

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF ENVIRONMENTAL RESPONSE AND REMEDIATION

*Illegal Drug Operations Site Reporting and Decontamination Act,
Decontamination Specialist Certification Program*

Decontamination Specialist Training Manual

March 2022

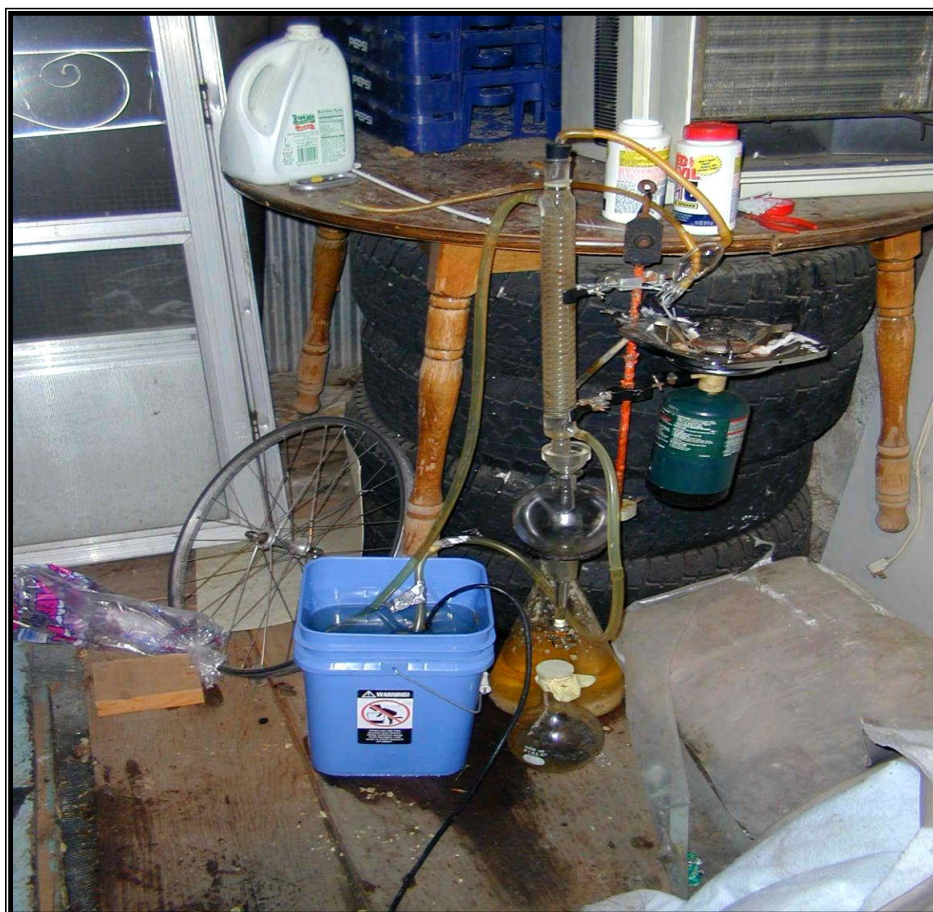


Photo courtesy of Salt Lake City Police Department Meth Initiative

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ACKNOWLEDGEMENTS

This training manual contains information from other states that have been impacted by clandestine drug labs. We thank states such as Arkansas, California, Colorado, Minnesota, Missouri, New Mexico, Oklahoma, Oregon, Tennessee and Washington for their publications and on-going efforts.

We also thank the Utah Legislature for the passage of the Illegal Drug Operations Site Reporting and Decontamination Act during the 2004 General Session and our many stakeholders in Utah that provided valuable feedback on the Decontamination Specialist Certification Program rules and this training manual. Our stakeholders include members of the Solid and Hazardous Waste Control Board and representatives from the Utah Substance Abuse Anti-Violence Coordinating Council, Department of Health and local health departments as well as members from the real estate, law enforcement and consulting/engineering communities.

NOTICE

This document was prepared by the Utah Department of Environmental Quality, Division of Environmental Response and Remediation to assist our customers with the certification exam noted in R311-500.

The Utah Department of Environmental Quality, Division of Environmental Response and Remediation revoked R311-501, Illegal Drug Operations Site Reporting and Decontamination Act, Contesting an Initial Order or Notice in September 2010. This rule outlined a process to contest a decision by the Executive Secretary to deny an application submitted under Title 19 Chapter 6 Part 9, Illegal Drug Operations Site Reporting and Decontamination Act or revoke a Certificate issued under R311-500-6. R311-501 was revoked in order to ensure the DERR's certification procedures under the Illegal Drug Operations Site Reporting and Decontamination Act are consistent with the Utah Administrative Procedures Act. Until new rules are adopted, decontamination specialists will be afforded due process by following the provisions of UAPA and the Environmental Quality Code.

