



**Minnesota
Pollution
Control
Agency**

F List of Hazardous Wastes

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Listed hazardous wastes

In Minnesota, a waste may be hazardous for one of these reasons:

- It displays a hazardous waste characteristic
- It is recorded in one of four lists of hazardous waste – the K, F, P, or U List
- It contains polychlorinated biphenyls (PCBs)

This fact sheet will discuss the F List of hazardous waste.

For more information on the other lists, PCBs, or hazardous waste characteristics, see Minnesota Pollution Control Agency (MPCA) hazardous waste fact sheets #2.01, 2.02, 2.03, 2.04, 2.05, and 4.48a, available on the MPCA's [hazardous waste publications](http://www.pca.state.mn.us/waste/pubs/business.html) webpage, <http://www.pca.state.mn.us/waste/pubs/business.html>.

F List in Minnesota

The MPCA has adopted the federal F List of hazardous waste, located in Chapter 40 of the Code of Federal Regulations (CFR), parts 261.30 and 261.31, as amended. Because Minnesota adopted the federal list, changes made to the list by the U.S. Environmental Protection Agency (EPA) are implemented automatically in Minnesota.

Reducing listed waste

Reducing the amount of listed hazardous waste you generate can lower your costs as well as make complying with the regulatory requirements easier. The Minnesota Technical Assistance Program (MnTAP) has staff and resources to assist you in assessing alternate products and processes to help reduce your listed waste generation. For contact information for MnTAP, see the 'More information' section on page six.

Wastes mixed with listed waste

If a listed waste is mixed with any other waste, the entire mixture then takes on the listed waste's identity and requirements. Examples of listed mixtures include F-listed solvents sprayed over or into a parts washer and F-listed solvents applied to a sorbent for wiping. The resulting parts washer waste and sorbents become regulated as F-listed wastes.

For more information on managing sorbents used with hazardous waste solvents, see MPCA hazardous waste fact sheet #4.61, [Managing Towels, Wipes, and Sorbents](#), available on the MPCA's [hazardous waste publications](#) webpage.

**Exhibit
3376**

State of Minnesota v. 3M Co.,
Court File No. 27-CV-10-28862

w-hw2-00

Explanation of F List

Reason for listing

Each group of wastes on the F List (list) was included for one or more of the following reasons, identified in the list by the capitalized letters in parentheses following the definition:

- Ignitable (I)
- Reactive (R)
- Toxic (T)
- Acutely Hazardous (H)

Acutely hazardous F-listed wastes

The wastes listed for being acutely hazardous (H) are F020, F021, F022, F023, F026, and F027. These wastes are subject to more restrictive requirements than other hazardous wastes, including generator size calculation, accumulation limits, and empty container determinations.

For more information on managing acutely hazardous wastes, see MPCA hazardous waste fact sheet #2.02, [P List of Acutely Hazardous Waste](#), available on the MPCA's [hazardous waste publications](#) webpage.

Listing-specific information

Many wastes on the F List have additional listing-specific information associated with them, including definitions and possible exemptions. This information is referenced in this fact sheet by the numbers in superscript following the reason for listing. Explanation of the numbers is given after the complete list in this document.

Although the MPCA has included the most common particulars in this guidance document, the EPA may have issued additional interpretation.

Waste codes

A four-character hazardous waste code is assigned to each group of wastes on the list. Use this code for annual reporting and manifesting. The list below is grouped according to the type of waste. In alphabetical order:

- Contaminated soil treatment residues (F028)
- Discarded unused products (F027)
- Landfill leachate (F039)
- Manufacturing and processing (F020-F026)
- Metal treating (F006-F012 and F019)
- Petroleum refinery (F037-F038)
- Spent solvents (F001-F005)
- Wood preserving (F032-F035)

*Reserved (No listings currently use codes F013-F018, F029-F031, F033 or F036)

The following list is grouped in numerical order of the waste codes.

Spent solvents (F001 – F005)

- F001** These spent halogenated solvents used in degreasing; spent solvent mixtures used in degreasing containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F002, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures used in degreasing. (T)¹
- carbon tetrachloride
 - chlorinated fluorocarbons
 - methylene chloride
 - tetrachloroethylene, also called perchloroethylene
 - 1,1,1-trichloroethane
 - trichloroethylene, also called 'TCE'
- F002** These spent halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (T)¹
- chlorobenzene
 - methylene chloride
 - ortho-dichlorobenzene
 - tetrachloroethylene, also called 'perchloroethylene'
 - 1,1,1-trichloroethane
 - 1,1,2-trichloroethane
 - trichloroethylene, also called 'TCE'
 - trichlorofluoromethane
 - 1,1,2-trichloro-1,2,2-trifluoroethane
- F003** These spent non-halogenated solvents; spent solvent mixtures containing, before use, either only these non-halogenated solvents, or one or more of these non-halogenated solvents and a total of 10 percent or more by volume of the solvents listed in F001, F002, F004, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (I)^{1,2}
- acetone
 - cyclohexane
 - ethyl acetate
 - ethyl benzene
 - ethyl ether
 - methanol
 - methyl isobutyl ketone
 - n-butyl alcohol
 - xylene
- F004** These spent non-halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F002, or F005, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (T)¹
- cresols and cresylic acid
 - nitrobenzene

