

**WINCHESTER/FREDERICK COUNTY REGIONAL
HAZARDOUS MATERIALS RESPONSE TEAM
EMERGENCY MEDICAL SERVICES
PROTOCOLS**

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TABLE OF CONTENTS

<u>Chemical</u>	<u>Protocol #</u>
ACIDS	1
ALCOHOL.....	2
ALKALINE CORROSIVES.....	3
AMMONIA.....	4
ANILINE.....	5
ARSENIC.....	6
BLISTER AGENTS.....	7
BORON-HADROGEN HALIDES.....	8
CARBAMATES.....	9
CARBON DISULFIDE.....	10
CARBON MONOXIDE.....	11
CARBONYL SULFIDE.....	12
CHLORATES.....	13
CHLORINE.....	14
CONTACT INSECTICIDES.....	15
CYANIDE.....	16
DDT, (Dichloro Diphenyl Trichloroethane).....	17
ETHYLENE GLYCOL.....	18
ETHYLENE OXIDE.....	19
FLUORIDES.....	20
FLUOROCARBONS.....	21
FORMALDEHYDE.....	22
HALOGENATED HYDROCARBONS.....	23
HERBICIDES.....	24
HEXAFLUORACETONE.....	25
INCAPACITATING AGENTS.....	26
METHYL & AMMONIUM BROMIDE.....	27
METHYL ETHERS.....	28
METHYL MERCAPTAN.....	29
NAPHTHALENE.....	30
NITRITES.....	31
NITROSYL CHLORIDE.....	32
ORGANOPHOSPHATES.....	33
PARAFFIN HYDROCARBONS.....	34
PETROLEUM PRODUCTS.....	35
PHENOL.....	36
PHOSGENE.....	37
PHOSPHINE.....	38
STRYCHNINE.....	39
TOLUENE.....	40
TURPENTINE.....	41
VINYL CHLORIDE.....	42
ZINC.....	43
APPENDICES.....	

DESCRIPTION – ACIDS

Protocol

#1

Clear, colorless or slightly yellow, fuming liquid with irritating, pungent odor.

HEALTH/TOXICITY 3

HEALTH HAZARDS

Toxic, eye, skin and respiratory irritant. Inhalation of high concentrations can be fatal within minutes; corrosive burns to skin.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Corrosion of mucous membranes around the mouth, throat and esophagus, with immediate pain and dysphagia.
- Epigastric pain, often associated with nausea and vomiting of coffee-like material.
- Circulatory collapse with shock-like signs/symptoms.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Do not induce vomiting.
- If ingested, administer 30ml Milk of Magnesia by mouth as a neutralizer and demulcent. **DO NOT** use Carbonates or Bicarbonates.
- Administer large amounts of water followed by a demulcent, e.g. milk, egg white, etc.
- Wash skin for at least 15 minutes with running water.
- Eye contamination - hold lids open and flush immediately with a slow stream of water for at least 15 minutes.
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer Morphine 2-10 mg, IV or IM, for relief of pain.
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS

- Avoid direct contact with the acid.

DESCRIPTION - LIQUID ALCOHOLS

Protocol

#2

Liquids used principally in solvents, Isoamyl main constituent of fuel oil. Solid alcohols used as emollients in cosmetics.

HEALTH/TOXICITY 2

HEALTH HAZARDS

CNS depressants. Vapor exposure causes marked irritation of eyes, nose, throat, headache, vertigo and drowsiness. Highly toxic on aspiration.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- CNS: Headache, muscle weakness, giddiness, ataxia, confusion, delirium, coma
- GI: Nausea, vomiting, diarrhea
- Irritation of skin, eyes, throat, cough, dyspnea.
- Respiratory arrest.
- Cardiac arrhythmias.

TREATMENT

Basic Life Support

- Remove from contaminated area immediately.
- If ingested, dilute with water.
- Administer O₂, 15 LPM by non-rebreather mask.
- Monitor for shock. Treat as necessary.
- Watch for respiratory arrest.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Cardiac problems, refer to Standard Cardiac Protocols.

DESCRIPTION - ALKALINE CORROSIVES

Protocol

#3

Alkaline corrosives. Are caustic materials which can produce necrosis within seconds.

HEALTH/TOXICITY 3

HEALTH HAZARDS

Severe irritant to skin, eyes, lips, tongue, esophagus, mucous membranes and lungs causing burns. Corrosive effects of alkaline chemicals usually occur rapidly.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Severe exposure will cause pulmonary edema.
- Skin irritation.
- Burns on lips, tongue, oral mucous membranes, esophagus and eyes (liquefaction necrosis)
- Breathing may be difficult.

TREATMENT

Basic Life Support

- Remove from contaminated area to fresh air.
- Remove, bag & tag contaminated clothing.
- Do not induce vomiting.
- Administer O₂, 15 LPM by non-rebreather mask.
- If ingested, administer orally, large amounts of diluents, e.g. milk or water.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Treat for pulmonary edema (see Pulmonary Edema Protocol).

PRECAUTION

- AVOID acidic agents (e.g. vinegar, fruit juices) to neutralize the alkali.

DESCRIPTION – AMMONIA

Protocol

#4

Ammonia in solution (NH₄ water, ammonia hydroxide) is used in a variety of products, e.g., cleaning agents. Anhydrous ammonia gas (liquefied) is used as a fertilizer and industrial refrigerant. Colorless gas with a pungent odor.

HEALTH/TOXICITY GAS (2) LIQUID (3)

HEALTH HAZARD

Varying degrees of irritation to eyes, skin or mucous membranes. May severely injure respiratory membranes with potential fatal results. Anhydrous Ammonia produces first through third degree burns on skin contact. Most dangerous consequence is pulmonary edema.

PROTECTION

When in gaseous form, wear SCBA. When liquefied, wear full PPE and SCBA.

SYMPTOMS

- Irritation of eyes and respiratory tract. High concentrations may cause Pulmonary Edema.
- Contact with skin causes burns.
- Ingestion is similar to other corrosive alkalis.
- Extensive systemic absorption may lead to coma.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- If ingested, dilute immediately with large quantities of water.
- Administer a demulcent, e.g., milk, (if ingestion has occurred within 30 minutes)
- Contaminated skin and eyes should be washed with running water for at least 15 minutes.
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Treat for pulmonary edema (see Pulmonary Edema Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS

DO NOT USE EMETICS.

DESCRIPTION - ANILINE

Protocol #

5

Colorless, oily liquid with a characteristic odor.

HEALTH/TOXICITY 3

HEALTH HAZARD

Highly toxic when absorbed through the skin, inhaled as a vapor, or swallowed. Excessive exposure may cause respiratory arrest. Causes hemoglobin conversion to methemoglobin, which cannot supply O₂ for body metabolism, resulting in cyanosis.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Gray blue cyanosis without signs of cardiac or pulmonary insufficiency.
- Headache, nausea, vomiting, dryness of throat
- CNS: confusion, ataxia, vertigo, weakness, tinnitus, disorientation, lethargy, drowsiness, coma.
- Cardiac arrhythmias
- Death, if it occurs, is usually a result of cardiovascular collapse.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Wash contaminated skin with soap and running water for 15 minutes.
- Administer O₂, 15 LPM by non-rebreather mask.
- If ingested within previously 30 minutes, administer 30ml Syrup of Ipecac P.O. Contraindicated in the patient who could rapidly become comatose, at risk of convulsing or vomiting.
- Administer Activated Charcoal in Sorbital, 50 gm P.O. Do not exceed 15 cc/kg in a child
- Monitor for shock. Treat as necessary
- Remove contact lenses.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer Methylene Blue 1-2 mg/kg Of 1% solution, IV slowly, if the patient is cyanotic and symptomatic.
- Treat cardiac dysrhythmias (see Arrhythmia Protocols).