The Utah Department of Health promulgated a new Methamphetamine Decontamination Standard in June 2017 and August 2018. This document has been updated to reflect the changes in the Standard.

Currently, the [State Rule 392-600](#) addresses both properties that have been seized by the police as clandestine drug labs as well as use sites. Certain local health departments have created ordinances outlining their procedures. For jurisdictions where local ordinances have not been created, the Department of Health recommends using the [State Rule 392-600](#) as guidelines for remediation.

We welcome comments and recommendations to make the training manual as useful and user friendly as possible. Please direct questions as well as any comments or recommendations to:

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DEFINITIONS

• The following definitions apply to R392-600:

- (1) "Background concentration" means the level of a contaminant in soil, groundwater or other media up gradient from a facility, practice or activity that has not been affected by the facility, practice or activity; or other facility, practice or activity.
- (2) "Decontamination specialist" means an individual who has met the standards for certification as a decontamination specialist and has a currently valid certificate issued by the Waste Management and Radiation Control, as defined under Utah Code Subsection 19-6-906(2).
- (3) "Chain-of-custody protocol" means a procedure used to document each person that has had custody or control of an environmental sample from its source to the analytical laboratory, and the time of possession of each person.
- (4) "Characterize" means to determine the quality or properties of a material by sampling and testing to determine the concentration of contaminants, or specific properties of the material such as flammability or corrosiveness.
- (5) "Combustible" means vapor concentration from a liquid that has a flash point greater than 100 degrees F.
- (6) "Composite sample" means the combination of up to 3 individual wipe (grab) samples into one submission for analysis by a laboratory. The composite sample result will be the average or standardized result in units of micrograms of methamphetamine per 100 square centimeters.
- (7) "Confirmation sampling" means collecting samples by a certified decontamination specialist during a preliminary assessment or upon completion of decontamination activities. Only confirmation sampling can be used to confirm that contamination is not above the decontamination standards outlined in this rule.
- (8) "Contaminant" means a hazardous material.
- (9) "Contamination" or "contaminated" means: a) polluted by hazardous materials that cause property to be unfit for human habitation or use due to immediate or long-term health hazards; or b) that a property is polluted by hazardous materials as a result of the use, production, or presence of methamphetamine in excess of decontamination standards adopted by the Department of Health under Section 26-51-201, as defined under Utah Code Subsection 19-6-902(3).
- (10) "Corrosive" means a material such as acetic acid, acetic anhydride, acetyl chloride, ammonia (anhydrous), ammonium hydroxide, benzyl chloride, dimethylsulfate, formaldehyde, formic acid, hydrogen chloride/hydrochloric acid, hydrobromic acid, hydriodic acid, hydroxylamine, methylamine, methylene chloride (dichloromethane, methylene dichloride), methyl methacrylate, nitroethane, oxalylchloride, perchloric acid, phenylmagnesium bromide, phosphine, phosphorus oxychloride, phosphorus pentoxide, sodium amide (sodamide), sodium metal, sodium hydroxide, sulfur trioxide, sulfuric acid, tetrahydrofuran, thionyl chloride or any other substance that increases or decreases the pH of a material and may cause degradation of the material.
- (11) "Decontamination" means treatment or removal of contamination by a decontamination specialist or owner of record to reduce concentrations of contaminants so the results are not above the decontamination standards.

DEFINITIONS

- (12) "Decontamination standards" means the levels or concentrations of contaminants that must be met to demonstrate that contamination is not present or that decontamination has successfully removed the contamination.
- (13) "Delineate" means to determine the nature and extent of contamination by sampling, testing, or investigating.
- (14) "Easily cleanable" means an object and its surface that can be cleaned by detergent solution applied to its surface in a way that would reasonably be expected to remove dirt from the object when rinsed and to be able to do so without damaging the object or its surface finish.
- (15) "Ecstasy" means 3,4-methylenedioxy-methamphetamine (MDMA).
- (16) "EPA" means the United States Environmental Protection Agency.
- (17) "EPA Method 8015B" means the EPA approved method for determining the concentration of various non-halogenated volatile organic compounds and semi-volatile organic compounds by gas chromatography/flame ionization detector.
- (18) "EPA Method 6010B" means the EPA approved method for determining the concentration of various heavy metals by inductively coupled plasma.
- (19) "EPA Method 8260B" means the EPA approved method for determining the concentration of various volatile organic compounds by gas chromatograph/mass spectrometer.
- (20) "FID" means flame ionization detector.
- (21) "Flammable" means vapor concentration from a liquid that has a flash point less than 100 degree F.
- (22) "Grab Sample" means one sample collected from a single, defined area or media at a given time and location.
- (23) "Hazardous materials" has the same meaning as "hazardous or dangerous materials" as defined in Section 58-37d-3; and includes any illegally manufactured controlled substances.
- (24) "Hazardous waste" means toxic materials to be discarded as directed in 40 CFR 261.3.
- (25) "HEPA" means high-efficiency particulate air and indicates the efficiency of an air filter or air filtration system.
- (26) "Impacted groundwater" means water present beneath ground surface that contains concentrations of a contaminant above the UGWQS.
- (27) "Impacted soil" means soil that contains concentrations of a contaminant above background or EPA residential Risk Based Screening Concentrations as contained in the document listed in R392-600-8.
- (28) "LEL/O₂" means lower explosive limit/oxygen.
- (29) "Negative pressure enclosure" means an air-tight enclosure using a local exhaust and HEPA filtration system to maintain a lower air pressure in the work area than in any adjacent area and to generate a constant flow of air from the adjacent areas into the work area.

