that has occurred as a result of the improper management of wastes containing the constituent.

j. Actions taken by other governmental agencies or regulatory programs based on the health or environmental hazard posed by the waste or waste constituent.

k. Other factors as may be relevant in a specific case.

(b) The department may list classes or types of solid waste if there is reason to believe that individual wastes, within the class or type of waste, typically or frequently because their quantity, concentration, or physical, chemical or infectious characteristics, may:

1. Cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

2. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.

(c) Hazardous wastes which have been listed in accordance with the criteria in par. (a) 2. are designated as acute hazardous wastes and wastes which have been listed in accordance with the criterion in par. (a) 3. are designated as toxic wastes.

Note: Section 144.62, Stats., requires the department to add any waste listed by U. S. EPA to the lists in s. NR 605.09. The criteria of sub. (2) apply only to wastes listed by Wisconsin.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91.

Register, August, 1992, No. 440

NR 605.08 Characteristics of hazardous waste. (1) GENERAL. (a) A solid waste which is not excluded from regulation under s. NR 605.05 (1) is a hazardous waste if it exhibits any of the characteristics identified in this section.

(b) A hazardous waste which is identified by a characteristic in this section, is assigned every hazardous waste number that is applicable as set forth in this section. This number shall be used in complying with the notification requirements in s. NR 600.05 and all applicable record-keeping and reporting requirements under chs. NR 600 to 680.

(c) For purposes of this section, the department shall consider a sample obtained using any of the applicable sampling methods specified in appendix I to be a representative sample.

(2) CHARACTERISTIC OF IGNITABILITY. (a) A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

1. It is a liquid, other than an aqueous solution containing less than 24% alcohol by volume, and has a flash point less than 60°C (140°F), as determined by a Pensky-Martens closed cup tester, using the test method specified in ASTM standard D-93-85, or a Setaflash closed cup tester, using the test method specified in ASTM standard D-3278-82, or as determined by an equivalent test method approved by EPA.

Note: The publications containing these standards may be obtained from:

American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

The publications containing these standards are available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

2. It is not a liquid and is capable, at a temperature of 25°C and a pressure of one atmosphere, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.

3. It is an ignitable compressed gas as defined in 49 CFR 173.300 October 1, 1990, and as determined by the test methods described in that regulation, ASTM standard D-323-82, or equivalent test methods approved by EPA.

Note: The publication containing the CFR reference may be obtained from:

The Superintendent of Documents
U.S. Government Printing Office
Washington, DC 20402

The ASTM publication may be obtained from:

American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

These publications are available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

4. It is an oxidizer, such as a chlorate, permanganate, inorganic peroxide, nitro carbo nitrate or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter.

(b) A solid waste that exhibits the characteristic of ignitability has the hazardous waste number of D001.

(3) CHARACTERISTIC OF CORROSIVITY. (a) A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

1. It is aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, as determined by a pH meter using either EPA test method 9040 in SW-846, "Test Methods for Evaluating Solid Waste", 2nd Ed., 1982, as amended by update I in April, 1984 and update II in April, 1985 or an equivalent test method approved by EPA.

2. It is a liquid and corrodes plain carbon steel with a carbon content of 0.20% at a rate greater than 6.35 mm (0.250-inch) per year at a test temperature of 55°C (130°F) as determined by the test method specified in NACE (National Association of Corrosion Engineers) standard TM-01-69 as standardized in SW-846, "Test Methods for Evaluating Solid Waste", second edition, 1982, as amended by update I in April, 1984 and update II in April, 1985, or an equivalent test method approved by EPA.

Note: Publication SW-846 may be obtained from:

National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22161

This publication is available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

(b) A solid waste that exhibits the characteristic of corrosivity has the hazardous waste number of D002.

(4) CHARACTERISTIC OF REACTIVITY. (a) A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

1. It is normally unstable and readily undergoes violent change without detonating.

2. It reacts violently with water.

3. It forms potentially explosive mixtures with water.

4. When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

5. It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

6. It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

7. It is readily capable of detonation or explosive decomposition or reaction at a temperature of 25° C and a pressure of one atmosphere.

8. It is a forbidden explosive as defined in 49 CFR 173.51 [October 1, 1990], or a Class A explosive as defined in 49 CFR 173.53 [October 1, 1990], or a Class B explosive as defined in 49 CFR 173.88 [October 1, 1990].

Note: The publications containing these regulations may be obtained from:

Superintendent of Documents
U.S. Government Printing Office
P.O. Box 371954
Pittsburgh, PA 15250-7954
(202) 783-3238

The publications containing these regulations are available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

(b) A solid waste that exhibits the characteristic of reactivity has the hazardous waste number of D003.

(5) TOXICITY CHARACTERISTIC. (a) A solid waste exhibits the characteristic of toxicity if, using the toxicity characteristic leaching procedure, EPA method 1311 in SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", third edition, September, 1986, as amended by update I in July, 1992, the extract from a representative sample of the waste contains any of the contaminants listed in table I at a concentration equal to or greater than the respective value given in that table. Where the waste contains less than 0.5% filterable solids, the waste itself, after filtering using the methodology in method 1311, is considered to be the extract for the purpose of this subsection.

Note: Publication SW-846 may be obtained from:

Superintendent of Documents
U.S. Government Printing Office
P.O. Box 371954
Pittsburgh, PA 15250-7954
(202) 783-3238

This publication is available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

(b) A solid waste that exhibits the characteristic of toxicity has the hazardous waste number specified in table I which corresponds to the toxic contaminant causing it to be hazardous.

Table I
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

EPA HW No.[1]	Contaminant	CAS No.[2]	Regulatory Level (mg/L)
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

[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/1.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91; am. (1) (b), (2) (a) 1., (b), (3) (b), (4) (a) 8., (b), (5) (a) and (b), r. and recr. (5) table 1, Register, August, 1992, No. 440, eff. 9-1-92; am. (5) (a), Register, April, 1994, No. 460, eff. 5-1-94.

NR 605.09 Lists of hazardous wastes. (1) GENERAL. (a) A solid waste is a hazardous waste if it is listed in this section, unless it has been excluded from the lists under s. NR 605.10.

(b) The department has indicated the basis for listing the classes or types of wastes listed in this section by employing one or more of the following hazard codes:

1. Ignitable waste (I)
2. Corrosive waste (C)
3. Reactive waste (R)
4. Toxicity characteristic waste (E)
5. Acute hazardous waste (H)
6. Toxic waste (T)

Note: Appendix III identifies the constituent which caused the department to list the waste as a toxicity characteristic waste (E) or toxic waste (T) in sub. (2) (a) and (b).

(c) Each hazardous waste listed in subs. (2) and (3) is assigned a hazardous waste number which precedes the name of the waste. This number shall be used in complying with the notification requirements of s. NR 600.05 and recordkeeping requirements under chs. NR 610, 615, 620 and 630.

(d) The following hazardous wastes listed in table II of sub. (2) are acute hazardous wastes subject to the exclusion limits established in s. NR 610.09:

1. Hazardous waste numbers F020, F021, F022 and F023; and

2. Hazardous waste numbers F026 and F027.

(2) HAZARDOUS WASTE SOURCES. (a) Solid waste from nonspecific sources is a hazardous waste if it is listed in table II.

Table II
Hazardous Waste from Nonspecific Sources

Hazardous Waste Number	Hazardous Waste	Hazard Code
Generic:		
F001	The following spent halogenated solvents used in degreasing: tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all mixtures and blends of spent solvents used in degreasing containing, before use, a total of 10% or more, by volume, of one or more of the above halogenated solvents or those solvents listed in F002, F004 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F002	The following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane and 1,1,2-trichloroethane; all mixtures and blends of spent solvents containing, before use, a total of 10% or more, by volume, of one or more of the above halogenated solvents or those listed in F001, F004 or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F003	The following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone and methanol; all mixtures and blends of spent solvents containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents and a total of 10% or more, by volume, of one or more of those solvents listed in F001, F002, F004 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I)
F004	The following spent non-halogenated solvents: cresols, cresylic acid, and nitrobenzene; all mixtures and blends of spent solvents containing, before use, a total of 10% or more, by volume, of one or more of the above non-halogenated solvents or those solvents listed in F001, F002 and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(T)
F005	The following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol and 2-nitropropane; all mixtures and blends of spent solvents containing, before use, a total of 10% or more, by volume, of one or more of the above non-halogenated solvents or those solvents listed in F001, F002 or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.	(I, T)

Hazardous Waste Number	Hazardous Waste	Hazard Code
F006	Wastewater treatment sludges from electroplating operations, except from the following processes: (1) sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating, segregated basis, on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning or stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum. Note: Electroplating operations are considered to include common and precious metals electroplating, anodizing, chemical etching and milling, and cleaning and stripping when associated with these processes. For more information, refer to 51 FR 43350 to 43351, Tuesday, December 2, 1986.	(T)
F007	Spent cyanide plating bath solutions from electroplating operations.	(R, T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process.	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process.	(R, T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process.	(R, T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations.	(R, T)
F012	Quenching wastewater treatment sludges from metal heat treating operations where cyanides are used in the process.	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum.	(T)
F020	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production or manufacturing use, as a reactant, chemical intermediate or component in a formulating process, of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide derivatives. This listing does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.	(H)
F021	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production or manufacturing use, as a reactant, chemical intermediate or component in a formulating process, of pentachlorophenol, or of intermediates used to produce its derivatives.	(H)
F022	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the manufacturing use, as a reactant, chemical intermediate or component in a formulating process, of tetra-, penta-, or hexa-chlorobenzenes under alkaline conditions.	(H)
F023	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production of materials on equipment previously used for the production or manufacturing use, as a reactant, chemical intermediate or component in a formulating process, of tri- and tetrachlorophenols. This listing does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.	(H)
F024	Wastes including but not limited to, distillation residues, heavy ends, tars and reactor clean-out wastes from the production of chlorinated aliphatic hydrocarbons, having carbon content from one to 5, utilizing free radical catalyzed processes. This listing does not include light ends, spent filters and filter aids, spent desiccants, wastewater, wastewater treatment sludges, spent catalysts and waste listed in table III of s. NR 605.09 (2) (b).	(T)
F026	Wastes, except wastewater and spent carbon from hydrogen chloride purification, from the production of materials on equipment previously used for the manufacturing use, as a reactant, chemical intermediate or component in a formulating process, of tetra-, pentaor hexachlorobenzene under alkaline conditions.	(H)

Hazardous Waste Number	Hazardous Waste	Hazard Code
F027	Discarded, used or unused formulations containing tri-, tetra-or pentachlorophenol or discarded used or unused formulations containing compounds derived from these chlorophenols. This listing does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.	(H)
F028	Residues resulting from the incineration or thermal treatment of soil contaminated with hazardous wastes F020, F021, F022, F023, F026 or F027.	(T)
F039	Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified by more than one waste code under s. NR 605.09, or from a mixture of wastes classified as hazardous under s. NR 605.09. Leachate resulting from the disposal of one or more of the following hazardous wastes and no other hazardous wastes retains its hazardous wastes code(s): F020, F021, F022, F026, F027 or F028.	(T)
F500	Waste contaminated with the halogenated compounds tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, chloroform, ortho-dichlorobenzene, dichlorodifluoromethane, 1,1,2-trichloro-1,2,2-trifluoroethane, trichlorofluoromethane, 1,1-dichloroethylene, and 1,2-dichloroethylene at greater than 1% (10,000 ppm) solvent concentration, except used chlorofluorocarbon refrigerants that are recycled and that are handled according to s. NR 605.05 (1m) and (1r). This listing includes any combination of the above named halogenated compounds where the total concentration of the sum of the concentrations of the individual compounds exceeds 1% or 10,000 ppm on a weight to weight basis. Halogenated solvent concentration shall be determined using EPA methods 8010 or 8240 for halogenated volatile organics as specified in SW-846, "Test Methods for Evaluating Solid Waste" or total chloride analysis of bomb washings from ASTM D 240-76, "Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter".	(T)

Note: The publication SW-846, "Test Methods for Evaluating Solid Waste", may be obtained from:

National Technical Information Services
U.S. Department of Commerce
Springfield, Virginia 22161

The publication containing the ASTM method may be obtained from:

American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

The publications are available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

(b) Solid waste from specific sources is a hazardous waste if it is listed in table III.

Table III
Hazardous Waste from Specific Sources

Hazardous Waste Number	Hazardous Waste	Hazardous Code
Wood Preservation		
K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote or pentachlorophenol.	(T)
Inorganic Pigments		

Hazardous Waste Number	Hazardous Waste	Hazardous Code
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments.	(T)
K003	Wastewater treatment sludge from the production of molybdate orange pigments.	(T)
K004	Wastewater treatment sludge from the production of zinc yellow pigments.	(T)
K005	Wastewater treatment sludge from the production of chrome green pigments.	(T)
K006	Wastewater treatment sludge from the production of chrome oxide green pigments, anhydrous and hydrated.	(T)
K007	Wastewater treatment sludge from the production of iron blue pigments.	(T)
K008	Oven residue from the production of chrome oxide green pigments.	(T)
Organic Chemicals		
K009	Distillation bottoms from the production of acetaldehyde from ethylene.	(T)
K010	Distillation side cuts from the production of acetaldehyde from ethylene.	(T)
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile.	(R, T)
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile.	(R, T)
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile.	(T)
K015	Still bottoms from the distillation of benzyl chloride.	(T)
K016	Heavy ends or distillation residues from the production of carbon tetrachloride.	(T)
K017	Heavy ends or still bottoms from the purification column in the production of epichlorohydrin.	(T)
K018	Heavy ends from the fractionation column in ethyl chloride production.	(T)
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production.	(T)
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production.	(T)
K021	Aqueous spent antimony catalyst waste from fluoromethanes production.	(T)
K022	Distillation bottom tars from the production of phenol or acetone from cumene.	(T)
K023	Distillation light ends from the production of phthalic anhydride from naphthalene.	(T)
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene.	(T)
K093	Distillation light ends from the production of phthalic anhydride from ortho-xylene.	(T)
K094	Distillation bottoms from the production of phthalic anhydride from ortho-xylene.	(T)
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene.	(T)
K026	Stripping still tails from the production of methyl ethyl pyridines.	(T)
K027	Centrifuge and distillation residues from toluene diisocyanate production.	(R, T)
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane.	(T)
K029	Waste from the product stream stripper in the production of 1,1,1-trichloroethane.	(T)
K095	Distillation bottoms from the production of 1,1,1-trichloroethane.	(T)
K096	Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane.	(T)

Hazardous Waste Number	Hazardous Waste	Hazardous Code
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene.	(T)
K083	Distillation bottoms from aniline production.	(T)
K103	Process residues from aniline extraction from the production of aniline.	(T)
K104	Combined wastewater streams generated from nitrobenzene/aniline production.	(T)
K085	Distillation or fractionating column bottoms from the production of chlorobenzenes.	(T)
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes.	(T)
K111	Product washwaters from the production of dinitrotoluene via nitration of toluene.	(C, T)
K112	Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene.	(T)
K113	Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	(T)
K114	Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	(T)
K115	Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene.	(T)
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine.	(T)
K117	Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene.	(T)
K118	Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.	(T)
K136	Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene.	(T)
Pesticides		
K031	By-product salts generated in the production of MSMA and cacodylic acid.	(T)
K032	Wastewater treatment sludge from the production of chlordane.	(T)
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane.	(T)
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane.	(T)
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane.	(T)
K035	Wastewater treatment sludges generated in the production of creosote.	(T)
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton.	(T)
K037	Wastewater treatment sludges from the production of disulfoton.	(T)
K038	Wastewater from the washing and stripping of phorate production.	(T)
K039	Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate.	(T)
K040	Wastewater treatment sludge from the production of phorate.	(T)
K041	Wastewater treatment sludge from the production of toxaphene.	(T)
K098	Untreated process wastewater from the production of toxaphene.	(T)
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T.	(T)
K043	2,6-Dichlorophenol waste from the production of 2,4-D.	(T)
K099	Untreated wastewater from the production of 2,4-D.	(T)

Hazardous Waste Number	Hazardous Waste	Hazardous Code
K123	Process wastewater, including supernates, filtrates and washwaters, from the production of ethylenebisdithiocarbamic acid and its salt.	(T)
K124	Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts.	(C, T)
K125	Filtration, evaporation and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts.	(T)
K126	Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts.	(T)
Explosives		
K044	Wastewater treatment sludges from the manufacturing and processing of explosives.	(R)
K045	Spent carbon from the treatment of wastewater containing explosives.	(R)
K046	Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds.	(T)
K047	Pink or red water from TNT operations.	(R)
Petroleum Refining		
K048	Dissolved air flotation (DAF) float from the petroleum refining industry.	(T)
K049	Slop oil emulsion solids from the petroleum refining industry.	(T)
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry.	(T)
K051	American Petroleum Institute (API) separator sludge from the petroleum refining industry.	(T)
K052	Tank bottoms, leaded, from the petroleum refining industry.	(T)
Iron and Steel		
K061	Emission control dust or sludge from the electric furnace primary production of steel.	(T)
K062	Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry identified by the SIC codes 331 and 332.	(C,T)
Secondary Lead		
K069	Emission control dust or sludge from secondary lead smelting.	(T)
K100	Waste leaching solution from acid leaching of emission control dust or sludge from secondary lead smelting.	(T)
Inorganic Chemicals		
K071	Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used.	(T)
K073	Chlorinated hydrocarbon wastes from the purification step of the diaphragm cell process using graphite anodes in chlorine production.	(T)
K106	Wastewater treatment sludge from the mercury cell process in chlorine production.	(T)
Ink Formulation		
K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments; driers, soaps and stabilizers containing chromium and lead.	(T)
Veterinary Pharmaceuticals		
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)

Hazardous Waste Number	Hazardous Waste	Hazardous Code
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds.	(T)
Coking		
K060	Ammonia still lime sludge from coking operations.	(T)
K087	Decanter tank tar sludge from coking operations.	(T)

Note: The Standard Industrial Classification Manual may be obtained from:

The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

This publication is available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

(3) DISCARDED COMMERCIAL CHEMICAL PRODUCTS, OFF-SPECIFICATION SPECIES, CONTAINER RESIDUES AND SPILL RESIDUES THEREOF. (a) The following materials or items are hazardous wastes if and when they are discarded or intended to be discarded, when they are mixed with used oil or other solid waste and applied to the land for dust suppression or road treatment, when they are otherwise applied to the land in lieu of their original intended use or when they are contained in products that are applied to the land in lieu of their original intended use, or when, in lieu of their original intended use, they are produced for use as, or as a component of, a fuel, distributed for use as a fuel or burned as a fuel:

1. Any commercial chemical product or manufacturing chemical intermediate having a generic name listed in table IV or V.

2. Any off-specification commercial chemical product or manufacturing chemical intermediate which, if it met specifications, would have a generic name listed in table IV or V.

