U.S. Department
of Transportation
**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

Report to Congress

Pursuant to Section 741 of the USA PATRIOT Improvement and Reauthorization Act of 2005

Byproducts of the Methamphetamine-Production Process Designated as Hazardous Materials

January 2021

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1. Introduction

This Report satisfies the Secretary of Transportation's obligation to report to Congress biennially on the information required by 49 U.S.C. § 5103(e).[1]

The information in the Report describes whether the Secretary has designated as hazardous materials (hazmat) those by-products of the methamphetamine-production process that are known by the Secretary to pose an unreasonable risk to health and safety or property when transported in commerce in a particular amount and form.[2]

[1] 49 U.S.C. § 5103. General regulatory authority. Paragraph (e). Available at: https://www.law.cornell.edu/uscode/text/49/5103

[2] USA Patriot Improvement and Reauthorization Act of 2005. Pub. L. 109–177, title VII, § 741, Mar. 9, 2006, 120 Stat. 272. Subtitle D—Enhanced Environmental Regulation of Methamphetamine Byproducts. Available at: https://www.govinfo.gov/content/pkg/PLAW-109publ177/pdf/PLAW-109publ177.pdf

2. Regulation of Methamphetamine Byproducts as Hazmat in Transportation

This section satisfies requirements under 49 U.S.C. § 5103(e), to provide the House Committee on Transportation and Infrastructure, and the Senate Committee on Commerce, Science, and Transportation, information concerning the designation of all by-products of the methamphetamine-production process as hazmat for purposes of 49 U.S.C. Chapter 51.

On March 9, 2006, the President signed into law the USA PATRIOT Improvement and Reauthorization Act of 2005, Public Law No. 109–177, 120 Stat. 192 (2006). This law extends and modifies provisions in the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act (USA PATRIOT Act) of 2001, Public Law No. 107–56, 115 Stat. 272 (2001), and is divided into seven titles. Title VII of the 2006 amendment to the USA PATRIOT Act incorporates into law the "Combat Methamphetamine Epidemic Act of 2005," which sets forth provisions relating to: (1) the domestic and international regulation of precursor chemicals; (2) enhanced criminal penalties for methamphetamine production and trafficking; (3) enhanced environmental regulation of methamphetamine by-products; and (4) various additional programs and activities.

The Department of Transportation (DOT) designates materials that pose an unreasonable risk to health and safety or property when transported in commerce as hazmat for purposes of the Federal hazmat law and the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). These include materials that are specifically listed by name in the Hazardous Materials Table (49 CFR 172.101), materials that meet hazard classification criteria set forth in the HMR (such as for flammability, toxicity and corrosivity), and materials that are hazardous wastes under regulations promulgated by the Environmental Protection Agency (EPA). Based on the information available to us, DOT believes all hazardous by-products of methamphetamine production are regulated as hazmat under the HMR.

This section is unchanged from its publication in the 2013-2014 Biennial Report.

TABLE A-1. Cyanides

Substance	Form	ID Number	Hazard Class	Exposure
Sodium Cyanide	Solid	UN1689	6.1	Skin, Eyes, Ingestion
Potassium Cyanide	Solid	UN1680	6.1	Skin, Eyes, Ingestion
Benzyl Cyanide	Liquid	UN2810	6.1	Skin, Eyes, Inhalation, Ingestion
Hydrogen Cyanide	Gas, Liquid	UN1051	6.1	Inhalation

* Refer to 40 CFR 261.33 for listings, as well as 40 CFR 261.23 (characteristic of reactivity) for cyanide–bearing waste.

Health Effects:
If solid cyanide salts come in contact with acid, hydrogen cyanide gas will be released. Inhalation of hydrogen cyanide may result in rapid progression of symptoms to respiratory failure, coma, and death. Ingestion of the salts may also lead to these symptoms, but hydrogen cyanide gas poses the greater exposure risk.

TABLE A-2. Irritants and Corrosives

Substance	Form	ID Number	Hazard Class	Exposure
Acetic Acid[a]	Liquid	UN2789	8	Skin, Eyes, Inhalation
Acetyl Chloride	Liquid	UN1717	3	Skin, Eyes, Inhalation
Ammonia (anhydrous)	Gas	UN1005	2.2	Skin, Eyes, Inhalation
Ammonium Hydroxide	Liquid	UN3318	2.2	Skin, Eyes, Inhalation
Benzyl Chloride[a]	Liquid	UN1738	6.1	Skin, Eyes, Inhalation
Dimethylsulfate	Liquid	UN1595	6.1	Skin, Eyes, Inhalation
Formaldehyde	Gas, Liquid	UN1198	3	Skin, Eyes, Inhalation
Formic Acid	Liquid	UN1779	8	Skin, Eyes, Inhalation
Hydrogen Chloride/ Hydrochloric Acid	Gas, Liquid	UN1789	8	Skin, Eyes, Inhalation
Hydrobromic Acid	Liquid	UN1788	8	Skin, Eyes, Inhalation
Hydriodic Acid	Liquid	UN1787	8	Skin, Eyes, Inhalation
Hydroxylamine[a,b]	Liquid, Solid	UN2811	6.1	Skin, Eyes, Inhalation
Methylamine[a]	Gas, Liquid, Solid	UN1235	3	Skin, Eyes, Inhalation
Methylene Chloride[a] (dichloromethane, methylene dichloride)	Liquid	UN1593	6.1	Skin, Eyes, Inhalation
Methyl Methacrylate	Liquid	UN1247	3	Skin, Eyes, Inhalation
Nitroethane[a,b]	Liquid	UN2842	3	Skin, Eyes, Inhalation
Oxalylchloride[b]	Liquid	UN2922	8	Skin, Eyes, Inhalation
Perchloric Acid[e]	Liquid	UN1873	5.1	Skin, Eyes, Inhalation
Phenylmagnesium Bromide[a,b]	Liquid	UN3399	4.3	Skin, Eyes, Inhalation
Phosphine[a]	Gas	UN2199	2.3	Eyes, Inhalation
Phosphorous Oxychloride	Solid	UN1810	6.1	Skin, Eyes, Inhalation