DESCRIPTION - ARSENIC

Protocol #6

Arsenic is divided into three groups; Arsenic Compounds, Organic Arsenic Compounds, and Arsine Gas. Arsine Gas is the most toxic form and is colorless, nonirritating, inflammable gas with a slight *garlic odor*. Arsenic Powder is white with a garlic scent.

HEALTH/TOXICITY

HEALTH HAZARDS

Arsenic may injure multiple organs. Acute injury usually involves blood, brain, heart, kidneys, and gastrointestinal tract. A chronic toxicity may develop. Ingestion usually produces symptoms within thirty minutes, but onset may be delayed by ingestion with food. The clinical presentation generally reflects hypovolemia.

SOURCES OF EXPOSURE

Exposure can be by inhalation, ingestion, and dermal exposure. It can be mobilized from its natural sources and can be in contaminated seafood, well water, ventilation, smelting of metals, and combustion fossil fuels. It is used in the production of insecticides, herbicides and the metal industry, particularly the smelting of copper. It is used as a desiccant in the cotton industry, making wood preservatives, and animal feed additives. Recently, there has been the increasing potential for hazardous materials incidents in relation to the hazardous materials exposures in the micro electronics industries. Arsenic is used in the production of computer chips and used in communications and scientific instruments.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Dehydration, intense thirst, vomiting, diarrhea, fluid and electrolyte disturbances are common.
- Hypovolemia.
- Dryness of mucous membranes.
- Blood in the stools and black tarry stools may develop.
- Cough, dyspnea, and chest pain after ventilation exposure.
- CNS signs include confusion, delirium, encephalopathy, seizures, and death.
- Hemolysis of red blood cells.
- *Garlic-like odor* of the breath and feces may occur.
- Multiple chronic changes that occur of multiple organs.

TREATMENT

Basic Life Support

- Remove patient to fresh air.
- Remove contaminated clothing.
- Completely decontaminate the patient.
- Administer O₂, 15 LPM by non-rebreather mask.
- Flush the skin copiously with water and then wash with soap and water.
- For eye contamination, flush immediately with water for at least 15 minutes.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Treat seizures (see Seizure Protocol).
- Treat hypotension (see Hypotension Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

DESCRIPTION - BLISTER AGENTS

Protocol #7

Mustard and arsenical vesicants are oily liquids (colorless to dark brown) with varying odors:

Mustard - a garlic or horseradish odor.

Nitrogen mustard - none or fish, irritating odor.

Lewisite - fruity to geranium-like smell.

Arsenical vesicants - fruity to geranium-like smell.

HEALTH/TOXICITY 3

HEALTH HAZARD

Burns and blisters eyes, lungs and skin. Symptoms may not appear for several hours. However, Lewisite and Phosgene Oxime are painful immediately.

PROTECTION

Wear impermeable, PPE and SCBA.

SYMPTOMS

- If ingested, nausea, vomiting, pain, diarrhea.
- If inhaled, hoarseness, fever, dyspnea, laryngitis, bronchopneumonia, cough and pain in chest.
- Burns on skin, blisters surrounded by redness.
- In eyes, feeling of grit in eye, lacrimation, irritation, conjunctivitis.

TREATMENT

Basic Life Support

- Put on protective mask.
- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- For eye contamination, hold eyelids open and irrigate immediately with copious amounts of water.
For skin contamination:
- If Erythema of skin develops, wash skin with soap and water.
- Skin contamination from Phosgene Oxime, flush with copious amounts of water.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Skin contamination, use Bleach Slurry (1 part Bleach with 2-3 parts water) then vigorously wash with soap & water
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS

- Speed and volume (dilution) is essential in decontaminating the eye.

DESCRIPTION - BORON-HYDROGEN HALIDES

Protocol #8

A colorless, fuming acidic liquid at temperatures below 12-15°C (54.5°F) and atmospheric pressure. Above this temperature, it becomes a colorless gas that fumes in moist air. Others are gases at room temperature with sharp, suffocating odors.

HEALTH/TOXICITY 3

HEALTH HAZARDS

Inhalation will result in edema and irritation of the upper respiratory tract. Skin contact may cause severe tissue irritation and necrosis.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Irritation of nose and throat.
- Severe exposure will cause pulmonary edema.
- Skin irritation.
- Laryngeal spasm may occur.
- Rapid pulse, sweating and collapse may occur as a result of severe exposure.

TREATMENT

Basic Life Support

- Remove from contaminated area immediately.
- Remove, bag & tag contaminated clothing.
- Wash all areas of affected skin with copiously running water.
- If eyes are involved, irrigate with copious quantities of running water. Failure to do so immediately may result in impairment or loss of vision. Irrigation should continue for at least 15 minutes.
- Administer O₂, 15 LPM by non-rebreather mask.
- Be prepared to initiate CPR.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Watch for pulmonary edema (see Pulmonary Edema Protocol).
- Be prepared to initiate Cardiac Protocol in susceptible patients.
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

DESCRIPTION - CARBAMATES

Protocol # 9

Found in insecticides, herbicides and some medicinal agents.

HEALTH/TOXICITY 3

HEALTH HAZARD

Carbaryl containing insecticides are cholinesterase inhibitors.
Well absorbed from all routes of exposure.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS (SLUDGEM)

- Nausea, vomiting abdominal cramps, diarrhea and excessive salivation, sweating.
- Lassitude, weakness, and headache.
- If inhaled, may have tightness of the chest and rhinorrhea.
- Blurring of vision or dizziness.
- Loss of muscle coordination, development of muscle fasciculation, inability to walk.
- Difficulty in breathing/respiratory depression.

TREATMENT

Basic Life Support

- Maintain airway, suction may be required.
- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Do not induce emesis. May be dangerous as seizures or respiratory depression may develop rapidly.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child
- Administer O₂, 15 LPM by non-rebreather mask.
- Monitor for shock. Treat as necessary.
- Decontaminate skin by alternate washings of area with soapy water and alcohol.
- Irrigate eyes with water or saline.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride to counteract dehydration.
- Administer Atropine, 1 to 4 mg. IV or IM if no cyanosis is present
Additional Atropine may be required at intervals of 15 to 60 minutes.
- Treat seizures (see Seizure Protocol).
- Watch for pulmonary edema (see Pulmonary Edema Protocol).

PRECAUTIONS

- Wear rubber gloves when working with patient.
- Do not routinely use 2 PAM (Prolidoxine Chloride) with Carbaryl poisoning as it potentiates it. May be used in severe poisoning upon Medical Direction.

DESCRIPTION - CARBON DISULFIDE

Protocol #10

Clear, colorless, volatile liquid that has a strong disagreeable odor like decaying cabbage. Used in solvent; vapor form as a disinfectant and insecticide.

HEALTH/TOXICITY 2

HEALTH HAZARD

Toxic by oral intake, inhalation or prolonged contact with the skin. *Absorption occurs through all portals including intact skin. Relatively small quantities can be fatal.* Acute exposure to 60 to 100 ppm may result in severe intoxication and death within a short period of time.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Mild to moderate irritation of skin, eyes and mucous membranes. If evaporation is prevented, liquid acts as vesicant. Percutaneous absorption occurs. Dermal exposure results in severe burns.
- Headache.
- Garlic breath, nausea, vomiting, diarrhea, and occasionally abdominal pain.
- Weak pulse, palpitations.
- Fatigue, weakness, vertigo.
- Mania, hallucinations with massive vapor exposures.
- Pulmonary edema.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- Decontaminate skin area by washing thoroughly with soapy water.
- Do not induce emesis, because of the potential for CNS depression and seizures.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or INT.
- Administer Proventil 2.5mg via Nebulizer
- For severe agitation, administer Diazepam, 5-10 mg IV.
- Administer Morphine Sulfate, 2-10 mg IV.
- Treat seizures as indicated with Diazepam 5-10 mg (see Seizure Protocol).