3. Any container or inner liner removed from a container that has held any commercial chemical product or manufacturing chemical intermediate having a generic name listed in par. (b) or (c), or off-specification chemical product or manufacturing chemical intermediate which, if it met specifications, would have a generic name listed in table IV or V, unless the container is empty under the criteria in s. NR 605.06 (3) to (5).

4. Any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any commercial chemical product or manufacturing chemical intermediate having a generic name listed in table IV or V, or any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any off-specification chemical product or manufacturing chemical intermediate which, if it met specifications, would have a generic name listed in table IV or V.

(b) The commercial chemical products, manufacturing chemical intermediates, off-specification commercial chemical products or manufacturing chemical intermediates described in par. (a) 1. or 2. or materials or items described in par. (a) 3. or 4. listed in table IV are identified as acute hazardous wastes (H) and are subject to the small quantity exclusion in s. NR 610.07. These wastes and their corresponding hazardous waste numbers are:

Table IV
Acute Hazardous Commercial Chemical Products and Manufacturing Chemical Intermediates

Hazardous Waste Number	Substance
P023	Acetaldehyde, chloro
P002	Acetamide, N-(aminothioxomethyl)
P057	Acetamide, 2-fluoro
P058	Acetic acid, fluoro-, sodium salt
P066	Acetimidic acid, N-[(methylcar-bamoyl)oxy]thio-, methyl ester
P001	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, and salts, when present in concentrations greater than 0.3%
P002	1-Acetyl-2-thiourea
P003	Acrolein
P070	Aldicarb
P004	Aldrin
P005	Allyl alcohol
P006	Aluminum phosphide (R,T)
P007	5-(Aminomethyl)-3-isoxazolol
P008	4-Aminopyridine
P009	Ammonium picrate (R)
P119	Ammonium vanadate
P010	Arsenic acid
P012	Arsenic (III) oxide
P011	Arsenic (V) oxide
P011	Arsenic pentoxide
P012	Arsenic trioxide
P038	Arsine, diethyl
P099	Argentate(1-), bis(cyano-C)-, potassium
P036	Arsonous dichloride, phenyl
P054	Aziridine
P067	Aziridine, 2-methyl
P013	Barium cyanide
P024	Benzenamine, 4-chloro
P077	Benzenamine, 4-nirto
P028	Benzene, (chloromethyl)
P042	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)
P014	Benzenethiol
P028	Benzyl chloride
P015	Beryllium
P016	Bis(chloromethyl) ether
P017	Bromoacetone
P018	Brucine
P045	2-Butanone, 3,3-dimethyl-1-(methylthio)-, 0-(methylamino) carbonyl oxime
P021	Calcium cyanide
P123	Camphene, octachloro
P103	Carbamimidoselenoic acid
P022	Carbon bisulfide
P022	Carbon disulfide
P095	Carbonyl chloride
P033	Chlorine cyanide
P023	Chloroacetaldehyde
P024	p-Chloroaniline
P026	1-(o-Chlorophenyl)thiourea
P027	3-Chloropropionitrile

Hazardous Waste Number	Substance
P029	Copper cyanides
P030	Cyanides (soluble cyanide salts), not otherwise specified
P031	Cyanogen
P033	Cyanogen chloride
P016	Dichloromethyl ether
P036	Dichlorophenylarsine
P037	Dieldrin
P038	Diethylarsine
P039	0,0-Diethyl S-[2-(ethylthio)ethyl] phosphorodithioate
P041	Diethyl-p-nitrophenyl phosphate
P040	0,0-Diethyl O-pyrazinyl phosphorothioate
P043	Diisopropylfluorophosphate (DFP)
P044	Dimethoate
P045	3,3-Dimethyl-1-(methylthio)-2-butanone-0 [(methylamino)carbonyl] oxime
P071	0,0-Dimethyl 0-p-nitrophenyl phosphorothioate
P082	Dimethylnitrosamine
P046	alpha, alpha-Dimethylphenethylamine
P047	4,6-Dinitro-o-cresol, and salts
P034	4,6-Dinitro-o-cyclohexylphenol
P048	2,4-Dinitrophenol
P020	Dinoseb
P085	Diphosphoramide, octamethyl
P039	Disulfoton
P049	2,4-Dithiobiuret
P109	Dithiopyrophosphoric acid, tetraethyl ester
P050	Endosulfan
P088	Endothall
P051	Endrin, and metabolites
P042	Epinephrine
P046	Ethanamine, 1,1-dimethyl-2-phenyl
P084	Ethanamine, N-methyl-N-nitroso
P066	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester
P101	Ethyl cyanide
P054	Ethylenimine
P097	Famphur
P056	Fluorine
P057	Fluoroacetamide
P058	Fluoroacetic acid, sodium salt
P065	Fulminic acid, mercury(2) salt (R,T)
P059	Heptachlor
P051	2,7:3,6-Dimetha-nonapth[2,3b]oxirane,octahydro,(1aalpha,2beta,2abeta,3alpha, 6alpha,6abeta,7beta,7aalpha)
P037	2,7:3,6-Dimethanonapth[2,3b]oxirane,3,4,5,6,9,9 -hexachloro-1a,2,2a,3,6,6a,7,7aoctahydro-,(1aalpha,2beta,2aalpha,3beta,6beta,6a alpha,7bēta,7aalpha)
P060	1,4,5,8-Dimethanonapthalene,1,2,3,4,10,10-hexachloro-1, 4,4a,5,8,8a-hexahydro,(1alpha,4alpha,4abeta,5beta,8beta,8abeta)
P004	1,4,5,8-Dime thanonapthalene,1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8ahexahydro,(1alpha,4alpha, 4abeta,5alpha,8alpha,8abeta)
P060	Hexachlorohexahydro-endo, endo-dimethanonaphthalene
P062	Hexaethyl tetraphosphate
P116	Hydrazinecarbothioamide
P068	Hydrazine, methyl

Hazardous Waste Number	Substance
P063	Hydrocyanic acid
P063	Hydrogen cyanide
P096	Hydrogen phosphide
P064	Isocyanic acid, methyl ester
P060	Isodrin
P007	3(2H)-Isoxazolone, 5-(aminomethyl)
P092	Mercury, (acetato-0) phenyl
P065	Mercury fulminate (R,T)
P016	Methane, oxybis (chloro)
P112	Methane, tetranitro-(R)
P118	Methanethiol, trichloro
P059	4,7-Methano-IH-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro
P066	Methomyl
P067	2-Methylaziridine
P068	Methyl hydrazine
P064	Methyl isocyanate
P069	2-Methyllactonitrile
P071	Methyl parathion
P072	alpha-Naphthylthiourea
P073	Nickel carbonyl
P074	Nickel cyanide
P074	Nickel (2+) cyanide
P073	Nickel tetracarbonyl
P075	Nicotine and salts
P076	Nitric oxide
P077	p-Nitroaniline
P078	Nitrogen dioxide
P076	Nitrogen (2+) oxide
P078	Nitrogen (IV) oxide
P081	Nitroglycerine (R)
P082	N-Nitrosomethylamine
P084	N-Nitrosomethylvinylamine
P050	5-Norbornene-2,3-dimethanol, 1,4,5,6,7,7-hexachloro, cyclic sulfite
P085	Octamethylpyrophosphoramide
P087	Osmium oxide
P087	Osmium tetroxide
P088	7-Oxabicyclo [2.2.1] heptane-2, 3-dicarboxylic acid
P089	Parathion
P034	Phenol, 2-cyclohexyl-4,6-dinitro
P048	Phenol, 2,4-dinitro
P047	Phenol, 2-methyl-4,6-dinitro-, and salts
P020	Phenol, 2-(1-methylpropyl)-4,6-dinitro
P009	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P036	Phenyl dichloroarsine
P092	Phenylmercuric acetate
P093	N-Phenylthiourea
P094	Phorate
P095	Phosgene
P096	Phosphine
P041	Phosphoric acid, diethyl 4-nitrophenyl ester
P044	Phosphorodithioic acid, 0,0-dimethyl S-[2-(methylamino)-2-oxoethyl]ester
P043	Phosphorofluoric acid, bis(1-methylethyl)ester
P094	Phosphorothioic acid, 0-0-diethyl S-(ethylthio)methyl ester

Hazardous Waste Number	Substance
P089	Phosphorothioic acid, 0,0-diethyl 0-(4-nitrophenyl) ester
P040	Phosphorothioic acid, 0-0-diethyl 0-pyrazinyl ester
P097	Phosphorothioic acid, 0-0-dimethyl 0-[p-((dimethylamino)-sulfonyl) phenyl]ester
P110	Plumbane, tetraethyl
P098	Potassium cyanide
P099	Potassium silver cyanide
P070	Propanal, 2-methyl-2(methylthio)-, 0-[(methylamino)carbonyl]oxime
P101	Propanenitrile
P027	Propanenitrile, 3-chloro
P069	Propanenitrile, 2-hydroxy-2-methyl
P081	1,2,3-Propanetriol, trinitrate-(R)
P017	2-Propanone, 1-bromo
P102	Propargyl alcohol
P003	2-Propenal
P005	2-Propen-1-ol
P067	1,2-Propylenimine
P102	2-Propyn-1-ol
P008	4-Pyridinamine
P075	Pyridine, (S)-3-(1-methyl-2-pyrrolidinyl)-, and salts
P111	Pyrophosphoric acid, tetraethyl ester
P103	Selenourea
P104	Silver cyanide
P105	Sodium azide
P106	Sodium cyanide
P107	Strontium sulfide
P108	Strychnidin-10-one, and salts
P018	Strychnidin-10-one, 2,3-dimethoxy
P108	Strychnine and salts
P115	Sulfuric acid, thallium (I) salt
P109	Tetraethyldithiopyrophosphate
P110	Tetraethyl lead
P111	Tetraethyl pyrophosphate
P112	Tetranitromethane (R)
P062	Tetraphosphoric acid, hexaethyl ester
P113	Thallic oxide
P113	Thallium (III) oxide
P114	Thallium (I) selenide
P115	Thallium (I) sulfate
P045	Thiofanox
P049	Thiomidodicarbonic diamide
P014	Thiophenol
P116	Thiosemicarbazide
P026	Thiourea (2-chlorophenyl)
P072	Thiourea, 1-naphthalenyl
P093	Thiourea, phenyl
P123	Toxaphene
P118	Trichloromethanethiol
P119	Vanadic acid, ammonium salt
P120	Vanadium pentoxide
P120	Vanadium (V) oxide
P001	Warfarin and salts, when present at concentrations greater than 0.3%
P121	Zinc cyanide

Hazardous Waste Number	Substance
P122	Zinc phosphide, when present at concentrations greater than 10% (R,T)

(c) The commercial chemical products, manufacturing chemical intermediates, off-specification commercial chemical products or manufacturing chemical intermediates described in par. (a) 1. or 2. or materials or items described in par. (a) 3. or 4. listed in table V are identified as toxic wastes (T) unless otherwise designated and are subject to the small quantity exclusion in s. NR 610.05 (1). These wastes and their corresponding hazardous waste numbers are:

Table V
Toxic Commercial Chemical Products and Manufacturing Chemical Intermediates

Hazardous Waste Number	Substance
U001	Acetaldehyde (I)
U034	Acetaldehyde, trichloro
U187	Acetamide, N-(4-ethoxyphenyl)
U005	Acetamide, N-9H-fluoren-2-yl
U112	Acetic acid, ethyl ester (I)
U144	Acetic acid, lead salt
U214	Acetic acid, thallium (I) salt
U232	Acetic acid,(2,4,5-trichlorophenoxy)
U002	Acetone (I)
U003	Acetonitrile (I,T)
U248	3-(alpha-Acetonylbenzyl)-4-hydroxycoumarin and salts, when present at concentrations of 0.3% or less
U004	Acetophenone
U005	2-Acetylaminofluorene
U006	Acetyl chloride (C, R, T)
U007	Acrylamide
U008	Acrylic acid (I)
U009	Acrylonitrile
U150	Alanine, 3-[p-bis(2-chloroethyl)amino] phenyl-,L
U328	2-Amino-1-methylbenzene
U353	4-Amino-1-methylbenzene
U011	Amitrole
U012	Aniline (I,T)
U136	Arsenic acid, dimethyl
U014	Auramine
U015	Azaserine
U010	Azirino (2', 3': 3, 4) pyrrolo (1, 2-a) indole-4, 7-dione, 6-amino-8-[((amino-carbonyl) oxy)methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-[1aS(1aalpha,8beta,8aa lpha,8balpha)]
U157	Benz[j]laceanthrylene, 1,2-dihydro-3-methyl
U016	Benz[c]acridine
U016	3,4 Benzacridine
U017	Benzal chloride
U018	Benz(a)anthracene
U018	1,2-Benzanthracene
U094	1,2-Benzanthracene, 7,12-dimethyl
U012	Benzenamine (I,T)

Hazardous Waste Number	Substance
U014	Benzenamine, 4,4'-carbonimidoylbis (N,N-dimethyl)
U049	Benzenamine, 4-chloro-2-methyl-, hydrochloride
U093	Benzenamine, N, N'-dimethyl-4-(phenylazo)
U158	Benzenamine, 4,4'-methylenebis (2-chloro)
U222	Benzenamine, 2-methyl-, hydrochloride
U181	Benzenamine, 2-methyl-5-nitro
U328	Benzenamine, 2-methyl
U019	Benzene (I, T)
U353	Benzenamine, 4-methyl
U038	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U030	Benzene, 1-bromo-4-phenoxy
U037	Benzene, chloro
U190	1,2-Benzenedicarboxylic acid anhydride
U028	1,2-Benzenedicarboxylic acid, bis(2-ethyl-hexyl)ester
U069	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	1,2-Benzenedicarboxylic acid, diethyl ester
U102	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	1,2-Benzenedicarboxylic acid, dioctyl ester
U070	Benzene, 1,2-dichloro
U071	Benzene, 1,3-dichloro
U072	Benzene, 1,4-dichloro
U017	Benzene, (dichloromethyl)
U223	Benzene, 1,3-diisocyanatomethyl-(R, T)
U239	Benzene, dimethyl-(I,T)
U201	1,3-Benzenediol
U127	Benzene, hexachloro
U056	Benzene, hexahydro-(I)
U188	Benzene, hydroxy
U220	Benzene, methyl
U105	Benzene, 1-methyl-2,4-dinitro
U106	Benzene, 1-methyl-2,6-dinitro
U203	Benzene, 1,2-methylenedioxy-4-allyl
U141	Benzene 1,2-methylenedioxy-4-propenyl
U090	Benzene, 1,2-methylenedioxy-4 propyl
U055	Benzene, (1-methylethyl)-(I)
U169	Benzene, nitro-(I,T)
U183	Benzene, pentachloro
U185	Benzene, pentachloronitro
U020	Benzenesulfonic acid chloride (C,R)
U020	Benzenesulfonyl chloride (C,R)
U207	Benzene, 1,2,4,5-tetrachloro
U023	Benzene, (trichloromethyl)-(C,R,T)
U234	Benzene, 1,3,5-trinitro-(R,T)
U021	Benzidine
U202	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, and salts
U120	Benzo [j,k] fluorene
U022	Benzo[a]pyrene
U022	3,4-Benzopyrene
U197	p-Benzoquinone
U023	Benzotrichloride (C, R, T)
U050	1,2-Benzphenanthrene
U085	2,2'-Bioxirane (I,T)

