Appendix G: Chemicals that Pose Excessive Hazards

Chemical	Description of Hazards
Acetic anhydride – liquid (acetic oxide, ethanoic anhydride) $C_4H_6O_{3(l)}$	Corrosive; causes severe burns to any area of contact; severe eye and respiratory irritant; harmful if swallowed; flammable liquid and vapour; water reactive.
Acetyl chloride – liquid (ethanoyl chloride) $CH_3COCl_{(l)}$	Corrosive; causes severe burns to eyes and skin; harmful if inhaled or swallowed; highly flammable; reacts violently with water, forming toxic phosgene.
Acrolein – liquid (2-propenal, acrylaldehyde) $C_3H_4O_{(l)}$	Corrosive; causes severe irritation or burns to eyes and skin; highly toxic if inhaled or ingested; highly flammable; may be carcinogenic.
Aluminium chloride, anhydrous – powder $AlCl_{3(s)}$	Corrosive; causes irritation and burns to skin, eyes, and respiratory and digestive tracts; reacts violently with water, forming HCl.
Ammonia, anhydrous (liquid under pressure) – gas $NH_{3(g)}$ & $NH_{3(l)}$	Corrosive liquid and gas; irritating and causes burns to eyes and skin; may cause burns if ingested or inhaled; flammable vapour; air-gas mixture explosive.
Ammonium chromate – crystals $(NH_4)_2CrO_{4(s)}$	Corrosive; causes severe irritation, burns to skin, eyes, and mucous membranes; may be fatal by ingestion, inhalation, or skin absorption; strong oxidizing agent, may explode when heated; mutagen; human carcinogen.
Ammonium dichromate – crystals $(NH_4)_2Cr_2O_{7(s)}$	Corrosive; causes severe skin and eye irritation and burns to any area of contact; toxic by inhalation or ingestion; very strong oxidizing agent; combustible solid if ignited; decomposes if heated; known human carcinogen.
Ammonium sulfide – liquid $(NH_4)_2S_{(l)}$	Corrosive; strong skin, eye, and mucous membrane irritant; causes burns to any area of contact; may be fatal if swallowed or inhaled; harmful if absorbed through skin; highly flammable liquid and vapour; toxic hydrogen sulfide gas is released when heated.
Antimony powder – solid $Sb_{(s)}$	Dust causes skin, eye, digestive, and respiratory irritation; prolonged exposure may cause blood abnormalities and cardiac disturbances; inhalation of fumes causes metal-fume fever; chronic inhalation may cause liver, kidney, and cardiac changes; bulk metal combustible at high temperatures; dust-air mixture is explosive.

Chemical	Description of Hazards
Antimony trichloride – crystals (trichlorostibine) $SbCl_{3(s)}$	Corrosive; contact with skin and eyes causes severe irritation or burns; harmful if inhaled, ingested, or absorbed through skin; inhalation of dust may cause dizziness and difficulty breathing; ingestion causes nausea, vomiting, and loss of consciousness; water-reactive; releases heat and toxic fumes.
Arsenic and arsenic compounds	Toxic, carcinogens; arsenic powder is a very strong neurotoxin; arsenic compounds are toxic by inhalation and/or ingestion.
Asbestos – fibrous solid	Causes irritation of the eyes, nose, and throat; prolonged inhalation of particles causes asbestosis and cancer.
Azide compounds	Explosive in contact with metals, extremely reactive, highly toxic.
Benzene – liquid $C_6H_{6(l)}$	Toxic; causes irritation of the skin, eyes, and respiratory tract; toxic by ingestion, inhalation, and skin absorption; depresses the central nervous system; highly flammable; human carcinogen.
Benzoyl peroxide - crystals (dibenzoyl peroxide, acetoxyl, nericur) $(C_6H_5CO)_2O_{2(s)}$	Irritant of skin, eyes, and respiratory tract; harmful if swallowed or inhaled; possible mutagen and carcinogen; highly flammable; strong oxidizer, reaction with reducing compounds can cause fire; extremely explosive; sensitive to shock, friction, and heat.
Beryllium and its compounds	Very toxic if swallowed or inhaled; irritating to skin, eyes, and respiratory system; human carcinogens.
Bromine – liquid and gas Br_2 (l) or Br_2 (g)	Highly toxic by skin contact, inhalation, or ingestion; severe skin irritant, causes severe burns; very strong oxidizer; reacts violently with many organic compounds.
Cadmium (powder or chunks) and cadmium salts	Toxic by skin contact, inhalation, or ingestion; may be fatal if inhaled; carcinogenic with prolonged exposure.
Carbides	React with acids and water to release heat and/or flammable gases.