PRECAUTIONS

- Avoid Amphetamines.

DESCRIPTION - CARBON MONOXIDE

Protocol #11

Combustible, non-irritating, colorless, tasteless and essentially odorless gas. Found wherever organic material is burned under conditions of incomplete combustion.

HEALTH/TOXICITY 2

HEALTH HAZARD

Carbon Monoxide is responsible for more instances of chemical poisoning than any other single element. Carbon Monoxide is not cumulative, but because of repeated exposure and associated oxygen deprivation, it may result in persistent neurological manifestations. CO binds with hemoglobin to form carboxyhemoglobin. Lower levels can be harmful to the fetus of a pregnant female patient.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- 100 ppm - No poisoning symptoms even after 8 hours.
- 200 ppm - Headache after 2-3 hours; collapse after 4-5 hours.
- 300 ppm - Headache after 15 hours; Distinct poisoning after 2-3 hours; collapse after 3 hours.
- 400 ppm - Distinct poisoning, frontal headache and nausea after 1-2 hours; collapse after 2 hours; death after 3-4 hours.
- 500 ppm - Distinct poisoning, frontal headache and nausea after 1-2 hours; collapse after 2 hours; death after 3-4 hours.
- 800 ppm - Hallucinations after 30-120 minutes.
- 1000 ppm - Difficulty in ambulation; death after 2 hours.
- Myocardial infarction.

TREATMENT

Basic Life Support

- Remove to fresh air.
- Administer O₂, 15 LPM by non-rebreather mask. Assist ventilations as necessary.
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Avoid stimulants,
- Cardiac arrhythmias (see Cardiac Protocol).

DESCRIPTION - CARBONYL SULFIDE

Protocol #12

A colorless, acidic, flammable gas, which is decomposed by water and bases, forming carbon dioxide and hydrogen sulfide. Other agents are gases with highly offensive odors.

HEALTH/TOXICITY 3

HEALTH HAZARDS

All agents are flammable, toxic and irritating to the eyes and mucous membranes. Some agents have hemolytic affect. Toxic action due to hydrogen sulfide gas produced by partial decomposition in lungs and after, absorption into blood.

SYMPTOMS

- Headache, giddiness, vertigo and confusion.
- GI disorders.
- Irritation of the eyes, mucous membranes of the nose.
- Loss of appetite and nausea.
- Concentrations of hydrogen sulfide above 600 ppm can cause respiratory paralysis and be fatal within 30 minutes.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Flush skin with water for at least 15 minutes.
- Administer O₂, 15 LPM by non-rebreather mask. Assist ventilations as necessary.
- Be alert for respiratory distress.
- Irrigate eyes with water for at least 15 minutes.
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Observe for pulmonary edema (see Pulmonary Edema Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

DESCRIPTION - CHLORATES

Protocol #13

Chlorates are strong oxidizers used in making dyes, explosives matches, fabric prints, weed killers and mouthwashes.

HEALTH/TOXICITY 2

HEALTH HAZARDS

Chlorates are toxic mainly through ingestion and inhalation, not through skin absorption. Irritates gastrointestinal mucosa, destroys blood cells, Methemoglobinemia and causes kidney failure. Oxygen-carrying capacity of blood is reduced. Fatal dose is about 50-500 gm. Chlorates should never be taken internally.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- If ingested, only sign may be pallor.
- Nausea, vomiting, abdominal cramping, diarrhea.
- Cyanosis, confusion, convulsions.
- Dermal exposure may cause burns.

TREATMENT

Basic Life Support

- Establish respiration.
- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- *If ingestion within previously 30 minutes*, administer 30ml Syrup of Ipecac P.O. Contraindicated in the patient who could rapidly become comatose, at risk of convulsing or vomiting.
- *If ingestion 30-60 min.* Administer Activated Charcoal in Sorbital, 50 gm P.O. Do not exceed 15 cc/kg in a child
- Contact Medical Control before administration of Ipecac or Charcoal.
- Wash contaminated area thoroughly with soap and water.
- For mild gastric irritation, give patient milk or sweetened drinks.

Advanced Life Support

- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.
- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer antidote to symptomatic patients, Sodium Thiosulfate (2-5 gm. in 200 ml. of 5% Sodium Bicarbonate IV or orally.)

PRECAUTIONS

- Methylene Blue IV may be used to correct Methemoglobinemia in the severely poisoned patient upon direct Medical Direction.

DESCRIPTION - CHLORINE

Protocol #14

Clear, amber-colored liquid or greenish-yellow gas; nonflammable, but strong oxidant with a disagreeable, suffocating, irritating odor.

HEALTH/TOXICITY 4

HEALTH HAZARD

Toxic and irritating to the skin, eyes and mucous membranes. Liquid causes severe irritation and blistering of skin.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Stinging, burning sensation in eyes, nose and throat.
- Headache.
- Redness of the face, lacrimation, sneezing, coughing and huskiness of voice.
- Pulmonary edema.
- Suffocation, constriction in chest and tightness of throat.
- Skin contact may result in ulceration and necrosis.

TREATMENT

Basic Life Support

- Remove from contaminated area at once.
- Remove, bag & tag contaminated clothing.
- Wash skin with copious amounts of water followed by large quantities of soap and water.
- Flush eyes with running water for at least 15 minutes.
- Observe for pulmonary edema (see Pulmonary Edema Protocol).
- Administer O₂, 15 LPM by non-rebreather mask.
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Treat for pulmonary edema (see Pulmonary Edema Protocol).
- Administer Sodium Bicarbonate IV for acidosis, 1 mEq/kg (see Cardiac Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.
 - o Irrigation continues until the pH returns to normal. Evaluation is done with pH paper.

PRECAUTIONS

- DO NOT attempt to neutralize Chlorine with chemicals.

DESCRIPTION - CONTACT INSECTICIDES

Protocol #15

Found as powder, liquids, in oil bases in both concentrated and dilute form.

HEALTH/TOXICITY 2

HEALTH HAZARD

Irritation of skin and eyes; undiluted liquid may produce severe cutaneous reaction. Respiratory arrest may occur. Massive skin contamination may produce systemic poisoning, local irritation and dermatitis.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- CNS depression, interrupted by periods of restlessness, tachypnea, and tonic convulsions.
- Kerosene poisoning signs and symptoms may be dominant.
- Respiratory arrest may occur.
- Local skin irritation and dermatitis.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Wash with running water for at least 15 minutes.
- If ingested, dilute with water; administer Syrup of Ipecac 30 cc to induce vomiting.
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Positive pressure O₂ in the event of pulmonary edema (see Pulmonary Edema Protocol).
- If convulsions occur, administer Diazepam, 5-10 mg, IV over three (3) minutes.

PRECAUTIONS

- *Do not use Adrenergic Amines, Aminophylline, Phenothiazides, Barbiturates.*

DESCRIPTION - CYANIDE

Protocol #16

Colorless liquid that may, or may not, have a pungent odor. In solid form, found in white lumps or crystals with a faint almond like odor. Cyanide salts mixed with dilute mineral acid produce hydrogen cyanide gas, which can be fatal if inhaled.