Hazardous Waste Number	Substance
U021	(1,1'-Biphenyl)-4,4'-diamine
U073	(1,1'-Biphenyl)-4,4'-diamine, 3,3'-dichloro
U091	(1,1'-Biphenyl)-4,4'-diamine, 3,3'-dimethoxy
U095	(1,1'-Biphenyl)-4,4'-diamine, 3,3'-dimethyl
U024	Bis(2-chloroethoxy)methane
U027	Bis(2-chloroisopropyl) ether
U244	Bis(dimethylthiocarbamoyl) disulfide
U028	Bis(2-ethylhexyl) phthalate
U246	Bromine cyanide
U225	Bromoform
U030	4-Bromophenyl phenyl ether
U128	1,3-Butadiene, 1,1,2,3,4,4-hexachloro
U172	1-Butanamine, N-butyl-N-nitroso
U035	Butanoic acid, 4-[Bis(2-chloroethyl)amino] benzene
U031	1-Butanol (I)
U159	2-Butanone (I,T)
U160	2-Butanone peroxide (R,T)
U053	2-Butenal
U074	2-Butene, 1,4-dichloro-(I,T)
U031	n-Butyl alcohol (I)
U136	Cacodylic acid
U032	Calcium chromate
U238	Carbamic acid, ethyl ester
U178	Carbamic acid, methylnitroso-, ethyl ester
U176	Carbamide, N-ethyl-N-nitroso
U177	Carbamide, N-methyl-N-nitroso
U219	Carbamide, thio
U097	Carbamic chloride, dimethyl
U215	Carbonic acid, dithallium (I) salt
U156	Carbonochloridic acid, methyl ester (I,T)
U033	Carbon oxyfluoride (R,T)
U211	Carbon tetrachloride
U033	Carbonyl fluoride (R, T)
U034	Chloral
U035	Chlorambucil
U036	Chlordane, technical
U026	Chlornaphazin
U037	Chlorobenzene
U038	Chlorobenzilate
U039	4-Chloro-m-cresol
U041	1-Chloro-2, 3-epoxypropane
U042	2-Chloroethyl vinyl ether
U044	Chloroform
U046	Chloromethyl methyl ether
U047	beta-Chloronaphthalene
U048	o-Chlorophenol
U049	4-Chloro-o-toluidine, hydrochloride
U032	Chromic acid, calcium salt
U050	Chrysene
U051	Creosote
U052	Cresols
U052	Cresylic acid
U053	Crotonaldehyde

Hazardous Waste Number	Substance
U055	Cumene (I)
U246	Cyanogen bromide
U197	2,5-Cyclohexadiene-1,4-dione
U056	Cyclohexane (I)
U057	Cyclohexanone (I)
U130	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro
U058	Cyclophosphamide
U240	2,4-D, salts and esters
U059	Daunomycin
U060	DDD
U061	DDT
U142	Decachloroctahydro-1,3,4-metheno-2H-cyclobuta [c,d]-pentalen-2-one
U062	Diallate
U133	Diamine (R,T)
U221	Diaminotoluene
U063	Dibenz(a,h)anthracene
U063	1,2:5,6-Dibenzanthracene
U064	1,2:7,8-Dibenzopyrene
U064	Dibenzo[a,i]pyrene
U066	1,2-Dibromo-3-chloropropane
U069	Dibutyl phthalate
U062	S-(2,3-Dichloroallyl) diisopropylthiocarbamate
U070	o-Dichlorobenzene
U071	m-Dichlorobenzene
U072	p-Dichlorobenzene
U073	3,3'-Dichlorobenzidine
U074	1,4-Dichloro-2-butene (I, T)
U075	Dichlorodifluoromethane
U192	3,5-Dichloro-N-(1,1-dimethyl-2-propynyl) benzamide
U060	Dichloro diphenyl dichloroethane
U061	Dichloro diphenyl trichloroethane
U078	1,1-Dichloroethylene
U079	1,2-Dichloroethylene
U025	Dichloroethyl ether
U081	2,4-Dichlorophenol
U082	2,6-Dichlorophenol
U240	2,4-Dichlorophenoxyacetic acid, salts and esters
U083	1,2-Dichloropropane
U084	1,3-Dichloropropene
U085	1,2:3,4-Diepoxybutane (I,T)
U108	1,4-Diethylene oxide
U086	N,N'-Diethylhydrazine
U087	0,0-Diethyl-S-methyl-dithiophosphate
U088	Diethyl phthalate
U089	Diethylstilbesterol
U148	1,2-Dihydro-3,6-pyradizinedione
U090	Dihydrosafrole
U091	3,3-Dimethoxybenzidine
U092	Dimethylamine (I)
U093	Dimethylaminoazobenzene
U094	7,12-Dimethylbenz[a]anthracene
U095	3,3'-Dimethylbenzidine
U096	alpha,alpha-Dimethylbenzylhydroperoxide (R)

Hazardous Waste Number	Substance
U097	Dimethylcarbamoyl chloride
U098	1,1-Dimethylhydrazine
U099	1,2-Dimethylhydrazine
U101	2,4-Dimethylphenol
U102	Dimethyl phthalate
U103	Dimethyl sulfate
U105	2,4-Dinitrotoluene
U106	2,6-Dinitrotoluene
U107	Di-n-octyl phthalate
U108	1,4-Dioxane
U109	1,2-Diphenylhydrazine
U110	Dipropylamine (I)
U111	Di-n-propylnitrosamine
U001	Ethanal (I)
U174	Ethanamine, N-ethyl-N-nitroso
U067	Ethane, 1,2-dibromo
U076	Ethane, 1,1-dichloro
U077	Ethane, 1,2-dichloro
U114	1,2-Ethanediylbiscarbamodithioic acid, salts and esters
U131	Ethane, 1,1,1,2,2,2-hexachloro
U024	Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro]U003Ethanenitrile (I,T)
U117	Ethane, 1,1'-oxybis-(I)
U025	Ethane, 1,1'-oxybis[2-chloro]
U184	Ethane, pentachloro
U208	Ethane, 1,1,1,2-tetrachloro
U209	Ethane,1,1,2,2-tetrachloro
U218	Ethanethioamide
U227	Ethane, 1,1,2-trichloro
U247	Ethane, 1,1,1-trichloro-2,2-bis(p-methoxyphenyl)
U043	Ethene, chloro
U042	Ethene, 2-chloroethoxy
U078	Ethene, 1,1-dichloro
U079	Ethene, trans-1,2-dichloro
U210	Ethene, 1,1,2,2-tetrachloro
U173	Ethanol, 2,2F-(nitrosoimino)bis
U004	Ethanone, 1-phenyl
U006	Ethanoyl chloride (C,R,T)
U359	2-Ethoxyethanol
U112	Ethyl acetate (I)
U113	Ethyl acrylate (I)
U238	Ethyl carbamate (urethane)
U038	Ethyl 4,4'-dichlorobenzilate
U114	Ethylenebis(dithiocarbamic acid), salts and esters
U067	Ethylene dibromide
U077	Ethylene dichloride
U359	Ethylene glycol monoethyl ether
U115	Ethylene oxide (I, T)
U116	Ethylene thiourea
U117	Ethyl ether (I)
U076	Ethylidene dichloride
U118	Ethyl methacrylate
U119	Ethyl methanesulfonate
U139	Ferric dextran

Hazardous Waste Number	Substance
U120	Fluoranthene
U122	Formaldehyde
U123	Formic acid (C, T)
U124	Furan (I)
U125	2-Furancarboxaldehyde (I)
U147	2,5-Furandione
U213	Furan, tetrahydro-(I)
U125	Furfural (I)
U124	Furfuran (I)
U206	D-Glucopyranose, 2-deoxy-2(3-methyl-3-nitrosoureido)
U126	Glycidylaldehyde
U163	Guanidine, N-methyl-N'-nitro-N-nitroso
U127	Hexachlorobenzene
U128	Hexachlorobutadiene
U129	Hexachlorocyclohexane (gamma isomer)
U130	Hexachlorocyclopentadiene
U131	Hexachloroethane
U132	Hexachlorophene
U243	Hexachloropropene
U133	Hydrazine (R, T)
U086	Hydrazine, 1,2-diethyl
U098	Hydrazine, 1,1-dimethyl
U099	Hydrazine, 1,2-dimethyl
U109	Hydrazine, 1,2-diphenyl
U134	Hydrofluoric acid (C, T)
U134	Hydrogen fluoride (C,T)
U135	Hydrogen sulfide
U096	Hydroperoxide, 1-methyl-1-phenylethyl-(R)
U136	Hydroxydimethylarsine oxide
U116	2-Imidazolidinethione
U137	Indeno [1,2,3-cd]pyrene
U139	Iron dextran
U140	Isobutyl alcohol (I, T)
U141	Isosafrole
U142	Kepone
U143	Lasiocarpine
U144	Lead acetate
U145	Lead phosphate
U146	Lead subacetate
U129	Lindane
U147	Maleic anhydride
U148	Maleic hydrazide
U149	Malononitrile
U150	Melphalan
U151	Mercury
U152	Methacrylonitrile (I, T)
U092	Methanamine, N-methyl-(I)
U029	Methane, bromo
U045	Methane, chloro-(I,T)
U046	Methane, chloromethoxy
U068	Methane, dibromo
U080	Methane, dichloro
U075	Methane, dichlorodifluoro

Hazardous Waste Number	Substance
U138	Methane, iodo
U119	Methanesulfonic acid, ethyl ester
U211	Methane, tetrachloro
U121	Methane, trichlorofluoro
U153	Methanethiol (I,T)
U225	Methane, tribromo
U044	Methane, trichloro
U121	Methane, trichlorofluoro
U123	Methanoic acid (C,T)
U036	4,7-Methano-1H-indene,1,2,4,5,6,7,8,8 octachloro-2,3,3a,4,7,7a-hexahydro
U154	Methanol (I)
U155	Methapyrilene
U247	Methoxychlor
U154	Methyl alcohol (I)
U029	Methyl bromide
U186	I-Methylbutadiene (I)
U045	Methyl chloride (I,T)
U156	Methyl chlorocarbonate (I,T)
U226	Methylchloroform
U157	3-Methylcholanthrene
U158	4,4'-Methylenebis(2-chloroaniline)
U132	2,2'-Methylenebis(3,4,6-trichlorophenol)
U068	Methylene bromide
U080	Methylene chloride
U122	Methylene oxide
U159	Methyl ethyl ketone (I,T)
U160	Methyl ethyl ketone peroxide (R,T)
U138	Methyl iodide
U161	Methyl isobutyl ketone (I)
U162	Methyl methacrylate (I, T)
U163	N-Methyl-N'-nitro-N-nitrosoguanidine
U161	4-Methyl-2-pentanone (I)
U164	Methylthiouracil
U010	Mitomycin C
U059	5,12-Naphthacenedione, (8S-cis)8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxyl]-7 ,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy
U165	Naphthalene
U047	Naphthalene, 2-chloro
U166	1,4-Naphthalenedione
U236	2,7-Naphthalenedisulfonic acid,3,3'-[3,3-dimethyl-(1,1'-biphenyl)-4,4'diyl)]bis(azo)bis(5-amino-4-hydroxy)-,tet rasodium salt
U166	1,4-Naphthoquinone
U167	1-Naphthylamine
U168	2-Naphthylamine
U167	alpha-Naphthylamine
U168	beta-Naphthylamine
U026	2-Naphthalenamine, N,N'-bis(2-chloroethyl)
U169	Nitrobenzene (I, T)
U170	p-Nitrophenol
U171	2-Nitropropane (I, T)
U172	N-Nitrosodi-n-butylamine
U173	N-Nitrosodiethanolamine
U174	N-Nitrosodiethylamine
U111	N-Nitroso-n-propylamine

Hazardous Waste Number	Substance
U176	N-Nitroso-N-ethylurea
U177	N-Nitroso-N-methylurea
U178	N-Nitroso-N-methylurethane
U179	N-Nitrosopiperidine
U180	N-Nitrosopyrrolidine
U181	5-Nitro-o-toluidine
U193	1,2-Oxathiolane, 2,2-dioxide
U058	2H-1,3,2-Oxazaphosphorine, 2-[bis(2-chloroethyl)amino]-tetrahydro-, 2 oxide
U115	Oxirane (I,T)
U041	Oxirane, 2-(chloromethyl)
U182	Paraldehyde
U183	Pentachlorobenzene
U184	Pentachloroethane
U185	Pentachloronitrobenzene
See F027	Pentachlorophenol
U186	1,3-Pentadiene (I)
U187	Phenacetin
U188	Phenol
U048	Phenol, 2-chloro
U039	Phenol, 4-chloro-3-methyl
U081	Phenol, 2,4-dichloro
U082	Phenol, 2,6-dichloro
U101	Phenol, 2,4-dimethyl
U170	Phenol, 4-nitro
See F027	Phenol, pentachloro
See F027	Phenol, 2,3,4,6-tetrachloro
See F027	Phenol, 2,4,5-trichloro
See F027	Phenol, 2,4,6-trichloro
U137	1,10-(1,2-Phenylene)pyrene
U145	Phosphoric acid, lead (2) salt
U087	Phosphorodithioic acid, 0,0-diethyl- S-methyl ester
U189	Phosphorous sulfide (R)
U190	Phthalic anhydride
U191	2-Picoline
U192	Pronamide
U194	1-Propanamine (I,T)
U110	1-Propanamine, N-propyl-(I)
U066	Propane, 1,2-dibromo-3-chloro
U149	Propanedinitrile
U171	Propane, 2-nitro-(I)
U027	Propane, 2,2'-oxybis[2-chloro]
U193	1,3-Propane sultone
U235	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U126	1-Propanol, 2,3-epoxy
U140	1-Propanol, 2-methyl-(I,T)
U002	2-Propanone (I)
U007	2-Propenamide
U084	Propene, 1,3-dichloro
U243	1-Propene, 1,1,2,3,3,3-hexachloro
U009	2-Propenenitrile
U152	2-Propenenitrile, 2-methyl-(I,T)
U008	2-Propenoic acid (I)
U113	2-Propenoic acid, ethyl ester (I)

Hazardous Waste Number	Substance
U118	2-Propenoic acid, 2-methyl-,ethyl ester
U162	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
See F027	Propionic acid, 2-(2,4,5-trichlorophenoxy)
U194	n-Propylamine (I, T)
U083	Propylene dichloride
U196	Pyridine
U155	1,2-Ethanediamine,N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)
U179	Pyridine, hexahydro-N-nitroso
U191	Pyridine, 2-methyl
U1644	(IH)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo
U180	Pyrrole, tetrahydro-N-nitroso
U200	Reserpine
U201	Resorcinol
U202	Saccharin and salts
U203	Safrole
U204	Selenious acid
U204	Selenium dioxide
U205	Selenium disulfide (R, T)
U015	L-Serine, diazoacetate (ester)
See F027	Silvex
U089	4,4'-Stilbenediol, alpha, alpha'-diethyl
U206	Streptozotocin
U135	Sulfur hydride
U103	Sulfuric acid, dimethyl ester
U189	Sulfur phosphide (R)
U205	Sulfur selenide (R,T)
See F027	2,4,5-T
U207	1,2,4,5-Tetrachlorobenzene
U208	1,1,1,2-Tetrachloroethane
U209	1,1,2,2-Tetrachloroethane
U210	Tetrachloroethene
See F027	2,3,4,6-Tetrachlorophenol
U213	Tetrahydrofuran (I)
U214	Thallium (I) acetate
U215	Thallium (I) carbonate
U216	Thallium (I) chloride
U217	Thallium (I) nitrate
U218	Thioacetamide
U153	Thiomethanol (I,T)
U219	Thiourea
U244	Thiram
U220	Toluene
U221	Toluenediamine
U223	Toluene diisocyanate (R,T)
U328	o-Toluidine
U353	p-Toluidine
U222	o-Toluidine hydrochloride
U011	IH-1,2,4-Triazol-3-amine
U226	1,1,1-Trichloroethane
U227	1,1,2-Trichloroethane
U228	Trichloroethene
U228	Trichloroethylene
U121	Trichloromonofluoromethane

Hazardous Waste Number	Substance
See F027	2,4,5-Trichlorophenol
See F027	2,4,6-Trichlorophenol
See F027	2,4,5-Trichlorophenoxyacetic acid
U234	sym-Trinitrobenzene (R, T)
U182	1,3,5-Trioxane,2,4,6-trimethyl
U235	Tris (2,3-dibromopropyl)phosphate
U236	Trypan blue
U237	Uracil, 5[bis(2-chloromethyl)amino]
U237	Uracil mustard
U043	Vinyl chloride
U248	Warfarin and salts, when present at concentrations of 0.3% or less
U239	Xylene (I)
U200	Yohimban-16-carboxylic acid, ll, 17-dimethoxy-18-[(3,4,5-trimethoxy-benzoyl)oxy]-, methyl ester
U249	Zinc phosphide, when present at concentrations of 10% or less
U237	2,4(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91; am. (1) (b) 4., (2) (a) Table II and (3) (a) 3., Register, August, 1992, No. 440, eff. 9-1-92; correction in (2) (a) Table II made under s. 13.93 (2m) (b), 7, Stats., Register, March, 1993, No. 447.

NR 605.10 Procedures for modifying the hazardous waste lists. (1) (a) Any person seeking to delist either a waste listed in s. NR 605.09 or a waste produced at a particular generation site from the hazardous waste lists in s. NR 605.09 which is also listed as a hazardous waste in the federal regulations promulgated by the EPA under 42 USC 6921 (b) shall petition the EPA to delist that waste.

Note: The publication containing Title 42 of the United States Code may be obtained from:

The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

(b) If EPA denies a petition for delisting, the department shall recognize that denial.

(c) Persons who have had their petition for delisting approved by EPA shall continue to manage their wastes in compliance with any applicable restrictions established under chs. NR 600 to 685 unless and until the department recognizes EPA's delisting approval. A person may petition the department to recognize an EPA delisting by submitting the following to the department:

1. Copies of all materials and information submitted to EPA concerning the delisting petition.

2. Copies of all materials and information received from EPA, including the EPA notice of delisting.

3. All other information that the department determines is necessary to evaluate the delisting petition.

(d) When determining whether or not to recognize an EPA granted delisting, the department shall:

1. Consider all available information including, but not limited to, the information submitted by the applicant to EPA; and

2. Apply the same criteria as applied by EPA under 40 CFR 260.22 as of July 1, 1990.

Note: The publication containing the CFR references may be obtained from:

The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

(e) The department shall recognize an EPA granted delisting unless the department clearly establishes that a delisting would threaten human health or the environment.