TABLE A-2. Irritants and Corrosives

Substance	Form	ID Number	Hazard Class	Exposure
Phosphorous Pentoxide	Solid	UN1807	8	Skin, Eyes
Sodium Amide (Sodamide)[b]	Solid	UN3131	4.3	Skin, Eyes, Inhalation
Sodium Metal[a,b]	Solid	UN1428	4.3	Skin, Eyes
Sodium Hydroxide	Liquid, Solid	UN1823	8	Skin, Eyes
Sulfur Trioxide	Liquid, Solid	UN1829	8	Skin, Eyes, Inhalation
Sulfuric Acid[f]	Liquid	UN1831	8	Skin, Eyes, Inhalation
Tetrahydrofuran[a,b]	Liquid	UN2056	3	Skin, Eyes, Inhalation
Thionyl Chloride	Liquid	UN1836	8	Skin, Eyes, Inhalation

* Refer to 40 CFR 261.33 for a detailed listing.
[a] Flammable
[b] Explosive
[c] Flashpoint <141 degrees F
[d] Uninhibited
[e] >50% but <72% strength
[f] Unspent

Health Effects:
Vapors of volatile corrosives may cause eye irritation, lacrimation, conjunctivitis, and corneal injury. Inhalation may cause irritation of mucous membranes of the nose and throat, and lung irritation resulting in cough, chest pain, and shortness of breath. Pulmonary edema, coughing up of blood, and chronic lung disease may occur in severe cases. High concentrations of vapor may cause skin irritation. Additional symptoms of vapor inhalation may include headache, nausea, dizziness, and anxiety. Phosphine may detonate, and has the odor of decaying fish. Direct contact with corrosives may result in severe eye or skin burns. Methylmethacrylate skin exposure may result in contact dermatitis and sensitization. Formaldehyde is a suspected human carcinogen. Formic acid ingestion or inhalation may result in kidney or liver damage. Sodium metal reacts violently with water. Tetrahydrofuran and Perchloric Acid can form explosive crystals.

TABLE A-3. Solvents

Substance	Form	ID Number	Hazard Class	Exposure
Acetone[a]	Liquid	UN1090	3	Skin, Eyes, Inhalation
Acetonitrile[a]	Liquid	UN1648	3	Skin, Eyes, Inhalation
Aniline	Liquid	UN1547	6.1	Skin, Eyes, Inhalation
Benzene[a]	Liquid	UN1114	3	Skin, Eyes, Inhalation
Benzylchloride[a]	Liquid	UN1738	6.1	Skin, Eyes, Inhalation
Carbon Tetrachloride	Liquid	UN1846	6.1	Skin, Eyes, Inhalation
Chloroform	Liquid	UN1888	6.1	Skin, Eyes, Inhalation
Cyclohexanone[a,d]	Liquid	UN1915	3	Skin, Eyes, Inhalation
Dioxane[a]	Liquid	UN1165	3	Skin, Eyes, Inhalation
Ethanol[a]	Liquid	UN1170	3	Skin, Eyes, Inhalation
Ethyl Acetate[a]	Liquid	UN1173	3	Skin, Eyes, Inhalation
Ethyl Ether[b,c]	Liquid	UN1155	3	Skin, Eyes, Inhalation
Freon 11 (trichloromonofluoromethane)	Liquid	UN3082	9	Skin, Eyes, Inhalation
Hexane[a]	Liquid	UN1208	3	Skin, Eyes, Inhalation
Isopropanol[a]	Liquid	UN1219	3	Skin, Eyes, Inhalation
Methanol[a]	Liquid	UN1230	3	Skin, Eyes, Inhalation
Methylene Chloride (dichloromethane, methylene dichloride)	Liquid	UN1593	6.1	Skin, Eyes, Inhalation
Petroleum Ether[a]	Liquid	UN1993	3	Skin, Eyes, Inhalation
Pyridine[a]	Liquid	UN1282	3	Skin, Eyes, Inhalation
Toluene[a]	Liquid	UN1294	3	Skin, Eyes, Inhalation
o-Toluidine[a,b]	Liquid	UN1708	6.1	Skin, Eyes, Inhalation

* Refer to 40 CFR 261.31 and 40 CFR 261.33 for detailed listings.