Chemical	Description of Hazards
Carbon disulfide – liquid (carbon bisulfide) $CS_{2(l)}$	Toxic; may be fatal if inhaled or ingested; harmful if absorbed through skin; affects the central nervous system and heart; may cause liver and kidney damage; has adverse reproductive and fetal effects; extremely flammable liquid and gas.
Carbon tetrachloride – liquid $CCl_{4(l)}$	Toxic; may be fatal by inhalation or skin absorption; highly toxic by ingestion; causes irritation to skin, eyes, and respiratory tract; readily absorbed through skin; reproductive toxin; flammable; emits toxic fumes; mutagen and possible human carcinogen.
Chlorine – gas $Cl_{2(g)}$	Extremely toxic if inhaled; strong oxidizer.
Chloroform – liquid (trichloromethane) $CHCl_{3(l)}$	Causes irritation to skin, eyes, and respiratory tract; may be fatal if swallowed, inhaled, or absorbed through skin; extended exposure may affect the central nervous system, cardiovascular system, liver, and kidneys; possible human carcinogen.
Chromic acid – solution (chromium VI oxide solution) $CrO_{3(aq)}$	Corrosive; causes burns to skin, eyes, and mucous membranes; highly toxic; powerful oxidizing agent; avoid contact with reducing agents and organic material; a human carcinogen as fume or dust.
Colchicine – powder $C_{22}H_{25}NO_{6(s)}$	Corrosive and highly toxic if swallowed; causes severe irritation of eyes; causes irritation of skin and respiratory tract; may be fatal if inhaled or absorbed through skin; may cause birth defects; affects the reproductive system; combustible if heated or ignited.
Collodion solution – liquid (pyroxylin solution) Mixture Ethyl ether Ethyl alcohol Nitrocellulose	Causes skin irritation, possible burns, and moderate eye irritation; harmful if inhaled, swallowed, or absorbed through skin; extended exposure to vapour can cause lung damage; may cause central nervous system depression or reproductive and fetal effects; may cause liver and kidney damage; prolonged exposure to air may form unstable explosive peroxides; extremely flammable; possible human carcinogen.
Copper metal – powder $Cu_{(s)}$	Causes irritation to skin, eyes, and mucous membranes; harmful if swallowed or inhaled; affects the liver and kidneys; chronic exposure may cause tissue damage.
1,2-dichloroethane – liquid (ethylene dichloride) $ClCH_2CH_2Cl_{(l)}$	Harmful if swallowed, inhaled, or absorbed through skin; affects the nervous system, liver, kidneys, and cardiovascular system; flammable liquid and vapour; possible human carcinogen.

Chemical	Description of Hazards
2,4-dinitrophenol – powder (aldefin) $C_6H_4N_2O_{5(s)}$	Toxic by inhalation and ingestion; danger of cumulative effects; flammable; may explode when heated.
1,4-dioxane – liquid (1,4-diethylene dioxide) $C_4H_8O_{2\ (l)}$	Most toxic by inhalation; easily absorbed through lungs; poisoning has poor warning properties; anhydrous form oxidizes, slowly forming explosive peroxides in storage; highly flammable; a possible human carcinogen.
Diethyl ether – liquid (ethyl ether) $C_4H_{10}O_{(l)}$	Causes skin, eye, and respiratory irritation; harmful by ingestion, inhalation, or skin absorption; may cause inebriation or coma; extremely flammable; unstable; reacts with air to form explosive peroxides while in storage.
Formaldehyde - solution (formalin, methanal) Mixture: HCHO CH_3OH H_2O	Toxic by inhalation, ingestion, and through skin absorption; extremely destructive to tissues of the mucous membranes and upper respiratory tract; ingestion may be fatal or cause blindness; flammable liquid and vapour; mutagen; probable human carcinogen.
Hydrazine	Flammable, corrosive, and highly toxic; unstable; carcinogen.
Hydrogen fluoride - solution (hydrofluoric acid) $HF_{(aq)}$	Extremely corrosive and toxic; vapour causes severe burns to skin, eyes, and respiratory tract; burns to skin may not be immediately painful or visible; may be fatal if swallowed or inhaled; causes bone damage; reaction with metals generates explosive hydrogen gas.
Hydrogen sulfide – gas $H_2S_{(g)}$	Very corrosive and toxic; low concentrations (50 ppm) cause eye and respiratory membrane irritation; death occurs in 1-4 hours at 300-500 ppm, immediate respiratory arrest in excess of 1000 ppm; toxic by ingestion or inhalation; severe exposures, short of death, may cause long-term symptoms including lung damage, memory loss, paralysis of facial muscles, or nerve tissue damage.
Lithium – solid $Li_{(s)}$	Corrosive; causes eye and skin burns; may cause severe respiratory or digestive tract irritation or burns; may cause kidney damage and central nervous effects; light sensitive; reacts with water; flammable solid.
Mercury – liquid (quicksilver) $Hg_{(l)}$	Corrosive; causes burns to skin, eyes, and respiratory tract; may be fatal if swallowed or inhaled; harmful if absorbed through skin; chronic exposure affects the central nervous system and kidneys.