(2) Any person seeking to exclude a waste from the hazardous waste lists in s. NR 605.09 or a waste produced at a particular generation site which is not listed as a hazardous waste in the federal regulations promulgated by the EPA under 42 USC 6921 (b) shall petition the department to delist that waste. The department shall either deny the petition in writing or proceed with rulemaking to delist the waste from the hazardous waste lists in s. NR 605.09.

(3) If the EPA deletes a hazardous waste from the hazardous waste lists in the federal regulations promulgated by the EPA under 42 USC 6921 (b), the department shall proceed with rulemaking to either delete the waste from the hazardous waste lists in s. NR 605.09 or retain it. The department may retain the waste on the hazardous waste lists in s. NR 605.09 if the department determines that the waste has characteristics which identify it as a hazardous waste based on the criteria in ss. NR 605.07 and 605.08 and if the department determines that the retention is necessary to protect public health, safety or welfare. The department shall issue specific findings and conclusions on which its determination is based.

(4) If EPA deletes a hazardous waste from a particular generation site from the hazardous waste lists in the federal regulations promulgated by EPA under 42 USC 6921 (b), the department may not regulate under chs. NR 600 to 685 those wastes that have been deleted.

(5) If the EPA adds an additional solid waste to the hazardous waste lists in the federal regulations promulgated by the EPA under 42 USC 6921 (b), the department shall regulate the additional waste as a hazardous waste under chs. NR 600 to 685 as soon as EPA's action becomes final and shall proceed with rulemaking to adopt identical changes in s. NR 605.09.

(6) The department may include, or a person may petition the department to include, on the hazardous waste lists in s. NR 605.09 any additional solid waste which is not included on the hazardous waste lists in the federal regulations promulgated by the EPA under 42 USC 6921 (b) if the department determines that the solid waste has characteristics which identify it as a hazardous waste based on the criteria in ss. NR 605.07 and 605.08 and if the department determines that the inclusion is necessary to protect public health, safety or welfare. The department shall issue specific findings and conclusions on which its determination is based and shall include the additional solid waste on the lists of hazardous waste in s. NR 605.09 by rule.

Note: For the purpose of this section, petitions under subs. (2) and (6) are petitions for rules under s. 227.12, Stats. The publication containing Title 42 of the United States Code may be obtained from:

The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91; renum. (1) to be (1) (a), cr. (1) (b) to (e), Register, August, 1992, No. 440, eff. 9-1-92.

NR 605.11 EP toxicity test procedure. History: Cr. Register, February, 1991, No. 422, eff. 3-1-91; r. Register, August, 1992, No. 440, eff. 9-1-92.

NR 605.12 Analytical methods. (1) Chemical and physical samples shall be analyzed by a laboratory certified or registered under ch. NR 149. The following tests are excluded from this requirement:

(a) Physical tests of soil,

(b) Air quality tests,

(c) Gas tests,

(d) Field pH tests,

(e) Field conductivity,

(f) Turbidity tests,

(g) Water elevation,

(h) Temperature,

(i) Leachate-liner compatibility testing.

(2) Bacteriological and radiological samples shall be analyzed by the state laboratory of hygiene or at a laboratory approved or certified by the department of health and social services.

(3) Other chemical and physical samples shall be analyzed by a laboratory certified or registered under ch. NR 149. The department may allow, on a case-by-case basis, facilities to submit analytical test results from a laboratory that has not been certified, registered or approved by the department or the department of health and social services.

History: Cr. Register, February, 1991, No. 422, eff. 3-1-91.

NR 605.13 PCB wastes regulated under toxic substances control act. The disposal of PCB containing dielectric fluid and electric equipment containing such fluid authorized for use and regulated under 40 CFR 761, July 1, 1990, and that are hazardous only because they fail the test for the toxicity characteristic, hazardous codes D018 to D043 only, are exempt from regulation under chs. NR 600 to 685 and the notification requirements of section 3010 of RCRA.

Note: The publication containing the CFR references may be obtained from:

The Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

History: Cr. Register, August, 1992, No. 440, eff. 9-1-92.

APPENDIX I

REPRESENTATIVE SAMPLING METHODS

The methods and equipment used for sampling waste materials will vary with the form and consistency of the waste materials to be sampled. Samples collected using the following sampling protocols, for sampling waste with properties similar to the indicated materials, will be considered by the department to be representative of the waste:

(1) For extremely viscous liquid - ASTM Standard D-140-70

(2) For crushed or powdered material - ASTM Standard D-346-78

(3) For soil or rock-like material - ASTM Standard D-420-69

(4) For soil-like material - ASTM Standard D-1452-80

(5) For fly ash-like material - ASTM Standard D-2234-76

Note: The publications containing these standards may be obtained from the:

American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

These publications are available for inspection at the offices of the department, the secretary of state, and the revisor of statutes.

(6) For containerized liquid wastes - "COLIWASA" described in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" (SW-846).

(7) For liquid waste in pits, ponds, lagoons and similar reservoirs - "Pond Sampler" described in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" (SW-846).

Note: Publication SW-846 may be obtained from:

National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22161

This publication is available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

APPENDIX II

CHEMICAL ANALYSIS TEST METHODS

Tables 1, 2 and 3 specify the appropriate analytical procedures, described in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW 846 which shall be used to determine whether a sample contains a given Appendix III or IV toxic constituent.

Table 1 identifies each Appendix III or IV organic constituent along with the approved measurement method. Table 2 identifies the corresponding methods for inorganic species. Table 3 summarizes the contents of SW-846 and supplies specific section and method numbers for sampling and analysis methods.

Prior to final sampling and analysis method selection the analyst should consult the specific section or method described in SW-846 for additional guidance on which of the approved methods should be employed for a specific sample analysis situation.

Note: Publication SW-846 may be obtained from:

National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22161

This publication is available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

Table 1
Analysis Methods for Organic Chemicals Contained in SW-846

Compound	Method Numbers
Acetonitrile	8030, 8240
Acrolein	8030, 8240
Acrylamide	8015, 8240
Acrylonitrile	8030, 8240
2-Amino-l-methylbenzene (o-Toluidine)	8250
4-Amino-l-methylbenzene (p-Toluidine)	8250
Aniline	8250
Benzene	8020, 8024
Benz(a)anthracene	8100, 8250, 8310
Benzo(a)pyrene	8100, 8250, 8310
Benzotrichloride	8120, 8250
Benzyl chloride	8120, 8250
Benzo(b)fluoanthene	8100, 8250, 8310
Bis(2-chloroethoxymethane)	8010, 8240
Bis(2-chloroethyl)ether	8010, 8240
Bis(2-chloroisopropyl)ether	8010, 8240
Carbon disulfide	8015, 8240
Carbon tetrachloride	8010, 8240
Chlordane	8080, 8250
Chlorinated biphenyls	8080, 8250
Chlorinated dibenzo-p-dioxins	8280
Chlorinated dibenzofurans	8280
Chloroacetaldehyde	8010, 8240
Chlorobenzene	8020, 8240
Chloroform	8010, 8240
Chloromethane	8010, 8240
2-Chlorophenol	8040, 8250
Chrysene	8100, 8250, 8310

Appendix

Compound	Method Numbers
Creosote[1]	18100, 8250
Cresol(s)	8040, 8250
Cresylic Acid(s)	8040, 8250
Dichlorobenzene(s)	8010, 8120, 8250
Dichloroethane(s)	8010, 8240
Dichloromethane	8010, 8240
Dichlorophenoxyacetic acid	8150, 8250
Dichloropropanol	8120, 8250
2,4-Dimethylphenol	8040, 8250
Dinitrobenzene	8090, 8250
4,6-Dinitro-o-cresol	8040, 8250
2,4-Dinitrotoluene	8090, 8250
2,6-Dinitrotoluene	8060, 8250
Endrin	8080, 8250
2-Ethoxyethanol	8030, 8240
Ethyl ether	8015, 8240
Ethylene dibromide	8010, 8240
Ethylene thiourea	8250, 8330
Formaldehyde	8015, 8240
Formic acid	8250
Heptachlor	8080, 8250
Hexachlorobenzene	8120, 8250
Hexachlorobutadiene	8120, 8250
Hexachloroethane	8010, 8240
Hexachlorocyclopentadiene	8120, 8250
Lindane	8080, 8250
Maleic anhydride	8250
Methanol	8010, 8240
Methomyl	8250
Methyl ethyl ketone	8015, 8240
Methyl isobutyl ketone	8015, 8240
Napthalene	8100, 8250
Napthoquinone	8090, 8250
Nitrobenzene	8090, 8250
4-Nitrophenol	8040, 8240
2-Nitropropane	8030, 8240
Paraldehyde (trimer of acetaldehyde)	8015, 8240
Pentachlorophenol	8040, 8250
Phenol	8040, 8250
Phorate	8140
Phosphorodithioic acid esters	8140
Phthalic anhydride	8090, 8250
2-Picoline	8090, 8250
Pyridine	8090, 8250
Tetrachlorobenzene(s)	8120, 8250
Tetrachloroethane(s)	8010, 8240
Tetrachloroethene	8010, 8240
Tetrachlorophenol	8040, 8250
Toluene	8020, 8024
Toluene diisocyanate(s)	8250
Toluenediamine	8250
2,4-Toluenediamine	8250
2,6-Toluenediamine	8250
3,4-Toluenediamine	8250
Toxaphene	8080, 8250

Compound	Method Numbers
Trichloroethane	8010, 8240
Trichloroethene(s)	8010, 8240
Trichlorofluoromethane	8010, 8240
Trichlorophenol(s)	8040, 8250
2,4,5-Trichlorophenoxy propionic acid	8150, 8250
Trichloropropane	8010, 8240
Vinyl chloride	8010, 8240
Vinylidene chloride	8010, 8240
Xylene	8020, 8240

[1]Analyne for phenanthrene and carbazole; if these are present in a ratio between 1.4:1 and 5:1 creosote should be considered present.

Table 2
Analysis Methods for Inorganic Chemicals Contained in SW-846

Compound	First edition method(s)	Second edition method(s)
Antimony	8.50	7040, 7041
Arsenic	8.51	7060, 7061
Barium	8.52	7080, 7081
Cadmium	8.53	7090, 7091
Chromium	8.54	7190, 7191
Chromium: Hexavalent	8.545, 8.546, 8.547	7195, 7196, 7197
Lead	8.56	7420, 7421
Mercury	8.57	7470, 7471
Nickel	8.58	7520, 7521
Selenium	8.59	7740, 7741
Silver	8.60	7760, 7761
Cyanides	8.55	9010
Total Organic Halogen	8.66	9020
Sulfides	8.67	9030

Table 3
Sampling and Analysis Methods Contained in SW-846

Title	First edition		Second edition	
	Section No.	Method No.	Section No.	Method No.
Sampling of Solid Wastes	1.0	—	1.0	—
Development of Appropriate Sampling Plans	1.0	—	1.1	—
Regulatory and Scientific Objectives	1.0-2	—	1.1.1	—
Fundamental Statistical Concepts	1.0-3	—	1.1.2	—
Basic Statistical Strategies	1.0-7	—	1.1.3	—
Simple Random Sampling	—	—	1.1.3.1	—
Stratified Random Sampling	—	—	1.1.3.2	—
Systematic Random Sampling	—	—	1.1.3.3	—
Special Considerations	1.0-7	—	—	—
Composite Sampling	—	—	1.1.4.1	—
Subsampling	-	—	1.1.4.2	—
Cost and Loss Functions	—	—	1.1.4.3	—
Implementation of Sampling Plan	1.0-7	—	1.2	—
Selection of Sampling Equipment	—	—	1.2.1	—
Composite Liquid Waste Sampler	3.2.1	—	1.2.1.1	—
Weighted Bottle	3.2.2	—	1.2.1.2	—
Dipper	3.2.3	—	1.2.1.3	—
Thief	3.2.4	—	1.2.1.4	—
Trier	3.2.5	—	1.2.1.5	—

Appendix

Title	First edition		Second edition	
	Section No.	Method No.	Section No.	Method No.
Auger	3.2.6	—	1.2.1.6	—
Scoop and Shovel	3.2.7	—	1.2.1.7	—
Selection of Sample Containers	3.3	—	1.2.2	—
Processing and Storage of Samples	3.3	—	1.2.3	—
Documentation of Chain of Custody	2.0	—	1.3	—
Sample Labels	2.0-1	—	1.3.1	—
Sample Seals	2.0-3	—	1.3.2	—
Field Log Book	2.0-5	—	1.3.3	—
Chain-of-Custody Record	2.0-6	—	1.3.4	—
Sample Analysis Request Sheet	2.0-9	—	1.3.5	—
Sample Delivery to Laboratory	2.0-10	—	1.3.6	—
Shipping of Samples	2.0-10	—	1.3.7	—
Receipt and Logging of Sample	2.0-12	—	1.3.8	—
Assignment of Sample for Analysis	2.0-13	—	1.3.9	—
Sampling Methodology	3.0	—	1.4	—
Containers	3.2-2	—	1.4.1	—
Tanks	3.2-2	—	1.4.2	—
Waste Piles	3.2-2	—	1.4.3	—
Landfills and Lagoons	3.2-2	—	1.4.4	—
Waste Evaluation Procedures	—	—	2.0	—
Characteristics of Hazardous Waste	—	—	2.1	—
Ignitability	4.0	—	2.1.1	—
Pensky-Martens Closed-Cup Method	4.1	—	2.1.1	1010
Setaflash Closed-Cup Method	4.1	—	2.1.1	1020
Corrosivity	5.0	—	2.1.2	—
Corrosivity Toward Steel	5.3	—	2.1.2	1110
Reactivity	6.0	—	2.1.3	—
Extraction Procedure Toxicity	7.0	—	2.1.4	—
Extraction Procedure Toxicity Test	7.1, 7.2, 7.5	—	—	—
Method and Structural Integrity Test	7.4	—	2.1.4	1310
Sample Workup Techniques	—	—	4.0	—
Inorganic Techniques	8.49	—	4.1	—
Acid Digestion for Flame AAS	1	—	4.1	3010
Acid Digestion for Furnace AAS	1	—	4.1	3020
Acid Digestion of Oil, Grease, or Wax	8.49-9	—	4.1	3030
Dissolution Procedure for Oil, Grease or Wax	8.49-8			
Alkaline Digestion	8.0	8.458	4.1	3060
Organic Techniques	8.0	—	4.2	—
Separatory Funnel Liquid-Liquid Extraction	9.0	9.1	4.2	3510
Continuous Liquid-Liquid Extraction	9.0	9.01	4.2	3520
Acid-Base Cleanup Extraction	8.0	8.84	4.2	3530
Soxhlet Extraction	8.0	8.86	4.2	3540
Sonication Extraction	8.0	8.85	4.2	3550
Sample Introduction Techniques	—	—	5.0	—
Headspace	8.0	8.82	5.0	5020
Purge-and-Trap	8.0	8.83	5.0	5030
Inorganic Analytical Methods	8.0	—	7.0	—
Antimony, Flame AAS	8.0	8.50	7.0	7470

Title	First edition		Second edition	
	Section No.	Method No.	Section No.	Method No.
Antimony, Furnace AAS	8.0	8.50	7.0	7471
Arsenic, Flame AAS	8.0	8.51	7.0	7060
Arsenic, Furnace AAS	8.0	8.51	7.0	7061
Barium, Flame AAS	8.0	8.52	7.0	7080
Barium, Furnace AAS	8.0	8.52	7.0	7081
Cadmium, Flame AAS	8.0	8.53	7.0	7130
Cadmium, Furnace AAS	8.0	8.53	7.0	7131
Chromium, Flame AAS	8.0	8.54	7.0	7090
Chromium, Furnace AAS	8.0	8.54	7.0	7191
Chromium, Hexavalent, Coprecipitation	8.0	8.545	7.0	7195
Chromium, Hexavalent, Colorimetric	8.0	8.546	7.0	7196
Chromium, Hexavalent, Chelation	8.0	8.547	7.0	7197
Lead, Flame AAS	8.0	8.56	7.0	7420
Lead, Furnace AAS	8.0	8.56	7.0	7421
Mercury, Cold Vapor, Liquid	8.0	8.57	7.0	7470
Mercury, Cold Vapor, Solid	8.0	8.57	7.0	7471
Nickel, Flame AAS	8.0	8.58	7.0	7520
Nickel, Furnace AAS	8.0	8.58	7.0	7521
Selenium, Flame AAS	8.0	8.59	7.0	7740
Selenium, Gaseous Hydride AAS	8.0	8.59	7.0	7741
Silver, Flame AAS	8.0	8.60	7.0	7760
Silver, Furnace AAS	8.0	8.60	7.0	7761
Organic Analytical Methods	8.0	—	8.0	—
Gas Chromatographic Methods	8.0	—	8.1	—
Halogenated Volatile Organics	8.0	8.01	8.1	8010
Nonhalogenated Volatile Organics	8.0	8.01	8.1	8015
Aromatic Volatile Organics	8.0	8.02	8.1	8020
Acrolein, Acrylonitrile, Acetonitrile	8.0	8.03	8.1	8030
Phenols	8.0	8.04	8.1	8040
Phthalate Esters	8.0	8.06	8.1	8060
Organochlorine Pesticides and PCBs	8.0	8.08	8.1	8080
Nitroaromatics and Cyclic Ketones	8.0	8.09	8.1	8090
Polynuclear Aromatic Hydrocarbons	8.0	8.10	8.1	8100
Chlorinated Hydrocarbons	8.0	8.12	8.1	8120
Organophosphorus Pesticides	8.0	8.22	8.1	8140
Chlorinated Herbicides	8.0	8.40	8.1	8150
Gas Chromatographic/Mass Spectroscopy Methods (GC/MS)	8.0	—	8.2	—
GC/MS Volatiles	8.0	8.24	8.2	8240
GC/MS Semi-Volatiles, Packed Column	8.0	8.25	8.2	8250
GC/MS Semi-Volatiles, Capillary	8.0	8.27	8.2	8270
Analysis of Chlorinated Dioxins and Dibenzofurans	—	—	8.28	8280
High Performance Liquid Chromatographic Methods (HPLC)	8.0	—	8.3	—
Polynuclear Aromatic Hydrocarbons	8.0	8.10	8.3	8310

Appendix

Title	First edition		Second edition	
	Section No.	Method No.	Section No.	Method No.
Miscellaneous Analytical Methods	8.0	—	9.0	—
Cyanide; Total and Amenable to Chlorination	8.0	8.55	9.0	9010
Total Organic Halogen (TOX)	8.0	8.66	9.0	9020
Sulfides	8.0	8.67	9.0	9030
pH Measurement.....	5.0	5.2	9.0	9040
Quality Control/Quality Assurance ...	10.0	—	10.1	—
Introduction.....	10.0	—	10.1	—
Program Design.....	10.0	—	10.2	—
Sampling	10.0	—	10.3	—
Analysis.....	10.0	—	10.4	—
Data Handling.....	10.0	—	10.5	—

[1]See specific metal.