[a] Flammable

[b] Explosive

[c] Ethers may form explosive peroxides

[d] ≥50% peroxide

Health Effects:
Inhalation of vapors at low concentrations may result in mild eye, nose, and throat irritation. Symptoms of intoxication (drowsiness and loss of coordination) or loss of consciousness may occur at high concentrations. Liver and kidney impairment may also occur at high doses, or with prolonged exposure. Benzene is a known human carcinogen. Chloroform, carbon tetrachloride, dioxane, o-toluidine, and methylene chloride are probable human carcinogens. Spilling of Freon on the skin may result in freezing injury. Ingestion of small amounts of methanol may lead to permanent damage to vision. Aniline can be readily absorbed through the skin and may cause mental confusion and decreased blood hemoglobin by all exposure routes. O-Toluidine is highly toxic when absorbed through the skin, inhaled as a vapor, or ingested, causing possible kidney injury.

TABLE A-4. Metals/Salts

Substance	Form	ID Number	Hazard Class	Exposure
Aluminum Chloride	Solid	UN1726	8	Skin, Eyes
Magnesium[a,d]	Solid	UN1418	4.3	Skin, Eyes
Palladium	Solid	UN3089	4.1	Skin, Eyes
Red Phosphorus[b]	Solid	UN1338	4.1	Skin, Eyes
Iodine	Solid	UN1759	8	Skin, Eyes
Mercuric Chloride	Solid	UN1624	6.1	Skin, Eyes
Lead Acetate	Solid	UN1616	6.1	Skin, Eyes
Lithium Aluminum Hydride[a,b]	Solid	UN1410	4.3	Skin, Eyes
Lithium Hydroxide	Solid	UN2680	8	Skin, Eyes
Potassium Hydroxide	Solid	UN1813	8	Skin, Eyes
Raney Nickel[a,b]	Solid	UN3178	4.1	Skin, Eyes
Sodium Hydroxide	Solid	UN1427	4.3	Skin, Eyes
Sodium Metal[a,b]	Solid in kerosene	UN1428	4.3	Skin, Eyes
Potassium Metal[a,b]	Solid in kerosene	UN2257	4.3	Skin, Eyes
Thorium Salts[c]	Solid	UN2976	Entry removed effective 10/1/04	Skin, Eyes

* Other than lead acetate, none of these possess EPA Waste Codes under 40 CFR 261.33; however, chemicals may exhibit one or more characteristics of hazardous waste. Refer

to 40 CFR 261.21-.24 for characteristics (i.e., ignitability, corrosivity, reactivity, and/or toxicity).
[a] Flammable
[b] Explosive
[c] Radioactive
[d] Magnesium metal (powder, pellets, turnings on ribbon)

Health Effects:
Most metals and salts are stable solids with minimal potential for exposure unless ingested or the metal is present in the air as dust or fumes, if heated. Sodium and potassium metal, and sodium and lithium hydroxides are extremely corrosive in the presence of moisture. Lithium aluminum hydride, and sodium, magnesium, and potassium metals are extremely reactive with air and water and can ignite or explode. (Hydrogen gas may be liberated, which is explosive.) Thorium is an alpha-emitting radioactive material. Flu-like symptoms and possible lung damage may result from breathing metal fumes. Acute overexposure to lead or mercury salts may lead to nausea and vomiting, and long-term exposure can affect the central nervous system. Hematologic and neurologic complications and kidney damage may occur with chronic exposure to mercury salts. Red phosphorous, if contaminated with white phosphorous, may explode on contact, or with friction or heat, but is relatively nontoxic by ingestion.

TABLE A-5. Miscellaneous

Substance	Form	ID Number	Hazard Class	Exposure	Health Effects
Cyclohexanone	Liquid	UN1915	3	Skin	Irritant
Fentanyl	Solid	UN2811	6.1	Inhalation, Skin, Eyes	Narcotic drug product causing respiratory failure at extremely low doses (i.e., equivalent to a few grains of dust)
Hydrogen	Gas	UN1954	2.1	Inhalation	Flammable, Explosive
Lysergic Acid Diethylamide	Powder	UN2811	6.1	Ingestion, Inhalation	Hallucination at extremely low doses
MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine); MPPP (1-methyl-4-phenyl-4-propionoxypiperidine)	Solids	UN2811	6.1	Inhalation, Skin	By-product or intermediates of alphaprodine laboratories. (*Extremely low doses may cause irreversible Parkinson's disease*.)
Methylfentanyl	Solid	UN2811	6.1	Inhalation, Skin, Eyes	See "Fentanyl"
Phenylacetic Acid	Solid	Not DOT regulated	N/A	Skin, Eyes	Irritant
Phenyl-2-Propanone (phenylacetone)	Liquid	No Data	N/A	Skin, Inhalation	Irritant; few toxicity data available
Piperidine	Liquid	UN2401	8	Skin, Inhalation	Irritant; few toxicity data available