HEALTH/TOXICITY 4

HEALTH HAZARD

Extremely toxic. Death may occur within minutes. Toxic by inhalation, ingestion or skin absorption. Do not handle with bare hands. If contamination occurs, flush with copious amounts of water.

PROTECTION

Wear special protective clothing and SCBA. Upon any contact with skin or eyes, the materials should be washed immediately. Remove contaminated clothing.

SYMPTOMS

- Massive doses often produce sudden loss of consciousness and death from respiratory arrest.
- Smaller lethal doses may have symptoms delayed for an hour or more.
- Onset of anxiety, confusion, vertigo, giddiness. Often may experience a sensation of stiffness in the lower jaw.
- Odor of bitter almonds may be noted on breath.
- In early phases, BP increase, heart rate decreases; later pulse becomes rapid, weak and often irregular.
- Unconsciousness followed by convulsions.
- Paralysis, skin color brick red.
- Death from respiratory arrest.

TREATMENT

Basic Life Support

- Remove from contaminated atmosphere.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- Decontaminate skin immediately with soapy water.
- Do not induce vomiting.
- Maintain airway; be prepared to assist ventilations.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child
For acute / chronic ingestion
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- The following drugs are located in the Lilly Cyanide Kit
 - Administer by inhalation, Amyl Nitrite ampule for 30 seconds every minute, until Sodium Nitrite is administered.
 - Discontinue Amyl Nitrite; immediately inject IV, 10 ml of a 3% solution of Sodium Nitrite over a period of 2-4 minutes. Caution! Dose may be lethal in young children. Appropriate adjustment in dose should be made (child 0.15-0.33 ml/kg up to 10 ml).
 - Immediately after Sodium Nitrite administer 50 ml of a 25% solution of Sodium Thiosulfate. (Child 1.65 ml/kg of 25% solution).
- Cardiac Asystole (see Cardiac Arrest Protocol).
- Seizures (see Seizure Protocol).
- If symptoms reappear, injections of Sodium Nitrite and Sodium Thiosulfate may be repeated in one half the above doses.

PRECAUTIONS

Highly toxic to rescuers. Extreme caution must be taken.

DESCRIPTION - DDT (Dichloro Diphenyl Trichloroethane)

Protocol

#17

(ALL CHLORINATED HYDROCARBON INSECTICIDES)

Now banned from domestic use. However, still found in some areas and manufactured for export. Formulated as wettable powders, solutions, emulsions, aerosols and dusts in concentrations of 1 to 75%. Used as an insecticide.

HEALTH/TOXICITY 2

HEALTH HAZARD

Toxic. Acts primarily on the central nervous system.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

(Onset usually 2 to 3 hours after ingestion.)

- Large doses initiate vomiting.
- Paresthesias, usually first of lips, tongue and face.
- Malaise, headache, sore throat, fatigue.
- Coarse tremors, apprehension, ataxia, confusion.
- Convulsions.
- In severe cases, pulse may be irregular and slow.
- Ventricular Fibrillation and sudden death may occur at any time during the acute phase.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Decontaminate skin with soapy water, followed by 70% isopropyl alcohol washing, followed by washing with soapy water (total of three washings).
- Do not induce vomiting.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child
- Treat for shock.
- Irrigate exposed eye(s).

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer Diazepam 5-10 mg. IV, if tremors or convulsions occur (see Seizure Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

NOTE: Acute hazard potential may be ranked (highest to lowest approximately as: Endrin, Aldrin, Dieldrin, Chlordane, Toxophene, Kepone, Heptachlor, DDT, and Methoxychlor.

DESCRIPTION - ETHYLENE GLYCOL

Protocol #18

A heavy, toxic, colorless liquid with a sweetish, acrid taste. It is used in industrial solvents and in most permanent anti-freeze solutions.

HEALTH/TOXICITY 3

HEALTH HAZARD

Toxic CNS, eye and renal irritant. A dose (100 gm) can be damaging to brain and kidneys and can be fatal.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Initially may look very much like alcohol intoxication; slurred speech, ataxia, inebriation.
- Abdominal pain, nausea, and vomiting.
- Gradual lethargy, convulsions and coma may follow.
- Cyanosis, pulmonary edema, abnormal rapid breathing (tachypnea), and accelerated heart rate (tachycardia).
- Acidosis.
- Stupor, coma, death.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Do not induce vomiting.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child.
- Administer O₂, 15 LPM by non-rebreather mask.
- Eye contamination: hold lids open and flush immediately with a continuous stream of water for at least 15 minutes.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Pulmonary edema (see Pulmonary Edema Protocol).
- Seizures (see Seizure Protocol).
- Administer Sodium Bicarbonate IV for acidosis, 1 mEq/kg
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

DESCRIPTION - ETHYLENE OXIDE

Protocol #19

Colorless, extremely flammable, moderately toxic gas; in moderate concentrations the vapor has a sickening nauseating odor, whereas in high concentrations it is irritating.

HEALTH/TOXICITY 2

HEALTH HAZARD

Moderately toxic by inhalation; irritating to the eyes and mucous membranes. Dilute (1%) aqueous solutions can produce burns of the skin and eyes. Extremely flammable. Skin sensitization may occur from contact.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Low concentrations cause delayed nausea and vomiting.
- High concentrations produce general anesthetic effect.
- Coughing, vomiting.
- Irritation of eyes and pulmonary edema.
- Contact with skin DOES NOT cause immediate skin irritation. However, delayed skin burns can occur.

TREATMENT

Basic Life Support

- Remove immediately from contaminated area.
- Remove, bag & tag contaminated clothing.
- With skin exposure wash with copious amounts of water (e.g. hose/shower) then wash with soap and water.
- Administer O₂, 15 LPM by non-rebreather mask.
- If frostbite occurs, cover with warm hand or woolen material. Initiate rapid rewarming technique.
- Ingestion is unusual if it occurs do not induce vomiting. Administer Activated Charcoal in Sorbital, 50 gm P.O. Do not exceed 15 cc/kg in a child.
- Irrigate eyes with copious amounts of water for 15 minutes. If irritation persists, irrigate for another 15 minutes.
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Observe for lung congestion/shortness of breath.
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

DESCRIPTION - FLUORIDES

Protocol #20

The fluorides are gases with sharp, irritating odors. They are used in many industrial processes, e.g., in etching glass, in preventive dentistry and in rodenticides (i.e. rat and mouse poison). It is the most reactive of all non-metals

HEALTH/TOXICITY 4

HEALTH HAZARDS

Intensely toxic to skin, eyes, mucous membranes and respiratory system. Exposure to high concentrations of Fluorine and Interhalogen Fluoride is usually fatal, due to pulmonary edema and respiratory damage. Severe burns can be caused within seconds.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Irritation of eyes, eyelids, nose and skin.
- Coughing, choking.
- If ingested can cause: salivation, nausea, vomiting, diarrhea, abdominal pain.
- Painful burns.
- Cardiovascular collapse and pulmonary paralysis possible.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Decontaminate skin with soapy water for 15 minutes.
- For eye burns, wash with running water for 5 minutes; irrigate eyes with Normal Saline for 30-60 minutes.
- Administer O₂, 15 LPM by non-rebreather mask.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer Tums p. o. to bind Fluoride ion.
- Administer Calcium Gluconate 30-40cc Slow IV for serious exposures.
- Apply 2.5% Calcicum Gluconate Gel Topically for skin exposures.
- Observe for pulmonary edema (see Pulmonary Edema Protocol).
- Place patient on monitor. Observe for dysrhythmias.
- Place 2-3 drops Ophthetic (Proparacaine) in affected eye(s) and irrigate with one liter Normal Saline per eye, using Morgan Lens.