APPENDIX III

BASIS FOR LISTING HAZARDOUS WASTES

BASIS FOR LISTING HAZARDOUS WASTES

Hazardous Waste Number	Hazardous Constituents for Which Listed
F001	tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorinated fluorocarbons, carbon tetrachloride
F002	tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloroethylene, 1,1, 2-trichloro-1,2,2-trifluoroethane, o-dichlorobenzene, trichlorofluoromethane
F003	N.A.
F004	cresols and cresylic acid, nitrobenzene
F005	toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, 2-ethoxyethanol, benzene, 2-nitropropane
F006	cadmium, hexavalent chromium, nickel, cyanide (complexed)
F007	cyanide (salts)
F008	cyanide (salts)
F009	cyanide (salts)
F010	cyanide (salts)
F011	cyanide (salts)
F012	cyanide (complexed)
F019	hexavalent chromium, cyanide (complexed)
F020	Tetra- and pentachlorodibenzo-p-dioxins; tetra and pentachlorodi-benzofurans; tri- and tetrachlorophenols and their chlorophenoxy derivative acids, esters, ethers, amine and other salts.
F021	Penta- and hexachlorodibenzo-p-dioxins; penta- and hexachlorodibenzofurans; pentachlorophenol and its derivatives.
F022	Tetra-, penta- and hexachlorodibenzo-p-dioxins; tetra-, penta- and hexachlorodibenzofurans.
F023	Tetra- and pentachlorodibenzo-p-dioxins; tetra- and pentachlorodibenzofurans; tri- and tetrachlorophenols and their chlorophenoxy derivative acids, esters, ethers, amine and other salts.
F024	chloromethane, dichloromethane, trichloromethane, carbon tetrachloride, chloroethylene, 1,1-dichloroethane, 1,2-dichloroethane, trans-1-2-dichloroethylene, 1,1-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethylene, pentachloroethane, hexachloroethane, allyl chloride (3-chloropropene), dichloropropane, dichloropropene, 2-chloro-1,3-butadiene, hexachloro-1,3-butadiene, hexachlorocyclopentadiene, benzene, chlorobenzene, dichlorobenzene, 1,2,4-trichlorobenzene, tetrachlorobenzene, pentachlorobenzene, hexachlorobenzene, toluene, naphthalene
F026	Tetra-, penta- and hexachlorodibenzo-p-dioxins; tetra-, penta- and hexachlorodibenzofurans.
F027	Tetra-, penta- and hexachlorodibenzo-p-dioxins; tetra-, penta- and hexachlorodibenzofurans; tri-, tetra- and pentachlorophenols and their chlorophenoxy derivative acids, esters, ethers, amine and other salts.
F028	Tetra-, penta- and hexachlorodibenzo-p-dioxins; tetra-, penta- and hexachlorodibenzofurans; tri-, tetra- and pentachlorophenols and their chlorophenoxy derivative acids, esters, ethers, amine and other salts.
F039	All constituents for which treatment standards are specified for multi-source leachate wastewaters and nonwastewaters under s. NR 675.23 (1), table CCW.
F500	Same as F001 and F002

Appendix

Hazardous Waste Number	Hazardous Constituents for Which Listed
K001	benz(a)anthracene, benzo(a)pyrene, chrysene, naphthalene, phenol, 2-chlorophenol, 2,4-dimethylphenyl, trichlorphenols, pentachlorophenol, tetrachlorophenols, p-chloro-m-cresol, 2,4-dinitrophenol, creosote, fluoranthene, benzo(b)fluoranthene, indeno (1,2,3-cd) pyrene, dibenz(a)anthracene, acenaphthalene, pentachlorophenol
K002	hexavalent chromium, lead
K003	hexavalent chromium, lead
K004	hexavalent chromium
K005	hexavalent chromium, lead
K006	hexavalent chromium
K007	cyanide (complexed), hexavalent chromium
K008	hexavalent chromium
K009	chloroform, formaldehyde, methylene chloride, methyl chloride, paraldehyde, formic acid
K010	chloroform, formaldehyde, methylene chloride, methyl chloride, paraldehyde, formic acid, chloroacetaldehyde
K011	acrylonitrile, acetonitrile, hydrocyanic acid
K013	hydrocyanic acid, acrylonitrile, acetonitrile
K014	acetonitrile, acrylamide
K015	benzyl chloride, chlorobenzene, toluene, benzotrichloride
K016	hexachlorobenzene, hexachlorobutadiene, carbon tetrachloride, hexachloroethane, perchloroethylene
K017	epichlorohydrin, chloroethers (bis(chloromethyl) ether and bis (2-chloroethyl) ethers), trichloropropane, dichloropropanols
K018	1,2-dichloroethane, trichloroethylene, hexachlorobutadiene, hexachlorobenzene
K019	ethylene dichloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, tetrachloroethanes (1,1,2,2-tetrachloroethane and 1,1,1,2-tetrachloroethane), trichloroethylene, tetrachloroethylene, carbon tetrachloride, chloroform, vinyl chloride, vinylidene chloride
K020	ethylene dichloride, 1,1,1-trichloroethane, 1,1,2-trichloroethane, tetrachloroethanes (1,1,2,2-tetrachloroethane and 1,1,1,2-tetrachloroethane), trichloroethylene, tetrachloroethylene, carbon tetrachloride, chloroform, vinyl chloride, vinylidene chloride
K021	antimony, carbon tetrachloride, chloroform
K022	phenol, tars (polycyclic aromatic hydrocarbons)
K023	phthalic anhydride, maleic anhydride
K024	phthalic anhydride, 1,4 napthoquinone
K025	meta-dinitrobenzene, 2,4-dinitrotoluene
K026	paraldehyde, pyridines, 2-picoline
K027	toluene diisocyanate, toluene-2,4-diamine
K028	1,1,1-trichloroethane, vinyl chloride
K029	1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride, vinylidene chloride, chloroform
K030	hexachlorobenzene, hexachlorobutadiene, hexachloroethane, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, ethylene dichloride
K031	arsenic
K032	hexachlorocyclopentadiene
K033	hexachlorocyclopentadiene
K034	hexachlorocyclopentadiene
K035	creosote, benzo(b)fluoroanthene, benzo(a)pyrene, chrysene, naphthalene, fluoranthene, indeno(1,2,3-cd)pyrene, benzo(a)anthracene, dibenzo(a)anthracene, acenaphthalene
K036	toluene, phosphorodithioic and phosphorothioic acid esters
K037	toluene, phosphorodithioic and phosphorothioic acid esters
K038	phorate, formaldehyde, phosphorodithioic and phosphorothioic acid esters
K039	phosphorodithioic and phosphorothioic acid esters
K040	phorate, formaldehyde, phosphorodithioic and phosphorothioic acid esters
K041	toxaphene

Hazardous Waste Number	Hazardous Constituents for Which Listed
K042	hexachlorobenzene; ortho-dichlorobenzene
K043	2,4-dichlorophenol, 2,6-dichlorophenol, 2,4,6-trichlorophenol
K044	N.A.
K045	N.A.
K046	lead
K047	N.A.
K048	chromium (VI), lead
K049	chromium (VI), lead
K050	chromium (VI)
K051	chromium (VI), lead
K052	lead
K060	cyanide, naphthalene, phenolic compounds, arsenic
K061	chromium (VI), lead, cadmium
K062	chromium (VI), lead
K069	chromium (VI), lead, cadmium
K071	mercury
K073	chloroform, carbon tetrachloride, hexachloroethane, trichloroethane, tetrachlorethylene, dichloroethylene, 1,1,2,2-tetrachloroethane
K083	aniline, nitrobenzene, diphenylamine, phenylenediamine
K084	arsenic
K085	benzene, dichlorobenzenes, trichlorobenzenes, tetrachlorobenzene, pentachlorobenzene, hexachlorobenzene, benzyl chloride
K086	chromium (VI), lead
K087	phenol, naphtalene
K093	Phthalic anhydride, maleic anhydride
K094	Phthalic anhydride
K095	1,1,2-trichloroethane, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane
K096	1,2-dichloroethane, 1,1,1-trichloroethane, 1,1,2-trichloroethane
K097	Chlordane, heptachlor
K098	Toxaphene
K099	2,4-dichlorophenol, 2,4,6-trichlorophenol
K100	Hexavalent chromium, lead, cadmium
K101	Arsenic
K102	Arsenic
K103	Aniline, nitrobenzene, phenylenediamine
K104	Aniline, benzene, diphenylamine, nitrobenzene, phenylenediamine
K105	Benzene, monochlorobenzene, dichlorobenzene, 2,4,6-trichlorophenol
K106	Mercury
K111	2,4-Dinitrotoluene
K112	2,4-Toluenediamine, o-toluidine, p-toluidine, aniline
K113	2,4-Toluenediamine, o-toluidine, p-toluidine, aniline
K114	2,4-Toluenediamine, o-toluidine, p-toluidine
K115	2,4-Toluenediamine
K116	Carbon tetrachloride, tetrachloroethylene, chloroform, phosgene
K117	Ethylene dibromide
K118	Ethylene dibromide
K123	Ethylene thiourea
K124	Ethylene thiourea
K125	Ethylene thiourea
K126	Ethylene thiourea
K136	Ethylene dibromide

N.A. - Waste is hazardous because it meets either the ignitability, corrosivity or reactivity characteristics.

APPENDIX IV

HAZARDOUS CONSTITUENTS

A solid waste which contains any of the hazardous constituents listed in this appendix shall be listed in s. NR 605.09 as a hazardous waste unless the department concludes, after considering the factors in s. NR 605.07 (2) (a) 3., that the waste is not capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed or otherwise managed.

Note: Section NR 605.07 (2) (a) identifies criteria for listing hazardous waste. A waste containing any of the constituents in this appendix is examined by the department using these criteria. If the department determines the waste should be listed, it will be included under: Table II, Hazardous Waste from Nonspecific Sources; Table III, Hazardous Waste from Specific Sources; Table IV, Acute Hazardous Commercial Chemical Products and Manufacturing Chemical Intermediates; or Table V, Toxic Commercial Chemical Products and Manufacturing Chemical Intermediates. One shall not assume that a waste containing one or more of the constituents in this appendix will automatically be a hazardous waste. In this appendix, the abbreviation N.O.S. (not otherwise specified) signifies those members of the general class not specifically listed by name.

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Acetonitrile	Same	75-05-8	U003
Acetophenone	Ethanone, 1-phenyl-	98-86-2	U004
2-Acetylaminefluarone	Acetamide, N-9H-fluoren-2-yl-	53-96-3	U005
Acetyl chloride	Same	75-36-5	U006
1-Acetyl-2-thiourea	Acetamide, N-(aminothioxomethyl)-	591-08-2	P002
Acrolein	2-Propenal	107-02-8	P003
Acrylamide	2-Propenamide	79-06-1	U007
Acrylonitrile	2-Propenenitrile	107-13-1	U009
Aflatoxins	Same	1402-68-2	—
Aldicarb	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime	116-06-3	P070
Aldrin	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-10-hexachloro-1,4,4a,5,8,8ahexahydro-, (1alpha,4alpha,4abeta,5alpha, 8alpha,8abeta)-	309-00-2	P004
Allyl alcohol	2-Propen-1-ol	107-18-6	P005
Aluminum phosphide	Same	20859-73-8	P006
4-Aminobiphenyl	[1,1'-Biphenyl]-4-amine	92-67-1	—
5-(Aminomethyl)-3-isoxazolol	3(2H)-Isoxazolone, 5-(aminomethyl)-	2763-96-4	P007
4-Aminopyridine	4-Pyridinamine	504-24-5	P008
Amitrole	1H-1,2,4-Triazol-3-amine	61-82-5	U011
Ammonium vanadate	Vanadic acid, ammonium salt	7803-55-6	P119
Aniline	Benzenamine	62-53-3	U012
Antimony	Same	7440-36-0	—
Antimony compounds, N.O.S.[1]	—	—	—
Aramite	Sulfurous acid, 2-chloroethyl 2-[4-(1,1dimethylethyl) phenoxy]-1-methylethyl ester	140-57-8	—
Arsenic	Same	7440-38-2	—

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Arsenic compounds, N.O.S.[1]	—	—	—
Arsenic acid	Arsenic acid H3AsO4	7778-39-4	P010
Arsenic pentoxide	Arsenic oxide As2O5	1303-28-2	P011
Arsenic trioxide	Arsenic oxide As2O3	1327-53-3	P012
Auramine	Benzenamine, 4,4'-carbonimidoylbis [N,Ndimethyl	492-80-8	U014
Azaserine	L-Serine, diazoacetate (ester)	115-02-6	U015
Barium	Same	7440-39-3	—
Barium compounds, N.O.S.[1]	—	—	—
Barium cyanide	Same	542-62-1	P013
Benz[c]acridine	Same	225-51-4	U016
Benz[a]anthracene	Same	56-55-3	U018
Benzal chloride	Benzene, (dichloromethyl)-	98-87-3	U017
Benzene	Same	71-43-2	U019
Benzenearsonic acid	Arsonic acid, phenyl-	98-05-5	—
Benzidine	[1,1'-Biphenyl]-4,4 [1]-diamine	92-87-5	U021
Benzo[b]fluoranthene	Benz[e]acephenanthrylene	205-99-2	—
Benzo[j]fluoranthene	Same	205-82-3	—
Benzo[a]pyrene	Same	50-32-8	U022
p-Benzoquinone	2,5-Cyclohexadiene-1,4-dione	106-51-4	U197
Benzotrichloride	Benzene, (trichloromethyl)-	98-07-7	U023
Benzyl chloride	Benzene, (chloromethyl)-	100-44-7	P028
Beryllium	Same	7440-41-7	P015
Beryllium compounds, N.O.S.[1]	—	—	—
Bromoacetone	2-Propanone, 1-bromo-	598-31-2	P017
Bromoform	Methane, tribromo-	75-25-2	U225
4-Bromophenyl phenyl ether	Benzene, 1-bromo-4-phenoxy-	101-55-3	U030
Brucine	Strychnidin-10-one, 2,3-dimethoxy-	357-57-3	P018
Butyl benzyl phthalate	1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	85-68-7	—
Cacodylic acid	Arsinic acid, dimethyl-	75-60-5	U136
Cadmium	Same	7440-43-9	—
Cadmium compounds, N.O.S.[1]	—	—	—
Calcium chromate	Chromic acid H2CrO4, calcium salt	13765-19-0	U032
Calcium cyanide	Calcium cyanide Ca(CN)2	592-01-8	P021
Carbon disulfide	Same	75-15-0	P022
Carbon oxyfluoride	Carbonic difluoride	353-50-4	U033
Carbon tetrachloride	Methane, tetrachloro-	56-23-5	U211
Chloral	Acetaldehyde, trichloro-	75-87-6	U034
Chlorambucil	Benzenebutanoic acid, 4-[bis(2-chloroethyl) amino]-	305-03-3	U035
Chlordane	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	57-74-9	U036
Chlordane (alpha and gamma isomers)	—	—	U036
Chlorinated benzenes, N.O.S.[1]	—	—	—
Chlorinated ethane, N.O.S.[1]	—	—	—
Chlorinated fluorocarbons, N.O.S.[1]	—	—	—
Chlorinated naphthalene, N.O.S.[1]	—	—	—
Chlorinated phenol, N.O.S.[1]	—	—	—