Chemical	Description of Hazards
Mercury compounds	Toxic.
Methylene chloride – liquid (dichloromethane) $CH_2Cl_{2(l)}$	Causes irritation and possible burns to skin, eyes, and respiratory tract; may be absorbed through skin; may depress central nervous system function; combustible if heated or ignited; vapours may form explosive mixture with air; mutagen and possible human carcinogen.
Methyl ethyl ketone – liquid (2-butanone) $C_4H_8O_{(l)}$ or $CH_3COCH_2CH_{3(l)}$	Causes mild irritation to skin; vapour causes moderate irritation to eyes, nose, and respiratory tract; higher than 350 ppm exposure causes nervous system depression; very high concentrations cause unconsciousness and possible death; flammable liquid, vapour-air mixture explosive.
Nickel powder and nickel salts	Powder may cause irritation to skin, eyes, and respiratory tract; causes gastrointestinal irritation with nausea, vomiting, and diarrhea if ingested; powder pyrophoric, can ignite spontaneously; human carcinogen; nickel salts are carcinogenic with long-term exposure.
Nitrogen dioxide – liquefied gas $NO_{2(l)}$ & $NO_{2(g)}$	Very toxic and corrosive; short-term exposure causes irritation and possible burns to skin, eyes, and respiratory tract; potentially fatal if inhaled; strong oxidizer, contact with combustible material may cause fire.
Perchloric acid – solution $HClO_{4(aq)}$	Corrosive; causes severe burns at site of contact; very harmful through skin contact, inhalation, and ingestion; unstable, will decompose explosively at higher temperature or if allowed to dehydrate; contact with wood, paper, and other cellulose products may lead to explosion; strong oxidizer.
Phenol – solid (carbolic acid, hydroxybenzene, oxybenzene, phenic acid, phenyl hydrate, phenyl hydroxide, phenelic alcohol) $C_6H_6O_{(s)}$	Corrosive and toxic; absorbed rapidly through skin; causes severe burns to any area of contact; may be fatal if swallowed, inhaled, or absorbed through skin; affects central nervous system, liver, and kidneys; causes adverse reproductive and fetal effects; flammable.
Phosphorus, red $P_{(s)}$	Causes eye irritation; may be harmful if swallowed or if fumes are inhaled; flammable solid, may ignite from friction.
Phosphorus, yellow (white phosphorous) $P_{4(s)}$	Corrosive; causes severe skin and eye burns; harmful if absorbed through skin; acute inhalation causes serious damage to lungs and respiratory tract; may be fatal if swallowed; extremely flammable, ignites spontaneously on exposure to air; fumes from burning phosphorus extremely irritating.

Chemical	Description of Hazards
Phosphorus pentoxide – powder (phosphoric anhydride) $P_2O_{5(s)}$	Corrosive; fumes cause irritation to eyes and respiratory tract; causes burns to any area of contact; harmful if swallowed or inhaled; reacts violently with water to form phosphoric acid.
Picric acid – crystals (2,4,6-trinitrophenol) $C_6H_3N_3O_{7(s)}$	Toxic; causes skin and respiratory tract irritation, and severe eye irritation; harmful if swallowed, inhaled, or absorbed through the skin; affects the liver, kidneys, and blood; stable in water but explosive if allowed to dry; becomes increasingly shock-, heat-, and friction-sensitive as moisture is lost; flammable solid.
Potassium (metal) – solid $K_{(s)}$	Corrosive; causes burns to all areas in contact; harmful or fatal if swallowed; harmful if absorbed through skin; water reactive; flammable solid, ignites when exposed to air.
Potassium perchlorate	Powerful oxidizer; reactivity hazard.
Sodium (metal) – sticks $Na_{(s)}$	Corrosive; contact may cause burns; harmful if metal absorbed through skin; harmful or fatal if ingested; flammable solid, ignites spontaneously in air; reacts violently with water, releasing explosive hydrogen gas.
Sodium arsenite – powder $NaAsO_{2(s)}$	Toxic; causes irritation to skin, eyes, and respiratory tract; may be fatal by ingestion or inhalation; may cause liver and kidney damage; carcinogen.
Sodium fluoride – crystals $NaF_{(s)}$	Toxic; causes irritation to skin and eyes, and severe irritation to respiratory tract; irritation effects may be delayed; may be fatal if swallowed or inhaled; prolonged exposure affects the respiratory, circulatory, central nervous system, and kidneys; may cause mottling of teeth and bone damage.
Sodium peroxide – granules $Na_2O_{2(s)}$	Corrosive; causes burns to any area of contact; harmful if swallowed or inhaled; reacts with water; strong oxidizer; contact with combustible material may cause fire.
Sodium sulfide nonahydrate – crystals $Na_2S•9H_2O_{(s)}$	Corrosive; causes severe burns to any area of contact; harmful if swallowed or inhaled; unstable in storage; decomposes in contact with moisture and acids, forming toxic combustible hydrogen sulfide gas.
Strontium $Sr_{(s)}$	Corrosive; contact may case burns; harmful or fatal if swallowed; flammable solid, granules ignite spontaneously with air; reacts with water.