PRECAUTIONS

- Observe for circulatory collapse.
- Highly toxic for rescuers. **EXTREME CAUTION MUST BE TAKEN!**
- Do **NOT** use Morphine or Barbiturates for systemic reactions as they depress respiratory

drive.

DESCRIPTION - FLUOROCARBONS

Protocol #21

Fluorocarbons are colorless, flammable gases at room temperature; Dibromodifluoromethane is a nonflammable liquid. Bromotrifluoro-ethylene has a musty hay-like odor.

HEALTH/TOXICITY 2

HEALTH HAZARD

Members of this group are moderately toxic when inhaled, and may produce pulmonary edema. Bromotrifluoroethylene and Chlorotrifluoroethylene may cause frostbite on contact with skin.

PROTECTION

Wear full PPE, a full face shield, and SCBA.

SYMPTOMS

- Frostbite may develop if liquid bromotrifluoroethylene and Chlorotrifluoroethylene contact skin.
- Irritation of lungs.

TREATMENT

Basic Life Support

- Remove patient from contaminated area.
- Administer O₂, 15 LPM by non-rebreather mask.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Observe for Pulmonary Edema (see Pulmonary Edema Protocol).

DESCRIPTION - FORMALDEHYDE

Protocol #22

Formaldehyde is a colorless, pungent irritant gas (created by the oxidation of methyl alcohol) and used as a disinfectant, preservative or fumigant.

HEALTH/TOXICITY 2

HEALTH HAZARD

Irritant to eyes, skin and respiratory tract. Rapidly absorbed. A fatal dose is probably between 500-5000 mg.

PROTECTION

Wear full PPE, goggles for eye protection, and SCBA.

SYMPTOMS

- Burning sensation in chest followed by abdominal pain, cramps, occasional vomiting and diarrhea.
- Vertigo, stupor, coma, convulsions, shock.
- Coughing, irritation of respiratory tract.

TREATMENT

Basic Life Support

- Move patient to fresh air out of contaminated environment.
- Remove, bag & tag contaminated clothing.
- Administer 4-8 oz milk or water as a diluent, if ingested.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child.
- If eyes involved, irrigate with water for 15 minutes.
- Wash exposed area at least twice with soap and water.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer Diazepam, IV (up to 10 mg) for convulsions (see Seizure protocol).
- Treat for pulmonary edema (See Pulmonary Edema Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual lid retraction.

DESCRIPTION - HALOGENATED HYDROCARBONS

Protocol #23

Colorless liquid which yields heavy vapors of heavy, white, volatile, sweet-tasting liquid with a characteristic odor.

HEALTH/TOXICITY 3

HEALTH HAZARD

Highly toxic by ingestion or inhalation, slightly toxic by skin absorption. In high concentration, may cause narcosis and death. CCl₄ is probably the only one of the group, which is likely to be absorbed through intact skin in toxicologically significant quantities.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Prompt nausea, vomiting, and abdominal pain.
- Headache, dizziness, confusion, drowsiness, sometimes convulsions.
- Visual disturbances.
- Rapid progression of CNS depression.
- Occasional sudden death due to Ventricular Fibrillation.

TREATMENT

Basic Life Support

- Remove patient from contaminated area.
- Administer O₂, 15 LPM by non-rebreather mask.
- Keep patient at rest.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Watch for pulmonary edema (see Pulmonary Edema Protocol).

DESCRIPTION - HERBICIDES

Protocol #24

A Herbicide used mostly for control of woody weevils in non-edible crops and forests. It is moderately toxic.

HEALTH/TOXICITY 1

HEALTH HAZARD

Irritant to the skin, eyes, nose and throat. Toxic by ingestion, inhalation or absorption through the skin.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- If ingested, burning of mouth, esophagus and stomach.
- Fatigue, weakness, anorexia, perhaps nausea, vomiting and diarrhea.
- Muscle twitching and spasms, muscle weakness and stupor.
- Constricted pupils.
- Progressive decline in blood pressure.
- Cardiac dysrhythmias and arrhythmias, convulsions.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Decontaminate skin thoroughly with soapy water.
- Administer O₂, 15 LPM by non-rebreather mask.
- If ingested induce vomiting with Syrup of Ipecac, 30 cc P.O.. (Pediatric 15 cc P.O.) unless the patient is, or could rapidly become, obtunded, comatose, or convulsing.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
- Monitor for shock. Treat as necessary.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer Diazepam, 5-10 mg. IV or IM (see Seizure Protocol).
- For hypotension administer I.V. fluids then Dopamine as required. Follow Hypotension Protocol.
- Methemoglobinemia - 1-2 mg/kg of 1% Methylene Blue IV slowly.
- Cardiac arrhythmias (see Cardiac Protocol).

PRECAUTIONS

- Leather absorbs Pesticides and Herbicides and should not be worn in their presence.

DESCRIPTION - HEXAFLUORACETONE

Protocol #25

Hexafluoracetone is a highly toxic, nonflammable, colorless gas with a pungent odor that fumes when exposed to moist air.

HEALTH/TOXICITY 3

HEALTH HAZARD

Hazardous to the fetus. (Pregnancy hazard exposure) Vapors are toxic and irritating to the eyes, nose, throat, lungs and skin. Aqueous solutions are toxic through skin absorption.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Irritation of skin, eyes, nose and throat.
- Labored breathing.

TREATMENT

Basic Life Support

- Remove patient from contaminated area to fresh air.
- Create open airway. Administer O₂, 15 LPM by non-rebreather mask.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer Diazepam 5-10 mg IV slowly.
- Watch for pulmonary edema (see Pulmonary Edema Protocol).
- Anticipate to provide circulatory support (see Cardiac Protocols).

DESCRIPTION - INCAPACITATING AGENTS

Protocol #26

The incapacitating agents are odorless and can be disseminated by smoke-producing munitions or aerosols. They produce temporary mental and physical symptoms.

HEALTH/TOXICITY 2

HEALTH HAZARD

Can be absorbed through the respiratory tract and skin. The anticholinergics and cannabinoids sedate and destroy motivation; the indoles (category of drug) cause excessive nervous activity.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Dilation of pupils and blurring of vision.
- Dryness of nose, mouth, throat and skin.
- Flushed face.
- Tachycardia, elevated blood pressure.
- Urinary retention.
- Headache, giddiness, drowsiness, disorientation, hallucinations, and occasional maniacal behavior.
- Ataxia and lack of coordination.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Wash contaminated skin thoroughly with soap and water
- If body temperature is elevated above 102⁰ F, vigorous cooling is necessary with water evaporation.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- For anticholinergics, administer Atropine 1-4 mg IV or IM.
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS

- **DO NOT** use Barbiturates, Phenothiazines and other sedatives since they will potentiate the effect of these depressant compounds.

DESCRIPTION - METHYL AND AMMONIUM BROMIDE Protocol #27

Colorless, odorless gas, except in high concentrations which it has a sweetish, chloroform-like odor.

HEALTH/TOXICITY 4

Highly toxic upon inhalation. Contact of liquid or vapor with skin or eyes can cause severe irritation and injury.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Onset of symptoms may be delayed from one half to several hours.
- Fatigue, headache, dizziness, nausea, vomiting.
- Hearing and vision disturbances.
- Mental confusion, mild convulsions.
- Muscular weakness, collapse.
- Respiratory difficulties.
- Coma.
- Death is usually due to pulmonary damage.