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Chlornaphazin	Naphthalenamine, N,N'-bis(2-chloroethyl)-	494-03-1	U026
Chloroacetaldehyde	Acetaldehyde, chloro-	107-20-0	P023
Chloroalkyl ethers, N.O.S.[1]			
p-Chloroaniline	Benzenamine, 4-chloro-	106-47-8	P024
Chlorobenzene	Benzene, chloro-	108-90-7	U037
Chlorobenzilate	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester	510-15-6	U038
p-Chloro-m-cresol	Phenol, 4-chloro-3-methyl-	59-50-7	U039
2-Chloroethyl vinyl ether	Ethene, (2-chloroethoxy)-	110-75-8	U042
Chloroform	Methane, trichloro-	67-66-3	U044
Chloromethyl methyl ether	Methane, chloromethoxy-	107-30-2	U046
beta-Chloronaphthalene	Naphthalene, 2-chloro-	91-58-7	U047
o-Chlorophenol	Phenol, 2-chloro-	95-57-8	U048
1-(o-Chlorophenyl)thiourea	Thiourea, (2-chlorophenyl)-	5344-82-1	P026
Chloroprene	1,3-Butadiene, 2-chloro-	126-99-8	—
3-Chloropropionitrile	Propanenitrile, 3-chloro-	542-76-7	P027
Chromium	Same	7440-47-3	—
Chromium compounds, N.O.S.[1]	—	—	—
Chrysene	Same	218-01-9	U050
Citrus red No. 2	2-Naphthalenol, 1-[(2,5-dimethoxyphenyl)azo]-	6358-53-8	—
Coal tar creosote	Same	8007-45-2	—
Copper cyanide	Copper cyanide CuCN	544-92-3	P029
Creosote	Same	—	U051
Cresol (Cresylic acid)	Phenol, methyl-	1319-77-3	U052
Crotonaldehyde	2-Butenal	4170-30-3	U053
Cyanides (soluble salts and complexes) N.O.S.[1]	—	—	P030
Cyanogen	Ethanedinitrile	460-19-5	P031
Cyanogen bromide	Cyanogen bromide (CN)Br	506-68-3	U246
Cyanogen chloride	Cyanogen chloride (CN)Cl	506-77-4	P033
Cycasin	beta-D-Glucopyranoside, (methyl-ONN-azoxy)methyl	14901-08-7	—
2-Cyclohexyl-4,6-dinitrophenol	Phenol, 2-cyclohexyl-4, 6-dinitro-	131-89-5	P034
Cyclophosphamide	2H-1,3,2-Oxazaphosphorin-2-amine, N,Nbis(2-chloroethyl)tetrahydro-, 2oxide	50-18-0	U058
2,4-D	Acetic acid, (2,4-dichlorophenoxy)-	94-75-7	U240
2,4-D, salts, esters	—	—	U240
Daunomycin	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy-alpha- L-lyxohexopyranosyl)oxy]-7,8,9, 10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-	20830-81-3	U059
DDD	Benzene, 1,1'-(2,2-dichloroethylidene) bis[4-chloro-	72-54-8	U060
DDE	Benzene, 1,1'-(dichloroethenylidene) bis[4-chloro-	72-55-9	—

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
DDT	Benzene, 1,1'-(2,2,2-trichloroethylidene) bis[4-chloro-	50-29-3	U061
Diallate	Carbamothioic acid, bis(1-methylethyl)-, S(2,3-dichloro-2-propenyl) ester	2303-16-4	U062
Dibenz[a,h]acridine	Same	226-36-8	—
Dibenz[a,j]acridine	Same	224-42-0	—
Dibenz[a,h]anthracene	Same	53-70-3	U063
7H-Dibenzo[c,g]carbazole	Same	194-59-2	—
Dibenzo[a,e]pyrene	Naphtho[1,2,3,4-def]chrysene	192-65-4	—
Dibenzo[a,h]pyrene	Dibenzo[b,def]chrysene	189-64-0	—
Dibenzo[a,i]pyrene	Benzo[rst]pentaphene	189-55-9	U064
1,2-Dibromo-3-chloropropane	Propane, 1,2-dibromo-3-chloro-	96-12-8	U066
Dibutyl phthalate	1,2-Benzenedicarboxylic acid, dibutyl ester	84-74-2	U069
o-Dichlorobenzene	Benzene, 1,2-dichloro-	95-50-1	U070
m-Dichlorobenzene	Benzene, 1,3-dichloro-	541-73-1	U071
p-Dichlorobenzene	Benzene, 1,4-dichloro-	106-46-7	U072
Dichlorobenzene, N.O.S.[1]	Benzene, dichloro-	25321-22-6	—
3,3'-Dichlorobenzidine	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	91-94-1	U073
1,4-Dichloro-2-butene	2-Butene, 1,4-dichloro-	764-41-0	U074
Dichlorodifluoromethane	Methane, dichlorodifluoro-	75-71-8	U075
Dichloroethylene, N.O.S.[1]	Dichloroethylene	25323-30-2	—
1,1-Dichloroethylene	Ethene, 1,1-dichloro-	75-35-4	U078
1,2-Dichloroethylene	Ethene, 1,2-dichlrolo-, (E)-	156-60-5	U079
Dichloroethyl ether	Ethane, 1,1'oxybis[2-chloro-	111-44-4	U025
Dichloroisopropyl ether	Propane, 2,2'-oxybis[2-chloro-	108-60-1	U027
Dichloromethoxy ethane	Ethane, 1,1'-[methylenebis(oxy)] bis[2-chloro-	111-91-1	U024
Dichloromethyl ether	Methane, oxybis[chloro-	542-88-1	P016
2,4-Dichlorophenol	Phenol, 2,4-dichloro-	120-83-2	U081
2,6-Dichlorophenol	Phenol, 2,6-dichloro-	87-65-0	U082
Dichlorophenylarsine	Arsonous dichloride, phenyl-	696-28-6	P036
Dichloropropane, N.O.S.[1]	Propane, dichloro-	26638-19-7	—
Dichloropropanol, N.O.S.[1]	Propanol, dichloro-	26545-73-3	—
Dichloropropene, N.O.S.[1]	1-Propene, dichloro-	26952-23-8	—
1,3-Dichloropropene	1-Propene, 1,3-dichloro-	542-75-6	U084
Dieldrin	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,2aalpha, 3beta,6beta,6aalpha, 7beta,7aalpha)-	60-57-1	P037
1,2:3,4-Diepoxybutane	2,2[one-fourth]-Bioxirane	1464-53-5	U085
Diethylarsine	Arsine, diethyl-	692-42-2	P038
1,4-Diethyleneoxide	1,4-Dioxane	123-91-1	U108
Diethylhexyl phthalate	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	117-81-7	U028
N,N'-Diethylhydrazine	Hydrazine, 1,2-diethyl-	1615-80-1	U086
O,O-Diethyl S-methyl dithiophosphate	Phosphorodithioic acid, O,O-diethyl S-methyl ester	3288-58-2	U087
Diethyl-p-nitrophenyl phosphate	Phosphoric acid, diethyl 4-nitrophenyl ester	311-45-5	P041

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Diethyl phthalate	1,2-Benzenedicarboxylic acid, diethyl ester	84-66-2	U088
O,O-Diethyl O-pyrazinyl phosphorothioate	Phosphorothioic acid, O,O-diethyl Opyrazinyl ester	297-97-2	P040
Diethylstilbesterol	Phenol, 4,4'-(1,2-diethyl-1, 2-ethenediyl) bis-, (E)-	56-53-1	U089
Dihydrosafrole	1,3-Benzodioxole, 5-propyl-	94-58-6	U090
Diisopropylfluorophosphate (DFP)	Phosphorofluoridic acid, bis(1-methylethyl) ester	55-91-4	P043
Dimethoate	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester	60-51-5	P044
3,3'-Dimethoxybenzidine	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-	119-90-4	U091
p-Dimethylaminoazobenzene	Benzenamine, N,N-dimethyl-4-(phenylazo)-	60-11-7	U093
7,12-Dimethylbenz[a]anthracene	Benz[a]anthracene, 7,12-dimethyl-	57-97-6	U094
3,3'-Dimethylbenzidine	[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	119-93-7	U095
Dimethylcarbamoyl chloride	Carbamic chloride, dimethyl-	79-44-7	U097
1,1-Dimethylhydrazine	Hydrazine, 1,1-dimethyl-	57-14-7	U098
1,2-Dimethylhydrazine	Hydrazine, 1,2-dimethyl-	540-73-8	U099
alpha,alpha-Dimethylphenethylamine	Benzeneethanamine, alpha,alpha-dimethyl-	122-09-8	P046
2,4-Dimethylphenol	Phenol, 2,4-dimethyl-	105-67-9	U101
Dimethyl phthalate	1,2-Benzenedicarboxylic acid, dimethyl ester	131-11-3	U102
Dimethyl sulfate	Sulfuric acid, dimethyl ester	77-78-1	U103
Dinitrobenzene, N.O.S.[1]	Benzene, dinitro-	25154-54-5	
4,6-Dinitro-o-cresol	Phenol, 2-methyl-4,6-dinitro-	534-52-1	P047
4,6-Dinitro-o-cresol salts	—	—	P047
2,4-Dinitrophenol	Phenol, 2,4-dinitro-	51-28-5	P048
2,4-Dinitrotoluene	Benzene, 1-methyl-2,4-dinitro-	121-14-2	U105
2,6-Dinitrotoluene	Benzene, 2-methyl-1,3-dinitro-	606-20-2	U106
Dinoseb	Phenol, 2-(1-methylpropyl)-4, 6-dinitro-	88-85-7	P020
Di-n-octyl phthalate	1,2-Benzenedicarboxylic acid, dioctyl ester	117-84-0	U017
Diphenylamine	Benzenamine, N-phenyl-	122-39-4	—
1,2-Diphenylhydrazine	Hydrazine, 1,2-diphenyl-	122-66-7	U109
Di-n-propylnitrosamine	1-Propanamine, N-nitroso-N-propyl-	621-64-7	U111
Disulfoton	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester	298-04-4	P039
Dithiobiuret	Thioimidodicarbonic diamide [(H2N)C(S)]2NH	541-53-7	P049
Endosulfan	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro- 1,5,5a,6,9,9a-hexahydro-, 3-oxide	115-29-7	P050
Endothall	7-Oxabicyclo[2.2.1] heptane-2,3-dicarboxylic acid	145-73-3	P088

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Endrin	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9- hexachloro-1a,2,2a,3,6,6a, 7,7aocta-hydro-, (1aalpha,2beta, 2abeta,3alpha,6alpha, 6abeta,7beta,7aalpha)-	72-20-8	P051
Endrin metabolites	—	—	P051
Epichlorohydrin	Oxirane, (chloromethyl)-	106-89-8	U041
Epinephrine	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-	51-43-4	P042
Ethyl carbamate (urethane)	Carbamic acid, ethyl ester	51-79-6	U238
Ethyl cyanide	Propanenitrile	107-12-0	P101
Ethylenebisdithiocarbamic acid	Carbamodithioic acid, 1,2-ethanediylbis-	111-54-6	U114
Ethylenebisdithiocarbamic acid, salts and esters	—	—	U114
Ethylene dibromide	Ethane, 1,2-dibromo-	106-93-4	U067
Ethylene dichloride	Ethane, 1,2-dichloro-	107-06-2	U077
Ethylene glycol monoethyl ether	Ethanol, 2-ethoxy-	110-80-5	U359
Ethyleneimine	Aziridine	151-56-4	P054
Ethylene oxide	Oxirane	75-21-8	U115
Ethylenethiourea	2-Imidazolidinethione	96-45-7	U116
Ethylidene dichloride	Ethane, 1,1-dichloro-	75-34-3	U076
Ethyl methacrylate	2-Propenoic acid, 2-methyl-, ethyl ester	97-63-2	U118
Ethyl methanesulfonate	Methanesulfonic acid, ethyl ester	62-50-0	U119
Famphur	Phosphorothioic acid, O-[4-[(dimethylamino) sulfonyl]phenyl] O,Odimethyl ester	52-85-7	P097
Fluoranthene	Same	206-44-0	U120
Fluorine	Same	7782-41-4	P056
Fluoroacetamide	Acetamide, 2-fluoro-	640-19-7	P057
Fluoroacetic acid, sodium salt	Acetic acid, fluoro-, sodium salt	62-74-8	P058
Formaldehyde	Same	50-00-0	U122
Formic acid	Same	64-18-6	U123
Glycidylaldehyde	Oxiranecarboxyaldehyde	765-34-4	U126
Halomethanes, N.O.S.[1]	—	—	—
Heptachlor	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	76-44-8	P059
Heptachlor epoxide	2,5-Methano-2H-indeno [1,2-b]oxirene, 2,3,4,5,6,7,7-heptachloro- 1a,1b,5,5a,6,6a-hexa- hydro-, (1aalpha, 1bbeta, 2alpha, 5alpha, 5abeta, 6beta, 6aalpha)-	1024-57-3	
Heptachlor epoxide (alpha, beta, and gamma isomers)	—	—	—
Hexachlorobenzene	Benzene, hexachloro-	118-74-1	U127
Hexachlorobutadiene	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87-68-3	U128
Hexachlorocyclopentadiene	1,3-Cyclopentadiene, 1,2,3,4,5,5hexachloro-	77-47-4	U130
Hexachlorodibenzo-p-dioxins	—	—	—

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Hexachlorodibenzofurans	—	—	—
Hexachloroethane	Ethane, hexachloro-	67-72-1	U131
Hexachlorophene	Phenol, 2,2'-methylenebis [3,4,6-trichloro-	70-30-4	U132
Hexachloropropene	1-Propene, 1,1,2,3,3,3-hexachloro-	1888-71-7	U243
Hexaethyl tetraphosphate	Tetraphosphoric acid, hexaethyl ester	757-58-4	P062
Hydrazine	Same	302-01-2	U133
Hydrogen cyanide	Hydrocyanic acid	74-90-8	P063
Hydrogen fluoride	Hydrofluoric acid	7664-39-3	U134
Hydrogen sulfide	Hydrogen sulfide H2S	7783-06-4	U135
Indeno[1,2,3-cd]pyrene	Same	193-39-5	U137
Iron dextran	Same	9004-66-4	U139
Isobutyl alcohol	1-Propanol, 2-methyl-	78-83-1	U140
Isodrin	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8, 8a-hexahydro-, (1alpha, 4alpha, 4abeta, 5beta, 8beta, 8abeta)	465-73-6	P060
Isosafrole	1,3-Benzodioxole, 5-(1-propenyl)-	120-58-1	U141
Kepone	1,3,4-Metheno-2H-cyclobuta [cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b, 6-decachlorooctahydro-	143-50-0	U142
Lasiocarpine	2-Butenoic acid, 2-methyl-,7-[[2,3dihydroxy-2- (1-methoxyethyl)-3-methyl-1-(@xl oxobutoxy]methyl] -2,3,5,7atetrahydro- 1H-pyrrolizin-1-yl ester, [1S- [1alpha(Z),7(2S*,3R*), 7aalpha]]-	303-34-1	U143
Lead	Same	7439-92-1	—
Lead compounds, N.O.S.[1]	—	—	—
Lead acetate	Acetic acid, lead(2+) salt	301-04-2	U144
Lead phosphate	Phosphoric acid, lead(2+) salt (2:3)	7446-27-7	U145
Lead subacetate	Lead, bis (acetato-O) tetrahydroxytri-	1335-32-6	U146
Lindane	Cyclohexane, 1,2,3,4,5,6- hexachloro-, (1alpha, 2alpha, 3beta, 4alpha, 5alpha, 6beta)-	58-89-9	U129
Maleic anhydride	2,5-Furandione	108-31-6	U147
Maleic hydrazide	3,6-Pyridazinedione, 1,2-dihydro-	123-33-1	U148
Malononitrile	Propanedinitrile	109-77-3	U149
Melphalan	L-Phenylalanine, 4-[bis (2-chloroethyl)aminol]-	148-82-3	U150
Mercury	Same	7439-97-6	U151
Mercury compounds, N.O.S.[1]	—	—	—
Mercury fulminate	Fulminic acid, mercury(2+) salt	628-86-4	P065
Methacrylonitrile	2-Propenenitrile, 2-methyl-	126-98-7	U152
Methapyrilene	1,2-Ethanediamine, N,N-dimethyl- N'-2pyridinyl-N'- (2-thienylmethyl)-	91-80-5	U155
Methomyl	Ethanimidothioic acid, N[[(methylamino) carbonyl]oxy]-, methyl ester	16752-77-5	P066

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Methoxychlor	Benzene, 1,1'-(2,2,2trichloroethylidene) bis[4-methoxy-	72-43-5	U247
Methyl bromide	Methane, bromo-	74-83-9	U029
Methyl chloride	Methane, chloro-	74-87-3	U045
Methyl chlorocarbonate	Carbonochloridic acid, methyl ester	79-22-1	U156
Methyl chloroform	Ethane, 1,1,1-trichloro-	71-55-6	U226
3-Methylcholanthrene	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	56-49-5	U157
4,4'-Methylenebis(2-chloroaniline)	Benzenamine, 4,4'-methylenebis [2-chloro	101-14-4	U158
Methylene bromide	Methane, dibromo-	74-95-3	U068
Methylene chloride	Methane, dichloro-	75-09-2	U080
Methyl ethyl ketone (MEK)	2-Butanone	78-93-3	U159
Methyl ethyl ketone peroxide	2-Butanone, peroxide	1338-23-4	U160
Methyl hydrazine	Hydrazine, methyl-	60-34-4	P068
Methyl iodide	Methane, iodo-	74-88-4	U138
Methyl isocyanate	Methane, isocyanato-	624-83-9	P064
2-Methyllactonitrile	Propanenitrile, 2-hydroxy-2-methyl-	75-86-5	P069
Methyl methacrylate	2-Propenoic acid, 2-methyl-, methyl ester	80-62-6	U162
Methyl methanesulfonate	Methanesulfonic acid, methyl ester	66-27-3	—
Methyl parathion	Phosphorothioic acid, O,O-dimethyl O- (4-nitrophenyl) ester	298-00-0	P071
Methylthiouracil	4(1H)-Pyrimidinone, 2,3-dihydro- 6-methyl-2-thioxo-	56-04-2	U164
Mitomycin C	Azirino[2',3':3,4] pyrrolo [1,2a] 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)]-	50-07-7	U010
MNNG	Guanidine, N-methyl-N'-nitro-N-nitroso	70-25-7	U163
Mustard gas	Ethane, 1,1'-thiobis [2-chloro-	505-60-2	—
Naphthalene	Same	91-20-3	U165
1,4-Naphthoquinone	1,4-Naphthalenedione	130-15-4	—
alpha-Naphthylamine	1-Naphthalenamine	134-32-7	U167
beta-Naphthylamine	2-Naphthalenamine	91-59-8	U168
alpha-Naphthylthiourea	Thiourea, 1-naphthalenyl-	86-88-4	P072
Nickel	Same	7440-02-0	—
Nickel compounds, N.O.S.[1]	—	—	—
Nickel carbonyl	Nickel carbonyl Ni(CO)4, (T-4)-	13463-39-3	P073
Nickel cyanide	Nickel cyanide Ni(CN)2	557-19-7	P074
Nicotine	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)- 54-11-5	P075	
Nicotine salts	—	—	P075
Nitric oxide	Nitrogen oxide NO	10102-43-9	P076
p-Nitroaniline	Benzenamine, 4-nitro-	100-01-6	P077
Nitrobenzene	Benzene, nitro-	98-95-3	U169
Nitrogen dioxide	Nitrogen oxide NO2	10102-44-0	P078