F005 These spent non-halogenated solvents; spent solvent mixtures containing, before use, a total of 10 percent or more by volume of these solvents or the solvents listed in F001, F002, or F004, and still bottoms from the reclamation of these spent solvent and spent solvent mixtures. (I,T)¹

- benzene
- carbon disulfide
- 2-ethoxyethanol
- isobutanol
- methyl ethyl ketone, also called 'MEK'
- 2-nitropropane
- Pyridine
- toluene

Metal treating (F006-F012 and F019)

F006 All wastewater treatment sludges from electroplating operations except those from these processes. However, these sludges may still be hazardous for a hazardous waste characteristic. (T)

- sulfuric acid anodizing of aluminum
- tin plating of carbon steel
- zinc plating (segregated basis) on carbon steel
- aluminum or zinc aluminum plating on carbon steel
- cleaning/stripping associated with tin, zinc, and aluminum plating on carbon steel
- chemical etching and milling of aluminum

F007 Spent cyanide plating bath solutions from electroplating operations. (R,T)

F008 Plating bath sludges from the bottom of plating baths from electroplating operations where cyanides are used in the process. (R,T)³

F009 Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process. Sludges formed in electroplating stripping and cleaning bath solution tanks where cyanides are used in the process are also included. (R,T)³

F010 Quenching bath residues from oil baths from metal heat-treating operations where cyanides are used in the process. (R,T)³

F011 Spent cyanide solutions from salt bath pot cleaning from metal heat-treating operations. (R,T)

F012 Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process. (R,T)³

F019 Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process. (T)⁴

Manufacturing and processing (F020-F026)

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. (H)^{5,6}

- 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)⁵
- 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 hexachlorobenzenes under alkaline conditions. (H)⁵
- 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. (H)^{5,7}
- F024** Process wastes from the production of chlorinated aliphatic hydrocarbons with carbon chain lengths from one through five by free radical catalyzed processes, with any amount and position of chlorine substitution. Process wastes include but are not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, but do not include F025 wastes. (T)⁸
- F025** Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of chlorinated aliphatic hydrocarbons with carbon chain lengths from one through five by free radical catalyzed processes, with any amount and position of chlorine substitution. (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-, penta-, or hexachlorobenzene under alkaline conditions. (H)⁵

Discarded unused products (F027)

- F027** Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (H)^{5,9}

F027 includes, but is not limited to:

	CAS Registry #
• Acetic acid, (2,4,5-trichlorophenoxy)-	93-76-5
• Pentachlorophenol <i>or</i> Phenol, pentachloro-	87-86-5
• Phenol, 2,3,4,6-tetrachloro-	58-90-2
• Phenol, 2,4,5-trichloro-	95-95-4
• Phenol, 2,4,6-trichloro-	88-06-2
• Silvex (2,4,5-TP) <i>or</i> Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	93-72-1
• 2,4,5-T	93-76-5
• 2,3,4,6-Tetrachlorophenol	58-90-2
• 2,4,5-Trichlorophenol	95-95-4
• 2,4,6-Trichlorophenol	88-06-2

Contaminated soil treatment residues (F028)

- F028** Residues resulting from the incineration or thermal treatment of soil contaminated with hazardous waste codes F020, F021, F022, F023, F026, and F027. (T)

Wood preserving (F032-F035)

- F032** Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations. (T)^{10,11}
- F034** Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. (T)¹¹
- F035** Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. (T)¹¹

Petroleum refinery (F037-F038)

- F037** Petroleum refinery primary oil/water/solids separation sludge—Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. This listing includes residuals generated from processing or recycling oil-bearing hazardous secondary materials excluded in another state under 40 CFR 261.4(a)(12)(i) imported for processing into Minnesota, if those residuals are to be disposed of. (T)^{12,13}
- F038** Petroleum refinery secondary (emulsified) oil/water/solids separation sludge—Any sludge and/or float generated from the physical and/or chemical separation of oil/ water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. (T)^{12,14}

Landfill leachate (F039)