TREATMENT

Basic Life Support

- **SPEED IS ESSENTIAL**
- Remove immediately from contaminated area.
- Remove, bag & tag contaminated clothing.
- Wash the affected skin at least twice with soap and water. Blistered areas should be treated as burns.
- If eyes are involved, irrigate immediately with large quantities of water for a minimum of 15 minutes.
- Administer O₂, 15 LPM by non-rebreather mask.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO and an INT.
- Treat for pulmonary edema (see Pulmonary Edema Protocol).
- Administer Diazepam 5-10 mg IV or IM (see Seizure Protocol).

PRECAUTIONS

- Do **NOT** use drugs that will interfere with the respiratory center.
- Methyl Bromide can penetrate ordinary rubber gloves.

DESCRIPTION - METHYL ETHERS

Protocol #28

Colorless, highly flammable gases at room temperature and sea-level atmospheric pressure with sweet odor.

HEALTH/TOXICITY 1

HEALTH HAZARDS

Anesthetic properties may cause dizziness or suffocation. Contact will cause severe frostbite.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

Dizziness, headache, blurred vision.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Administer O₂, 15 LPM by non-rebreather mask.
- If eyes are affected, wash with continuous stream of water for at least 15 minutes.
- If frostbite occurs, cover area with warm hand or woolen material. Initiate rapid rewarming techniques.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Be prepared to initiate Cardiac Protocol.
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS

Skin contact of Methyl Vinyl Ether can cause frostbite.

DESCRIPTION - METHYL MERCAPTAN (HYDROGEN SULFIDE)

Protocol #29

Methyl Mercaptan is a colorless, highly flammable, toxic gas with an extremely disagreeable odor. It is used as a warning odor in natural gas.

HEALTH/TOXICITY 2

HEALTH HAZARD

Attacks the CNS causing muscular weakness, unconsciousness and respiratory paralysis.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Both liquid and vapor mercaptan irritate the eyes and skin.
- Irritation of the mucous membranes.
- Occasionally convulsions, pulmonary irritation and paralysis of the respiratory muscles, cyanosis.
- Fever, coma, depression of CNS, and seizures.

TREATMENT

Basic Life Support

- Immediately remove patient from contaminated area.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- Wash contaminated areas of skin with copious amounts of water for at least 15 minutes.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Watch for pulmonary edema (see Pulmonary Edema Protocol).
- Treat seizures (see Seizure Protocol).
- Treat hypotension (see Hypotension Protocol).

NOTE

Amyl Nitrite by inhalation and IV Sodium Nitrite may be beneficial by forming Sulfmethemoglobin, thus removing Sulfide. **DO NOT USE** Sodium Thiosulfate, (controversial). Contact Medical Control. These medications are located in the Lilly Cyanide Kit.

DESCRIPTION - NAPHTHALENE

Protocol #30

A white crystalline solid used as a moth repellent and used in dye manufacturing.

HEALTH/TOXICITY 3

HEALTH HAZARD

Toxic irritant known to cause red blood cell hemolysis and irritation to the mucous membranes of the eyes. The clinical toxification syndrome includes eye irritation, headache, confusion, nausea, and even renal failure. Naphthalene vapor causes mucous and eye irritation at 5 ppm.

Skin contact can cause dermatitis. Ocular irritation and cataracts have been described in humans with prolonged exposure. Sources of exposure usually follow ingestion but can occur after dermal or inhalation exposure.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Headache, listlessness, lethargy.
- Nausea and vomiting.
- Hemolysis, jaundice.
- Eye irritation.
- Facial flushing.
- Tachycardia.
- Seizures and coma.
- Redness and dermatitis of the skin.

TREATMENT

Basic Life Support

- Remove patient to fresh air.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- If ingested induce vomiting with Syrup of Ipecac, 30 cc P.O.. (Pediatric 15 cc P.O.) unless the patient is, or could rapidly become obtunded, comatose, or convulsing.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
- For eye contamination, flush immediately with continuous stream water for at least 15 minutes.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- May cause Methemoglobinemia and require treatment with 1% Methylene Blue IV, 2 mg/kg body weight slowly.
- Treat seizures with Diazepam 5-10 mg. IV (see Seizure Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

DESCRIPTION - NITRITES

Protocol #31

Salts used to preserve meats and to reduce blood pressure. Well water contaminated from fertilizer can cause nitrite poisoning in infants and children.

HEALTH/TOXICITY 3

HEALTH HAZARD

Toxic. May cause cyanosis due to hemoglobin oxidizing methemoglobin.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Nausea, vomiting, diarrhea, and crampy abdominal pain.
- Decrease in blood pressure (hypotension) and tachycardia.
- Cyanosis.
- Convulsions, vertigo, and coma possible.
- Nervous symptoms.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- Wash exposed area at least twice with soap and water.
- Keep patient in shock position and comfortably warm.
- Do not induce vomiting.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child
- For eye contamination, irrigate eyes continuously with water for 15 minutes.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Treat seizures with Diazepam 5-10 mg IV (see Seizure Protocol).
- Treat cyanosis with 1% Methylene Blue, 2 mg/kg IV slowly.
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS

- DO NOT use Epinephrine, Dopamine, etc.

DESCRIPTION - NITROSYL CHLORIDE

Protocol #32

Nitrosyl Chloride is a yellow to reddish-brown non-flammable toxic gas having a highly irritating odor. These vapors should be a warning sign of dangerous concentrations of this gas.

HEALTH/TOXICITY 3

HEALTH HAZARD

Toxic upon inhalation and irritating to eyes, skin and respiratory tract. Hydrochloric Acid and Nitrous Acid are formed when Nitrosyl Chloride is exposed to moisture. Nitrous Acid decomposes quickly at body temperature to form the toxic gases, Nitrogen Dioxide and Nitric Oxide.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Irritation of skin, eyes, and mucous membranes.

TREATMENT

Basic Life Support

- Remove patient from contaminated area.
- Remove, bag & tag contaminated clothing.
- Keep patient warm and quiet.
- Administer O₂, 15 LPM by non-rebreather mask.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Watch for pulmonary edema (see Pulmonary Edema Protocol).

DESCRIPTION - ORGANOPHOSPHATES

Protocol #33

Organophosphates: used as insecticides. May be in powder or liquid form.

HEALTH/TOXICITY 4

HEALTH HAZARD

Organophosphates are absorbed through the gut and skin and can be highly toxic when absorbed. Those used in agriculture are generally the most toxic; household pest controls are usually less toxic.

PROTECTION

Wear full protective impermeable clothing (no leather, as leather absorbs pesticides) and SCBA.

SYMPTOMS

- Abdominal pain, diarrhea, nausea, vomiting, increased salivation.
- Mental confusion, muscular in coordination, sweating, tremors, muscle spasms, weakness.
- Blurred vision, dizziness, headache, drowsiness, contraction of pupils (miosis).
- Cardiac irregularity, chest pain, bradycardia.
- Cyanosis possible.
- Low level absorption may produce influenza-like symptoms; high level absorption can produce symptoms similar to alcoholism.

TREATMENT

Basic Life Support

- Remove from contaminated area to fresh air.
- Support airway, suction secretions.
- Remove, bag & tag contaminated clothing, discard all leather, and wash hair and skin three times with soap and water.
- Irrigate eyes with running water for at least 15 minutes.
- Administer O₂, 15 LPM by non-rebreather mask.
- Do not induce vomiting.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Treat seizures with Diazepam 5-10 mg IV slowly; repeating if necessary (see Seizure Protocol).
- If symptomatic, administer Atropine Sulfate until secretions have dried. Adult dose Atropine 2-5 mg IV every 5-10 minutes. Child dose Atropine 0.05 mg/kg every 5-10 minutes.
- Monitor cardiac function closely (see Cardiac Protocol).
- Treat severe poisoning (profound muscle/diaphragmatic weakness, respiratory depression, coma, seizures) with Pralidoxime (Protopam, 2-Pam) in addition to Atropine. Adult dose Pralidoxime 1-2 gm mixed in 100cc D5W. Infusion rate is to be at 0.5 gm./min. Child dose Pralidoxime 25-50 mg./kg mixed in 100cc D5W. Infusion rate is to be over 5-30 minutes.

- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS

- **DO NOT** use Adrenergic Amines, Aminophylline, Succinylcholine, Phenothiazines, Barbiturates and other Tranquilizers, Reserpine Alkaloid or oils that enhance absorption.

DESCRIPTION - PARAFFIN HYDROCARBONS

Protocol #34

Colorless, flammable, non-toxic gases with characteristic odors.

HEALTH/TOXICITY 1

HEALTH HAZARDS

Simple asphyxiants, irritants or anesthetics at very high concentrations. Mildly irritating to the mucous membranes. Pose a significant hazard because they lower the concentration of oxygen below safe breathing levels. Liquefied forms may cause frostbite on contact with the skin.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Drowsiness
- Dizziness
- High concentrations of 1,3-Butadiene has anesthetic effects that cause respiratory paralysis and death.
- Contact with liquefied form will cause freezing burns.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Administer O₂, 15 LPM by non-rebreather mask.
- If frostbite has occurred, cover affected area with warm hand or woolen materials. Initiate rapid rewarming procedure as required.

Advanced Life Support

- If massive exposure, initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Be prepared to initiate Cardiac Protocol if patient is highly susceptible.

DESCRIPTION - PETROLEUM PRODUCTS

Protocol #35

Liquids used as fuels and solvents.

HEALTH/TOXICITY 3

HEALTH HAZARD

Fat solvents that cause CNS depression, coma and pulmonary irritation. Poisoning occurs through ingestion or inhalation. Toxicity is increased when combined with benzene, pesticides, camphor, or halogenated compounds. **Ingestion of 10 ml may be fatal!**

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

Inhalation:

- Temporary euphoria, burning sensation in chest.
- Headache, nausea
- Weakness, restlessness
- Confusion, drowsiness

Ingestion:

- Burning sensation in mouth
- Vomiting, diarrhea with bloody feces (stools)

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Administer O₂, 15 LPM by non-rebreather mask.
- Do not induce vomiting.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.

PRECAUTIONS

- Avoid epinephrine.
- Avoid alcohol.
- Care must be taken to prevent aspiration. **DO NOT INDUCE VOMITING!**

DESCRIPTION - PHENOL

Protocol #36

Also called Carboic Acid is obtained from petroleum as a naturally occurring compound as well as by oxidation. It occurs naturally in animal wastes and is produced by decomposition of organic wastes. It is a crystalline solid, and is water soluble in most organic solvents. It is very volatile. Most toxic effects occur from dermal and oral exposure. It has a distinctive odor.

HEALTH/TOXICITY 3

HEALTH HAZARD

Toxic irritant causing necrosis of mucous membranes, cerebral edema and degenerative changes in liver and kidney. Rapidly absorbed through the skin, by ingestion or by inhalation.

EXPOSURE SOURCES

Occupations associated with Phenol exposure are: iron and steel industries, leather tanning industries, Aluminum forming industries, electrical industries, pharmaceuticals, organic and plastic manufacturing, paint and ink formulation industries and rubber industries. Phenol used for medicinal uses includes: mouthwashes, throat lozenges, Phenol containing ointments, nose and eardrops, analgesic rubs, and antiseptic lotions. It is found in surface water, ground water, rain water, and drinking water, as well as urban water, and water in and around hazardous waste sites. It also enters the environment from natural sources such as coal tar as well as chemical waste from industries. It is released from paper pulp mills and wood treatment facilities. It is also used as a general disinfectant.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

Concentrated Phenol is extremely corrosive and may cause oral and esophageal burns following ingestion. Ocular and dermal contact may result in severe burns.

- Nausea, vomiting and diarrhea.
- Skin and mucous membranes become pale, intense burning.
- Bloody diarrhea, weakness.
- Hyperactivity, convulsions, profuse sweating, intense burning.
- Headache, dizziness, ringing in ears.
- Tachycardia, hypotension.
- Odor of Phenol on the breath.
- Coma may occur within 30 minutes of exposure of skin to Phenol.

TREATMENT

Basic Life Support

- Remove patient to fresh air.
- Remove, bag & tag contaminated clothing. Decontamination should be done to skin that's been exposed to Phenol with copious irrigation of water and washing at least twice with soap and water.
- Administer O₂, 15 LPM by non-rebreather mask.

- For ingestion, dilution actually enhances Phenol and should be avoided!
Immediately administer Activated Charcoal in Sorbital, 50 gm P.O.

- Wash exposed skin at least twice with soap and water.
- For eye contamination, flush immediately with a continuous stream of water for at least 15 minutes.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer 1% Methylene Blue IV, 2 mg/kg body weight, slowly.
- Treat seizures with Diazepam 5-10 mg. IV (see Seizure Protocol).
- Cardiac dysrhythmias and arrhythmias (see Cardiac Protocol).
- Administer Morphine 2-10 mg IV or IM to relieve pain.
- If at all possible, do **not** induce vomiting. Danger of inducing vomiting presents a risk of aspiration and consequent poisoning by inhalation.

NOTE

Phenol is rapidly absorbed through the skin; therefore it is imperative that immediate decontamination of the skin is done. It can also be very toxic and an acute ingestion of as low as 1 gram of pure Phenol in adults has resulted in death.

DESCRIPTION - PHOSGENE

Protocol #37

Phosgene is a colorless, nonflammable, highly toxic gas with an odor like that of freshly mown hay. When liquified, it becomes a light yellow liquid. Phosgene is often released in the atmosphere after combustion of Chlorinated Hydrocarbons.

HEALTH/TOXICITY 4

HEALTH HAZARDS

Phosgene is extremely toxic and presents a severe hazard. It is a strong lung irritant and damages the alveoli of the lungs. An atmosphere containing 25 ppm for 30 minutes is very dangerous; 90 ppm is fatal.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Choking, immediate coughing, bloody sputum, tightness of chest, lacrimation, dyspnea, cyanosis and weakness.
- Serious symptoms may not develop for several hours after exposure.

TREATMENT

Basic Life Support

- Remove patient from contaminated area and remove clothing bag and tag for collection. (Decreases potential off gassing to rescue or health care providers).
- Decontaminate skin and eyes.
- Keep patient at rest. (Exertion, even light exertion, can increase the symptoms and worsen the side effects i.e. pulmonary edema)
- Administer O₂, 15 LPM by non-rebreather mask.

Advanced Life Support

- Initiate IV 0.9% Sodium Chloride at KVO, or an INT.
- Watch for pulmonary edema (see Pulmonary Edema Protocol).
- Cardiac dysrhythmias (see Cardiac Protocol).

DESCRIPTION - PHOSPHINE

Protocol #38

Phosphine is a colorless, flammable, highly toxic gas (particularly to the organs of high oxygen flow and demand) and has a characteristic odor of decaying flesh.

HEALTH/TOXICITY 3

HEALTH HAZARD

Irritant to mucous membranes of mouth, throat and respiratory tract. May be damaging to brain, kidneys, liver and heart.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Fatigue, headache, drowsiness, dizziness, paresthesia.
- Nausea, vomiting.
- CNS depression, seizures, coma.
- Dyspnea, cough.