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Nitrogen mustard	Ethanamine, 2-chloro-N- (2-chloroethyl)-N-methyl-	51-75-2	—
Nitrogen mustard, hydrochloride salt	—	—	—
Nitrogen mustard N-oxide	Ethanamine, 2-chloro-N- (2-chloroethyl)-N-methyl-, N-oxide	126-85-2	—
Nitrogen mustard, N-oxide, hydro- chloride salt	Nitroglycerin 1,2,3-Propanetriol, trinitrate	55-63-0	P081
p-Nitrophenol	Phenol, 4-nitro-	100-02-7	U170
2-Nitropropane	Propane, 2-nitro-	79-46-9	U171
Nitrosamines, N.O.S.[1]	—	35576-91-1D	—
N-Nitrosodi-n-butylamine	1-Butanamine, N-butyl-N-nitroso-	924-16-3	U172
N-Nitrosodiethanolamine	Ethanol, 2,2'-(nitrosoimino) bis-	1116-54-7	U173
N-Nitrosodiethylamine	Ethanamine, N-ethyl-N-nitroso-	55-18-5	U174
N-Nitrosodimethylamine	Methanamine, N-methyl-N-nitroso-	62-75-9	P082
N-Nitroso-N-ethylurea	Urea, N-ethyl-N-nitroso-	759-73-9	U176
N-Nitrosomethylethylamine	Ethanamine, N-methyl-N-nitroso-	10595-95-6	—
N-Nitroso-N-methylurea	Urea, N-methyl-N-nitroso-	684-93-5	U177
N-Nitroso-N-methylurethane	Carbamic acid, methylnitroso-, ethyl ester	615-53-2	U178
N-Nitrosomethylvinylamine	Vinylamine, N-methyl-N-nitroso-	4549-40-0	P084
N-Nitrosomorpholine	Morpholine, 4-nitroso-	59-89-2	—
N-Nitrosonornicotine	Pyridine, 3-(1-nitroso-2-pyrrolidinyl)-, (S)-	16543-55-8	—
N-Nitrosopiperidine	Piperidine, 1-nitroso-	100-75-4	U179
N-Nitrosopyrrolidine	Pyrrolidine, 1-nitroso-	930-55-2	U180
N-Nitrososarcosine	Glycine, N-methyl-N-nitroso-	13256-22-9	—
5-Nitro-o-toluidine	Benzenamine, 2-methyl-5-nitro-	99-55-8	U181
Octamethylpyrophosphoramide	Diphosphoramide, octamethyl-	152-16-9	P085
Osmium tetroxide	Osmium oxide OsO4, (T-4)-	20816-12-0	P087
Paraldehyde	1,3,5-Trioxane, 2,4,6-trimethyl-	123-63-7	U182
Parathion	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	56-38-2	P089
Pentachlorobenzene	Benzene, pentachloro-	608-93-5	U183
Pentachlorodibenzo-p-dioxins	—	—	—
Pentachlorodibenzofurans	—	—	—
Pentachloroethane	Ethane, pentachloro-	76-01-7	U184
Pentachloronitrobenzene (PCNB)	Benzene, pentachloronitro-	82-68-8	U185
Pentachlorophenol	Phenol, pentachloro-	87-86-5	See F027
Phenacetin	Acetamide, N-(4-ethoxyphenyl)-	62-44-2	U187
Phenol	Same	108-95-2	U188
Phenylenediamine	Benzenediamine	25265-76-3	—
Phenylmercury acetate	Mercury, (acetato-O)phenyl-	62-38-4	P092
Phenylthiourea	Thiourea, phenyl-	103-85-5	P093
Phosgene	Carbonic dichloride	75-44-5	P095
Phosphine	Same	7803-51-2	P096

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Phorate	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio) methyl] ester	298-02-2	P094
Phthalic acid esters, N.O.S.[1]	—	—	—
Phthalic anhydride	1,3-Isobenzofurandione	85-44-9	U190
2-Picoline	Pyridine, 2-methyl-	109-06-8	U191
Polychlorinated biphenyls, N.O.S.[1]	—	—	—
Potassium cyanide	Potassium cyanide K(CN)	151-50-8	P098
Potassium silver cyanide	Argentate(1-), bis(cyano-C)-, potassium	506-61-6	P099
Pronamide	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	23950-58-5	U192
1,3-Propane sultone	1,2-Oxathiolane, 2,2-dioxide	1120-71-4	U193
n-Propylamine	1-Propanamine	107-10-8	U194
Propargyl alcohol	2-Propyn-1-ol	107-19-7	P102
Propylene dichloride	Propane, 1,2-dichloro-	78-87-5	U083
1,2-Propylenimine	Aziridine, 2-methyl-	75-55-8	P067
Propylthiouracil	4(1H)-Pyrimidinone, 2,3-dihydro-6-propyl-2-thioxo-	51-52-5	—
Pyridine	Same	110-86-1	U196
Reserpine	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-smethyl ester, (3beta, 16beta, 17alpha, 18beta, 20alpha)	50-55-5	U200
Resorcinol	1,3-Benzenediol	108-46-3	U201
Saccharin	1,2-Benzisothiazol-3(2H)-one, 1,1dioxide	81-07-2	U202
Saccharin salts	—	—	U202
Safrole 1,3-Benzodioxole, 5-(2-propenyl)-	94-59-7	U203	
Selenium	Same	7782-49-2	—
Selenium compounds, N.O.S.[1]	—	—	—
Selenium dioxide	Selenious acid	7783-00-8	U204
Selenium sulfide	Selenium sulfide SeS2	7488-56-4	U205
Selenourea	Same	630-10-4	P103
Silver	Same	7440-22-4	—
Silver compounds, N.O.S.[1]	—	—	—
Silver cyanide	Silver cyanide Ag(CN)	506-64-9	P104
Silvex (2,4,5-TP)	Propanoic acid, 2-(2,4,5-trichlorophenoxy)	93-72-1	See F027
Sodium cyanide	Sodium cyanide Na(CN)	143-33-9	P106
Streptozotocin	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino) carbonyl]amino]-	18883-66-4	U206
Strontium sulfide	Strontium sulfide SrS	1314-96-1	P107
Strychnine	Strychnidin-10-one	57-24-9	P108
Strychnine salts	—	—	P108
TCDD	Dibenzo[b,e][1,4]dioxin, 2,3,7,8-tetrachloro-	1746-01-6	—
1,2,4,5-Tetrachlorobenzene	Benzene, 1,2,4,5-tetrachloro-	95-94-3	U207
Tetrachlorodibenzo-p-dioxins	—	—	—
Tetrachlorodibenzofurans	—	—	—
Tetrachloroethane, N.O.S.[1]	Ethane, tetrachloro-, N.O.S.	25322-20-7	—
1,1,1,2-Tetrachloroethane	Ethane, 1,1,1,2-tetrachloro-	630-20-6	U208
1,1,2,2-Tetrachloroethane	Ethane, 1,1,2,2-tetrachloro-	79-34-5	U209

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
Tetrachloroethylene	Ethene, tetrachloro-	127-18-4	U210
2,3,4,6-Tetrachlorophenol	Phenol, 2,3,4,6-tetrachloro-	58-90-2	See F027
Tetraethyldithiopyrophosphate	Thiodiphosphoric acid, tetraethyl ester	3689-24-5	P109
Tetraethyl lead	Plumbane, tetraethyl-	78-00-2	P110
Tetraethyl pyrophosphate	Diphosphoric acid, tetraethyl ester	107-49-3	P111
Tetranitromethane	Methane, tetranitro-	509-14-8	P112
Thallium	Same	7440-28-0	—
Thallium compounds, N.O.S.[1]	—	—	—
Thallic oxide	Thallium oxide Tl2O3	1314-32-5	P113
Thallium(I) acetate	Acetic acid, thallium(1) salt	563-68-8	U214
Thallium(I) carbonate	Carbonic acid, dithallium(1) salt	6533-73-9	U215
Thallium(I) chloride	Thallium chloride TlCl	7791-12-0	U216
Thallium(I) nitrate	Nitric acid, thallium(1) salt	10102-45-1	U217
Thallium selenite	Selenious acid, dithallium(1) salt	12039-52-0	P114
Thallium(I) sulfate	Sulfuric acid, dithallium(1) salt	7446-18-6	P115
Thioacetamide	Ethanethioamide	62-55-5	U218
Thiofanox	2-Butanone, 3,3-dimethyl-1-(methylthio)-, 0-[(methylamino)carbonyl] oxime	39196-18-4	P045
Thiomethanol	Methanethiol	74-93-1	U153
Thiophenol	Benzenethiol	108-98-5	P014
Thiosemicarbazide	Hydrazinecarbothioamide	79-19-6	P116
Thiourea	Same	62-56-6	U219
Thiram	Thioperoxydicarbonic diamide [(H2N)C(S)]2S2, tetramethyl-	137-26-8	U244
Toluene	Benzene, methyl-	108-88-3	U220
Toluenediamine	Benzenediamine, ar-methyl-	25376-45-8	U221
Toluene-2,4-diamine	1,3-Benzenediamine, 4-methyl-	95-80-7	—
Toluene-2,6-diamine	1,3-Benzenediamine, 2-methyl-	823-40-5	—
Toluene-3,4-diamine	1,2-Benzenediamine, 4-methyl-	496-72-0	—
Toluene diisocyanate	Benzene, 1,3-diisocyanatomethyl-	26471-62-5	U223
o-Toluidine	Benzenamine, 2-methyl-	95-53-4	U328
o-Toluidine hydrochloride	Benzenamine, 2-methyl-, hydrochloride	636-21-5	U222
p-Toluidine	Benzenamine, 4-methyl-	106-49-0	U353
Toxaphene	Same	8001-35-2	P123
1,2,4-Trichlorobenzene	Benzene, 1,2,4-trichloro-	120-82-1	—
1,1,2-Trichloroethane	Ethane, 1,1,2-trichloro-	79-00-5	U227
Trichloroethylene	Ethene, trichloro-	79-01-6	U228
Trichloromethanethiol	Methanethiol, trichloro-	75-70-7	P118
Trichloromonofluoromethane	Methane, trichlorofluoro-	75-69-4	U121
2,4,5-Trichlorophenol	Phenol, 2,4,5-trichloro-	95-95-4	See F027
2,4,6-Trichlorophenol	Phenol, 2,4,6-trichloro-	88-06-2	See F027
2,4,5-T	Acetic acid, (2,4,5-trichlorophenoxy)	93-76-5	See F027
Trichloropropane, N.O.S.[1]	—	25735-29-9	—
1,2,3-Trichloropropane	Propane, 1,2,3-trichloro-	96-18-4	—

Appendix

Common name	Chemical abstracts name	Chemical abstracts No.	Hazardous waste No.
O,O,O-Triethyl phosphorothioate	Phosphorothioic acid, O,O,O-triethyl ester	126-68-1	—
1,3,5-Trinitrobenzene	Benzene, 1,3,5-trinitro-	99-35-4	U234
Tris(1-aziridinyl) phosphine sulfide	Aziridine, 1,1',1 "phosphinothioylidynetris-	52-24-4	—
Tris(2,3-dibromopropyl) phosphate	1-Propanol, 2,3-dibromo-, phosphate (3:1)	126-72-7	U235
Trypan blue	l2,7-Naphthalenedisulfonic acid, 3,3' [(3,3'-dimethyl [1,1'-biphenyl]-4,4'-diyl) bis(azo)]-bis [5-amino-4-hydroxy-, tetrasodium salt	72-57-1	U236
Uracil mustard	2,4-(1H,3H)- Pyrimidinedione, 5-[bis(2-chloroethyl) amino]-	66-75-1	U237
Vanadium pentoxide	Vanadium oxide V2O5	1314-62-1	P120
Vinyl chloride	Ethene, chloro-	75-01-4	U043
Warfarin	2H-1-Benzopyran-2-one, 4-hydroxy-3- (3-oxo-1-phenylbutyl)-, when present at concentrations less than 0.3%	81-81-2	U248
Warfarin	2H-1-Benzopyran-2-one, 4-hydroxy-3- (3-oxo-1-phenylbutyl)-, when present at concentrations greater than 0.3%	81-81-2	P001
Warfarin salts, when present at concentrations less than 0.3%	—	—	U248
Warfarin salts, when present at concentrations greater than 0.3%	—	—	P001
Zinc cyanide	Zinc cyanide Zn(CN)2	557-21-1	P121
Zinc phosphide	Zinc phosphide Zn3P2, when present at concentrations greater than 10%	1314-84-7	P122
Zinc phosphide	Zinc phosphide Zn3P2, when present at concentrations of 10% or less	1314-84-7	U249

[1]The abbreviation N.O.S. (not otherwise specified) signifies those members of the general class not specifically listed by name in this appendix.

APPENDIX V

METHOD OF ANALYSIS FOR CHLORINATED DIBENZO-P-DIOXINS AND DIBENZOFURANS[1,2,3,4]

Method 8280

1. Scope and Application

1.1 This method measures the concentration of chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans in chemical wastes including still bottoms, filter aids, sludges, spent carbon, and reactor residues and in soils.

1.2 The sensitivity of this method is dependent upon the level of interferences.

1.3 This method is recommended for use only by analysts experienced with residue analysis and skilled in mass spectral analytical techniques.

1.4 Because of the extreme toxicity of these compounds, the analyst shall take necessary precautions to prevent exposure to the analyst, or to others, of materials known or believed to contain CDDs or CDFs.

2. Summary of the Method

2.1 This method is an analytical extraction cleanup procedure, and capillary column gas chromatographlow resolution mass spectrometry method, using capillary column GC/MS conditions and internal standard techniques, which allow for the measurement of PCDDs and PCDFs in the extract.

2.2 If interferences are encountered, the method provides selected general purpose cleanup procedures to aid the analyst in their elimination.

3. Interferences

3.1 Solvents, reagents, glassware, and other sample processing hardware may yield discrete artifacts and elevated baselines, or both, causing misinterpretation of gas chromatograms. All of these materials shall be demonstrated to be free from interferences under the conditions of the analysis by running method blanks. Specific selection of reagents and purification of solvents by distillation in all-glass systems may be required.

3.2 Interferences co-extracted from the samples will vary considerably from source to source, depending upon the diversity of the industry being sampled. PCDD is often associated with other interfering chlorinated compounds such as PCBs which may be at concentrations several orders of magnitude higher than that of PCDD. While general cleanup techniques are provided as part of this method, unique samples may require additional cleanup approaches to achieve the sensitivity stated in Table 1.

Table 1
Gas Chromatography of TCDD

Column	Retention time (min.)	Detection limit (g/kg) [1]
Glass capillary	9.5	0.003

[1]Detection limit for liquid samples is 0.003 µg/l. This is calculated from the minimum detectable GC response being equal to 5 times the GC background noise assuming a 1 ml effective final volume of the 1 liter sample extract, and a GC injection of 5 microliters. Detection levels apply to both electron capture and GC/MS detection. For further details see 44 FR 69526, December 3, 1979.

3.3 The other isomers of tetrachlorodibenzo-p-dioxin may interfere with the measurement of 2,3,7,8-TCDD. Capillary column gas chromatography is required to resolve those isomers that yield virtually identical mass fragmentation patterns.

4. Apparatus and Materials

4.1. Sampling equipment for discrete or composite sampling.

4.1.1 Grab sample bottle-amber glass, 1-liter or 1-quart volume. French or Boston Round design is recommended. The container shall be washed and solvent rinsed before use to minimize interferences.

4.1.2. Bottle caps-threaded to screw on to the sample bottles. Caps shall be lined with Teflon. Solvent washed foil, used with the shiny side towards the sample, may be substituted for the Teflon if sample is not corrosive.

4.1.3. Compositing equipment-automatic or manual composing system. No tygon or rubber tubing may be used, and the system shall incorporate glass sample containers for the collection of a minimum of 250 ml. Sample containers must be kept refrigerated after sampling.

4.2 Water bath-heated, with concentric ring cover, capable of temperature control, ± 2° C. The bath should be used in a hood.

4.3 Gas chromatograph/mass spectrometer data system.

4.3.1 Gas chromatograph: An analytical system with a temperature-programmable gas chromatograph and all required accessories including syringes, analytical columns and gases.

4.3.2 Column: SP-2250 coated on a 30 m long X 0.25 mm I.D. glass column, Supelco No. 2-3714 or equivalent. Glass capillary column conditions: Helium carrier gas at 30 cm/sec linear velocity run splitless. Column temperature is 210° C.

4.3.3 Mass spectrometer: Capable of scanning from 35 to 450 amu every 1 sec or less, utilizing 70 volts, nominal, electron energy in the electron impact ionization mode and producing a mass spectrum which meets all the criteria in Table 2 when 50 ng of decafluorotriphenylphosphine (DFTPP) is injected through the GC inlet. The system shall also be capable of selected ion monitoring (SIM) for at least 4 ions simultaneously, with a cycle time of 1 sec or less. Minimum integration time for SIM is 100 ms. Selected ion monitoring is verified by injecting .015 ng of TCDD Cl^{37} to give a minimum signal to noise ratio of 5 to 1 at mass 328.