- F039** Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste listed as a F-, K-, P- or U-listed hazardous waste. Leachate resulting from the disposal of one or more hazardous wastes bearing the following waste codes which is not mixed with any other hazardous wastes retains its original codes and is not F039: F020, F021, F022, F026, F027, and F028. (T)

Explanation of superscripts

1. Wastes listed as spent solvents are regulated under the F001-F005 listings only when disposed of after use as a solvent. Products, such as paints, that contain ingredients on the F-list but that are not used as solvents, are not regulated as F-listed wastes. Unused solvents added to a non-solvent product, such as a reducer added to a paint to prepare it for use, are not regulated as F-listed wastes. These wastes may still be hazardous for another listing or because they display a hazardous waste characteristic.
2. F003 does not include wastes that would otherwise be F003 wastes, but are not ignitable when they are generated as a waste. Examples include solid still bottoms from F003 solvent reclamation and sorbents used to apply F003 solvents that will not release liquid when compressed ("are dry") after use. Note that deliberate evaporation of hazardous waste solvent is prohibited.

For more information on this exemption, see MPCA hazardous waste fact sheet #8.01, [Exclusion of Some Characteristic Wastes Under Certain Conditions](#), available on the MPCA's [hazardous waste publications](#) webpage.

3. F009, F010, and F012 include wastes from any processes where cyanides are actively used in the process, irrespective of whether the cyanide is added to the process in final form or is added in another form, such as a cyanate, and the cyanide is subsequently formed in the process itself.
4. F019 does not include wastewater treatment sludges from the manufacturing of motor vehicles using a zinc phosphating process if the wastes are not stored outside on the land and are disposed of in a permitted municipal or industrial solid waste landfill. Motor vehicle manufacturing includes only complete vehicles or chassis of automobiles and light truck/utility vehicles. Generators of such waste must maintain records of the volume of waste generated, the identity of the receiving facility, and confirmation of receipt of the waste at that facility.
5. Acutely hazardous wastes, including F020-F023 and F026-F027 are subject to more restrictive requirements than other hazardous wastes, including generator size calculation, accumulation limits, and empty container determinations.

For more information on acutely hazardous waste management, see MPCA hazardous waste fact sheet #2.02, [P List of Acutely Hazardous Waste](#), available on the MPCA's [hazardous waste publications](#) webpage.

6. F020 does not include wastes from the production of hexachlorophene from highly purified 2,4,5-trichlorophenol.
7. F023 does not include wastes from equipment used only for the production or use of hexachlorophene from highly purified 2,4,5-trichlorophenol.
8. F024 does not include light ends, spent filters and filter aids, spent desiccants, wastewater, wastewater treatment sludges, and spent catalysts. Condensed light ends, spent filters and filter aids, and spent desiccant wastes are F025 instead.
9. F027 does not include formulations containing hexachlorophene synthesized from prepurified 2,4,5-trichlorophenol as the sole component.
10. F032 does not include cross-contaminated wastes that have had the F032 waste code deleted under 40 CFR 261.65 or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations.
11. F032, F034, and F035 do not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol.
12. F037 and F038 do not include sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, and sludges generated in aggressive biological treatment units (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units). Aggressive biological treatment includes: activated sludge; trickling filter; rotating biological contactor for the continuous accelerated biological oxidation of wastewaters; or high-rate aeration.
13. F037 does not include K051.
14. F038 does not include F037, K048, and K051.

For more information regarding the K001, K048, or K051 listings, see MPCA hazardous waste fact sheet #2.01, [K List of Hazardous Waste](#), available on the MPCA's [hazardous waste publications](#) webpage.

More information

Your metropolitan county and the MPCA have staff available to answer waste management. For more information, contact your metropolitan county hazardous waste office or your nearest MPCA regional hazardous waste staff.

MPCA hazardous waste webpage: <http://www.pca.state.mn.us/waste/pubs/business.html>.

Metro County Hazardous Waste Offices

Anoka	763-422-7093
Carver	952-361-1800
Dakota	952-891-7557
Hennepin	612-348-3777
Ramsey	651-266-1199
Scott County.....	952-496-8475
Washington County.....	651-430-6655
Websites.....	www.co.[county].mn.us

Minnesota Technical Assistance Program

Toll free.....	1-800-247-0015
Metro	612-624-1300
Website	http://www.mntap.umn.edu

Minnesota Pollution Control Agency

Toll free (all offices).....	1-800-657-3864
Brainerd	218-828-2492
Detroit Lakes	218-847-1519
Duluth	218-723-4660
Mankato	507-389-5977
Marshall	507-537-7146
Rochester	507-285-7343
St. Paul	651-296-6300
Willmar	320-214-3786
Website	http://www.pca.state.mn.us