TREATMENT

Basic Life Support

- Remove patient from contamination and contaminated area.
- Remove clothing and bag and tag it for collection. (Done to decrease off gassing of product to rescue or health care providers).
- Decontaminate skin and eyes.
- Administer O₂, 15 LPM by non-rebreather mask.
-

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Administer Diazepam 5-10 mg IV slowly (see Seizure Protocol).
- Treat for pulmonary edema (see Pulmonary Edema Protocol).
- Treat/anticipate need for following cardiac protocol.

PRECAUTIONS

- For acute intoxication: Discontinue all drugs, give no Alcohol, Barbiturates, Sulfonamides, Narcotics, Salicylates, or Phenothiazines.

DESCRIPTION - STRYCHNINE

Protocol #39

Strychnine is a bitter tasting alkaloid, component of various tonics and laxatives, and is used as a Rodenticide.

HEALTH/TOXICITY 4

HEALTH HAZARD

Toxic. Strychnine, readily absorbed by the gastrointestinal tract, is a potent convulsant and CNS stimulant, exciting all parts of the CNS. It has a rapid absorption rate. < 5 mg is a lethal dose.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Greatly increased reflex excitability in spinal cord, causing muscles contractions.
- Excitation of all central nervous system. Convulsions and muscle spasms occur within 15-20 minutes following ingestion.
- Asphyxia from respiratory failure.
- Sudden tetanic convulsions of entire body; cyanosis of face and lips.
- Pulse slow and strong; death in 1-3 hours.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Decontaminate skin with soap and water washing.
- **Do not induce vomiting.**
- Administer Activated Charcoal in Sorbital, 50 gm P.O. if ingestion has occurred within the previous 15 minutes. Do not exceed 15 cc/kg in a child
- Administer O₂, 15 LPM by non-rebreather mask.
- Be prepared to assist respirations.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Treat seizures with Diazepam 5-10 mg IV (see Seizure Protocol).

PRECAUTION

- Patient and environment must be keep absolutely quiet to prevent onset of convulsions.

DESCRIPTION - TOLUENE

Protocol # 40

Used as solvents in glues, paint removers, degreasers and pesticides.

HEALTH/TOXICITY 3

HEALTH HAZARD

Irritant to skin, eyes and mucous membranes. Is rapidly absorbed by inhalation and ingestion, but less through the skin. Large amounts depress the central nervous system and bone marrow, create anemia and degeneration of the heart, liver and adrenals. Death can occur from respiratory failure.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Inhalation may cause headache, giddiness, muscular incoordination, or coma.
- Tightness of chest, coughing and hoarseness can occur.
- Blurred vision.
- Shallow and rapid respiration.
- Ingestion may result in a burning sensation in mouth and stomach, nausea, salivation and vomiting.

TREATMENT

Basic Life Support

- Remove from contaminated area to fresh air.
- Remove, bag & tag contaminated clothing.
- Do not induce vomiting.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child
- Wash exposed skin at least twice with soap and water.
- Irrigate exposed eyes copiously with water for 15 minutes.
- Administer O₂, 15 LPM by non-rebreather mask.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- For acidosis, consider administering Sodium Bicarbonate, 1 mEq/kg IV for prolonged exposures.
- Treat seizures with Diazepam 5-10 mg IV (see Seizure Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS

- **AVOID epinephrine!**
- Toluene reacting with nitric acid in the presence of Sulfuric Acid can cause an extremely violent reaction.

- Treatment is symptomatic and supportive. No specific antidotes are known.

DESCRIPTION - TURPENTINE

Protocol #41

Common solvent used for removing paint stains and mixing paint.

HEALTH/TOXICITY 1

HEALTH HAZARD

A central nervous depressant and is readily absorbed from the gastrointestinal tract, skin and respiratory tract. May cause congestion and edema in the lungs, brain and gastric mucosa, but death is usually due tachycardia. Probable lethal dose is 500 mg - 5 gm.

PROTECTION

Wear rubber gloves.

SYMPTOMS

- Odor of turpentine on breath and vomiting.
- Burning pain in throat, abdominal pain, nausea, vomiting.
- Coughing, dyspnea, cyanosis.
- Excitement, ataxia, dizziness.

TREATMENT

Basic Life Support

- Remove from contaminated area.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- Wash skin with soap and water. Decontaminate eyes by irrigating with water.
- If ingested, induce vomiting with Syrup of Ipecac, 30 cc P.O.. (Pediatric 15 cc P.O.) unless the patient is or could rapidly be obtunded, comatose, or convulsing.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- Watch for pulmonary edema (see Pulmonary Edema Protocol).
- Treat seizures (see Seizure Protocol).
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.

PRECAUTIONS: Avoid Morphine as it is a possible CNS depressant.

DESCRIPTION - VINYL CHLORIDE

Protocol #42

Vinyl chloride is a colorless, highly flammable gas with a *pleasant, sweet odor*. Vinyl Chloride monomer is the raw material used for the production of Polyvinyl Chloride (PVC), one of the major plastics.

HEALTH/TOXICITY 3

HEALTH HAZARD

Toxic, and in large quantities, carcinogenic. Liquid Vinyl Chloride may cause severe skin irritation and burns.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- Drowsiness, blurred vision, staggering gait, tingling and numbness in hands and feet, and CNS depression.

TREATMENT

Basic Life Support

- Remove patient from contaminated area.
- Remove, bag & tag contaminated clothing.
- Administer O₂, 15 LPM by non-rebreather mask.
- Wash all affected areas of skin with soap and water for at least 15 minutes.
- Keep patient quiet and comfortably warm.
- For eye contamination, hold lids open and irrigate eyes with copious amounts of water for at least 15 minutes.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride, KVO or an INT.
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual lid retraction.
- Monitor mental status and respiratory system.

DESCRIPTON - ZINC

Protocol #43

Zinc salts used in antiseptics, deodorants and smoke generators are very toxic. Zinc Cyanide, a white tasteless powder with the odor of bitter almond, is used in insecticides.

HEALTH/TOXICITY 3

HEALTH HAZARD

Zinc Oxide fumes can produce "metal fume fever", with flu-like symptoms that usually abate within 12-24 hours. Zinc Chloride fumes can be lethal. Eye exposure from zinc salts can result in erosion of the cornea.

PROTECTION

Wear full PPE and SCBA.

SYMPTOMS

- From inhaling fumes, flu-like symptoms (fever, chills and vomiting) start a few hours after inhalation of Zinc Oxide.
- If ingested, Zinc Salts, particularly Zinc Chloride and Phosphide, initiate violent vomiting, diarrhea, shock, collapse and death; Zinc Sulfate can produce a burning sensation in the mouth and throat.

TREATMENT

Basic Life Support

- Remove patient from contaminated area.
- Remove, bag & tag contaminated clothing.
- If recent ingestion, < 30 min., induce vomiting with Syrup of Ipecac, 30 cc P.O. (Pediatric 15 cc P.O.) unless the patient is, or could rapidly become, obtunded, comatose, or convulsing.
- Administer Activated Charcoal in Sorbital, 50 gm P.O.
Do not exceed 15 cc/kg in a child
- For eye contamination, irrigate with copious amounts of water.

Advanced Life Support

- Initiate I.V., 0.9% Sodium Chloride at KVO or an INT.
- For pain, administer Morphine 2-10 mg IV.
- For eye exposures administer 2-3 drops of Proparacaine Hydrochloride Ophthalmic Solution 0.5% to each affected eye, then continuously irrigate with Normal Saline using Morgan Lens or manual retraction.