Table 2
DFTPP Key Ions and Ion Abundance Criteria[1]

Mass	Ion abundance criteria
51	30-60% of mass 198.
68	Less than 2% of mass 69.
70	Less than 2% of mass 69.

127 ... 40-60% of mass 198.
197 ... Less than 1% of mass 198.
198 ... Base peak, 100% relative abundance.
199 ... 5-9% of mass 198.
275 ... 10-30% of mass 198.
365 ... Greater than 1% of mass 198.
441 ... Present but less than mass 443.
442 ... Greater than 40% of mass 198.
443 ... 17-23% of mass 442.

[1]J. W. Eichelberger, L.E. Harris, and W.L. Budde. 1975. Reference compound to calibrate ion abundance measurement in gas chromatography-mass spectrometry. Analytical Chemistry 47:995.

4.3.4 GC/MS interface: Any GC-to-MS interface that gives acceptable calibration points at 50 ng per injection for each compound of interest and achieves acceptable tuning performance criteria (see Sections 6.1 to 6.3) may be used. GC-to-MS interfaces constructed of all glass or glass-lined materials are recommended. Glass can be deactivated by silanizing with dichlorodimethylsilane. The interface must be capable of transporting at least 10 ng of the components of interest from the GC to the MS.

4.3.5 Data system: A computer system shall be interfaced to the mass spectrometer. The system shall allow the continuous acquisition and storage on machine-readable media of all mass spectra obtained throughout the duration of the chromatographic program. The computer shall have software that can search any GC/MS data file for ions of a specific mass and that can plot the ion abundances versus time or scan number. This type of plot is defined as an Extracted Ion Current Profile (EICP). Software shall also be able to integrate the abundance, in any EICP, between specified time or scan number limits.

4.4 Pipettes-Disposable, Pasteur, 150 mm long X 5 mm ID (Fisher Scientific Co., No. 13-678-6A or equivalent).

4.5 Flint glass bottle (Teflon-lined screw cap).

4.6 Reacti-vial (silanized) (Pierce Chemical Co.).

5. Reagents

5.1 Potassium hydroxide-(ACS), 2% in distilled water.

5.2 Sulfuric acid-(ACS), concentrated.

5.3 Methylene chloride, hexane, benzene, petroleum ether, methanol, tetradecane-pesticide quality or equivalent.

5.4 Prepare stock standard solutions of TCDD and ^{37}Cl-TCDD (molecular weight 328) in a glove box. The stock solutions are stored in a glovebox, and checked frequently for signs of degradation or evaporation, especially just prior to the preparation of working standards.

5.5 Alumina-basic, Woelm; 80/200 mesh. Before use activate overnight at 600° C, cool to room temperature in a dessicator.

5.6 Prepurified nitrogen gas

6.0 Calibration

6.1 Before using any cleanup procedure, the analyst shall process a series of calibration standards through the procedure to validate elution patterns and the absence of interferences from reagents.

6.2 Prepare GC/MS calibration standards for the internal standard technique that will allow for measurement of relative response factors of at least 3 CDD/37CDD ratios. Thus, for TCDDs, at least 3 TCDD/37Cl-TCDD and TCDF/37Cl-TCDF shall be determined.[5] The ^{37}Cl-TCDD/F concentration in the standard shall be fixed and selected to yield a reproducible response at the most sensitive setting of the mass spectrometer. Response factors for PCDD and HxCDD may be determined by measuring the response of the tetrachloro-labelled compounds relative to that of the unlabelled 1,2,3,4- or 2,3,7,8-TCDD, 1,2,3,4,7PCDD or 1,2,3,4,7,8-HxCDD, which are commercially available.[6]

6.3 Assemble the necessary GC/MS apparatus and establish operating parameters equivalent to those indicated in Section 11.1 of this method. Calibrate the GC/MS system according to Eichelberger, et al. (1975) by the use of decafluorotriphenyl phosphine (DFTPP). By injecting calibration standards, establish the response factors for CDDs vs. ^{37}Cl-TCDD, and for CDFs vs. ^{37}Cl-TCDF. The detection limit provided in Table 1 should be verified by injecting .015 ng of ^{37}Cl-TCDD which shall give a minimum signal to noise ratio of 5 to 1 at mass 328.

7. Quality Control

7.1 Before processing any samples, the analyst shall demonstrate through the analysis of a distilled water method blank, that all glassware and reagents are interference-free. Each time a set of samples is extracted, or there is a change in reagents, a method blank shall be processed as a safeguard against laboratory contamination.

7.2 Standard quality assurance practices shall be used with this method. Field replicates shall be collected to measure the precision of the sampling technique. Laboratory replicates shall be analyzed to establish the precision of the analysis. Fortified samples shall be analyzed to establish the accuracy of the analysis.

8. Sample Collection, Preservation, and Handling

8.1 Grab and composite samples shall be collected in glass containers. Conventional sampling practices should be followed, except that the bottle shall not be prewashed with sample before collection. Composite samples shall be collected in glass containers in accordance with the requirements of the RCRA program. Sampling equipment shall be free of tygon and other potential sources of contamination.

8.2 The samples shall be iced or refrigerated from the time of collection until extraction. Chemical preservatives shall not be used in the field unless more than 24 hours will elapse before delivery to the laboratory. If an aqueous sample is taken and the sample will not be extracted within 48 hours of collection, the sample shall be adjusted to a pH range of 6.0-8.0 with sodium hydroxide or sulfuric acid.

8.3 All samples shall be extracted within 7 days and completely analyzed within 30 days of collection.

9. Extraction and Cleanup Procedures

9.1 Use an aliquot of 1-10 g sample of the chemical waste or soil to be analyzed. Soils shall be dried using a stream of prepurified nitrogen and pulverized in a ball-mill or similar device. Perform this operation in a clear area with proper hood space. Transfer the sample to a tared 125 ml flint glass bottle (Teflonlined screw cap) and determine the weight of the sample. Add an appropriate quantity of ^{37}Cl-labelled 2,3,7,8-TCDD (adjust the quantity according to the required minimum detectable concentration), which is employed as an internal standard.

9.2 Extraction

9.2.1 Extract chemical waste samples by adding 10 ml methanol, 40 ml petroleum ether, 50 ml doubly distilled water, and then shaking the mixture for 2 minutes. Tars shall be completely dissolved in any of the recommended neat solvents. Activated carbon samples shall be extracted with benzene using method 3540 in SW-846 (Test Methods for Evaluating Solid Waste-Physical/Chemical Methods, available from G.P.O. Stock 1B055-022-81001-2). Quantitatively transfer the organic extract or dissolved sample to a clean 250 ml flint glass bottle (Teflon lined screw cap), add 50 ml doubly distilled water and shake for 2 minutes. Discard the aqueous layer and proceed with Step 9.3.

Note: The publication SW-846 may be obtained from:

National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22161

This publication is available for inspection at the offices of the department, the secretary of state and the revisor of statutes.

9.2.2 Extract soil samples by adding 40 ml of petroleum ether to the sample, and then shaking for 20 minutes. Quantitatively transfer the organic extract to a clean 250 ml flint glass bottle (Teflon-lined screw cap), add 50 ml doubly distilled water and shake for 2 minutes. Discard the aqueous layer and proceed with Step 9.3.

9.3 Wash the organic layer with 50 ml of 20% aqueous potassium hydroxide by shaking for 10 minutes and then remove and discard the aqueous layer.

9.4 Wash the organic layer with 50 ml of doubly distilled water by shaking for 2 minutes, and discard the aqueous layer.

9.5 Cautiously add 50 ml concentrated sulfuric acid and shake for 10 minutes. Allow the mixture to stand until layers separate (approximately 10 minutes), and remove and discard the acid layer. Repeat acid washing until no color is visible in the acid layer.

9.6 Add 50 ml of doubly distilled water to the organic extract and shake for 2 minutes. Remove and discard the aqueous layer and dry the organic layer by adding 10g of anhydrous sodium sulfate.

9.7 Concentrate the extract to incipient dryness by heating in a 55° C water bath and simultaneously flowing a stream of prepurified nitrogen over the extract. Quantitatively transfer the residue to an alumina microcolumn fabricated as follows:

9.7.1 Cut off the top section of a 10 ml disposable Pyrex pipette at the 4.0 ml mark and insert a plug of silanized glass wool into the tip of the lower portion of the pipette.

9.7.2 Add 2.8g of Woelm basic alumina (previously activated at 600° C overnight and then cooled to room temperature in a desiccator just prior to use).

9.7.3 Transfer sample extract with a small volume of methylene chloride.

9.8 Elute the microcolumn with 10 ml of 3% methylene chloride-in-hexane followed by 15 ml of 20% methylene chloride-in-hexane and discard these effluents. Elute the column with 15 ml of 50% methylene chloride-in-hexane and concentrate this effluent (55° C water bath, stream of prepurified nitrogen) to about 0.3-0.5 ml.

9.9 Quantitatively transfer the residue (using methylene chloride to rinse the container) to a silanized Reacti-Vial (Pierce Chemical Co.). Evaporate, using a stream of prepurified nitrogen, almost to dryness, rinse the walls of the vessel with approximately 0.5 ml methylene chloride, evaporate just to dryness, and tightly cap the vial. Store the vial at 5° C until analysis, at which time the sample is reconstituted by the addition of tridecane.

9.10 Approximately 1 hour before GC-MS (HRGC-LRMS) analysis, dilute the residue in the microreaction vessel with an appropriate quantity of tridecane. Gently swirl the tridecane on the lower portion of the vessel to ensure dissolution of the CDDs and CDFs. Analyze a sample by GC/EC to provide insight into the complexity of the problem, and to determine the manner in which the mass spectrometer should be used. Inject an appropriate aliquot of the sample into the GC-MS instrument, using a syringe.

9.11 If, upon preliminary GC-MS analysis, the sample appears to contain interfering substances which obscure the analyses for CDDs and CDFs, high performance liquid chromatographic (HPLC) cleanup of the extract is accomplished, prior to further GC-MS analysis.

10. HPLC Cleanup Procedure[7]

10.1 Place approximately 2 ml of hexane in a 50 ml flint glass sample bottle fitted with a Teflon-lined cap.

10.2 At the appropriate retention time, position sample bottle to collect the required fraction.

10.3 Add 2 ml of 5% (w/v) sodium carbonate to the sample fraction collected and shake for one minute.

10.4 Quantitatively remove the hexane layer (top layer) and transfer to a micro-reaction vessel.

10.5 Concentrate the fraction to dryness and retain for further analysis.

11. GC/MS Analysis

11.1 The following column conditions are recommended: Glass capillary column conditions: SP-2250 coated on a 30 m long x 0.25 mm I.D. glass column (Supelco No. 2-3714, or equivalent) with helium carrier gas at 30 cm/sec linear velocity, run splitless. Column temperature is 210° C. Under these conditions the retention time for TCDDs is about 9.5 min-

utes. Calibrate the system daily with, a minimum, 3 injections of standard mixtures.

11.2 Calculate response factors for standards relative to 37Cl-TCDD/F (see Section 12).

11.3 Analyze samples with selected ion monitoring of at least 2 ions from Table 3. Proof of the presence of CDD or CDF exists if the following conditions are met:

11.3.1 The retention time of the peak in the sample shall match that in the standard, within the performance specifications of the analytical system.

11.3.2 The ratio of ions shall agree within 10% with that of the standard.

11.3.3 The retention time of the peak maximum for the ions of interest shall exactly match that of the peak.

Table 3
List of Accurate Masses Monitored Using GC Selected-Ion Monitoring, Low Resolution, Mass Spectrometry for Simultaneous Determination of Tetra-, Penta- and Hexachlorinated Dibenzo-p-Dioxins and Dibenzofurans

Class of chlorinated dibenzodioxin or dibenzofuran	Number of chlorine substituents (x)	Monitored m/z for dibenzodioxins $C_{12}H_{8-x}O_2l_x$	Monitored m/z for dibenzofurans $C_{12}H_{8-x}Ol_x$	Approximate theoretical ratio expected on basis of isotopic abundance
Tetra	4	[1]319.897	[1]303.902	0.74
—	—	321.894	305.903	1.00
—	—	[1]327.885	[2]311.894	—
—	—	[3]256.933	—	0.21
—	—	[3]258.930	—	0.20
Penta	5	[1]353.858	[1]337.863	0.57
—	—	355.855	339.860	1.00
Hexa	6	389.816	373.821	1.00
—	—	391.813	375.818	0.87

[1]Molecular ion peak.

[2]Cl4-labelled standard peaks.

[3]Ions which can be monitored in TCDD analyses for confirmation purposes.

11.4 Quantitate the CDD and CDF peaks from the response relative to the 37Cl-TCDD/F internal standards. Recovery of the internal standard should be greater than 50%.

11.5 If a response is obtained for the appropriate set of ions, but is outside the expected ratio, a coeluting impurity may be suspected. In this case, another set of ions characteristic of the CDD/CDF molecules shall be analyzed. For TCDD a good choice of ions is m/e 257 and m/e 259. For TCDF a good choice of ions is m/e 241 and 243. These ions are useful in characterizing the molecular structure to TCDD or TCDF. For analysis of TCDD good analytical technique would require using all 4 ions, m/e 257, 320, 322, and 328, to verify detection and signal to noise ratio of 5 to 1. Suspected impurities such as DDE, DDD or PCB residues can be confirmed by checking for their major fragments. These materials can be removed by the cleanup columns. Failure to meet criteria shall be explained in the report, or the sample reanalyzed.

11.6 If broad background interference restricts the sensitivity of the GC/MS analysis, the analyst shall employ cleanup procedures and reanalyze by GC/MS. See section 10.0.

11.7 In those circumstances where these procedures do not yield a definitive conclusion, the use of high resolution mass spectrometry is suggested.

12. Calculations

12.1 Determine the concentration of individual compounds according to the formula:

$$\text{Concentration, } \mu g / gm = \frac{A_x \times A_s}{G \times A_{is} \times R_f}$$

where:

A = μg of internal standard added to the sample[8]

G = gm of sample extracted

A_s = area of characteristic ion of the compound being quantified.

A_{is} = area of characteristic ion of the internal standard

R_f = response factor[9]

Response factors are calculated using data obtained from the analysis of standards according to the formula:

$$R_f = \frac{A_s \times C_{is}}{A_{is} \times C_s}$$

where:

C_{is} = concentration of the internal standard

C_c = concentration of the standard compound

12.2 Report results in micrograms per gram without correction for recovery data. When duplicate and spiked samples are analyzed, all data obtained should be reported.

12.3 Accuracy and Precision. No data are available at this time.

[1]This method is appropriate for the analysis of tetra-, penta- and hexachlorinated dibenzo-p-dioxins and -dibenzofurans.

[2]Analytical protocol for determination of TCDDs in phenolic chemical wastes and soil samples obtained from the proximity of chemical dumps. T.O. Tiernan and M. Taylor, Brehm Laboratory, Wright State University, Dayton, OH 45435.

[3]Analytical protocol for determination of chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans in river water. T.O. Tiernan and M. Taylor. Brehm Laboratory, Wright State University, Dayton, OH 45435.

[4]In general, the techniques that should be used to handle these materials are those which are followed for radioactive or infectious laboratory materials. Assistance in evaluating laboratory practices may be obtained from industrial hygienists and persons specializing in safe laboratory practices. Typical infectious waste incinerators are probably not satisfactory devices for disposal of materials highly contaminated with CDDs or CDFs. Safety instructions are outlined in EPA Test Method 613 (4.0)

See also: (1) "Program for monitoring potential contamination in the laboratory following the handling and analyses of chlorinated dibenzo-p-dioxins and dibenzofurans" by F. D. Hileman et al., In: Human and Environmental Risks of Chlorinated Dioxins and Related Compounds, R.E. Tucker, et al, eds., Plenum Publishing Corp., 1983.(2) Safety procedures outlined in EPA Method 613, Federal Register volume 44, No. 233, December 3, 1979.

[5]^{37}Cl-labelled 2,3,7,8-TCDD and 2,3,7,8-TCDF are available from K.O.R. Isotopes, and Cambridge Isotopes, Inc., Cambridge, MA. Proper standardization requires the use of a specific labelled isomer for each congener to be determined. However, the only labelled isomers readily available are ^{37}Cl-2,3,7,8-TCDD and ^{37}Cl-2,3,7,8-TCDF. This method therefore uses these isomers as surrogates for the CDDs and the CDFs. When other labelled CDDs and CDFs are available, their use will be required.

[6]This procedure is adopted because standards are not available for most of the CDDs and CDFs, and assumes that all the congeners will show the same response as the unlabelled congener used as a standard. Although this assumption may not be true in all cases, the error will be small.

Note: The publication SW-846 may be obtained from:

National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22161

[7]For cleanup see also method #8320 or #8330, SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (1982).

[8]The proper amount of standard to be used is determined from the calibrations curve (See section 6.0).

[9]If standards for PCDDs/Fs and HxCDDs/Fs are not available, response factors for ions derived from these congeners are calculated relative to ^{37}Cl-TCDD/F. The analyst may use response factors for 1,2,3,4- or 2.3.7.8-TCDD, 1,2,3,4,7-PeCDD, or 1,2,3,4,7,8-HxCDD for quantitation of TCDDs/Fs, PeCDDs/Fs and HxCDDs/Fs, respectively. Implicit in this requirement is the assumption that the same response is obtained from PCDDs/Fs containing the same number of chlorine atoms.