DEFINITIONS

- (30) "Non-porous" means resistant to penetration of liquids, gases, powders and includes non-permeable substance or materials, that are sealed such as, concrete floors, wood floors, ceramic tile floors, vinyl tile floors, sheet vinyl floors, painted drywall or sheet rock walls or ceilings, doors, appliances, bathtubs, toilets, mirrors, windows, counter-tops, sinks, sealed wood, metal, glass, plastic, and pipes.
- (31) "Non-confirmation sampling" means collecting samples by any party other than a certified decontamination specialist.
- (32) "Owner of record" means (a) The owner of property as shown on the records of the county recorder in the county where the property is located; and (b) may include an individual, financial institution, company, corporation, or other entity.
- (33) "Personal protective equipment" means various types of clothing such as suits, gloves, hats, and boots, or apparatus such as facemasks or respirators designed to prevent inhalation, skin contact, or ingestion of hazardous chemicals.
- (34) "PID" means photo ionization detector.
- (35) "Porous" means material easily penetrated or permeated by gases, liquids, or powders such as carpets, draperies, bedding, mattresses, fabric covered furniture, pillows, drop ceiling or other fiber-board ceiling panels, cork paneling, blankets, towels, clothing, and cardboard or any other material that is worn or not properly sealed.
- (36) "Preliminary assessment" means an evaluation of a property to define all areas that are contaminated and delineate the extent of contamination. The preliminary assessment consists of an on-site evaluation conducted by the decontamination specialist or owner of record to gather information to demonstrate that contamination is not present above the decontamination standards or to enable development of a workplan outlining the most appropriate method to decontaminate the property.
- (37) "Properly disposed" means to discard at a licensed facility in accordance with all applicable laws and not reused or sold.
- (38) "Property" means: (a) any property, site, structure, part of a structure, or the grounds, surrounding a structure; and (b) includes single-family residences, outbuildings, garages, units of multiplexes, condominiums, apartment buildings, warehouses, hotels, motels, boats, motor vehicles, trailers, manufactured housing, shops, or booths.
- (39) "Return air housing" means the main portion of an air ventilation system where air from the livable space returns to the air handling unit for heating or cooling.
- (40) "Sample location" means the actual place where an environmental sample was obtained, including designation of the room, the surface (wall, ceiling, appliance, etc), and the direction and distance from a specified fixed point (corner, door, light switch, etc).
- (41) "Services" means the activities performed by decontamination specialist in the course of decontaminating residual contamination from the manufacturing of illegal drugs or from the storage of chemicals used in manufacturing illegal drugs and includes not only the removal of any contaminants but inspections and sampling.
- (42) "Toxic" means hazardous materials in sufficient concentrations that they can cause local or systemic detrimental effects to people.
- (43) "UGWQS" means the Utah Ground Water Quality Standards established in R317-6-2.

DEFINITIONS

- (44) "VOA" means volatile organic analyte.
- (45) "VOCs" means volatile organic compounds or organic chemicals that can evaporate at ambient temperatures used in the manufacture illegal drugs such as acetone, acetonitrile, aniline, benzene, benzaldehyde, benzyl chloride, carbon tetrachloride, chloroform, cyclohexanone, dioxane, ethanol, ethyl acetate, ethyl ether, Freon 11, hexane, isopropanol, methanol, methyl alcohol, methylene chloride, naphtha, nitroethane, petroleum ether, petroleum distillates, pyridine, toluene, o-toluidine, and any other volatile organic chemical that may be used to manufacture illegal drugs.
- (46) "Waste" means refuse, garbage, or other discarded material, either solid or liquid.
- For the purposes of the Decontamination Specialist Certification Program rules:
 - (1) "Applicant" means any individual who applies to become a Certified Decontamination Specialist or applies to renew the existing certificate.
 - (2) "Board" means the Solid and Hazardous Waste Control Board.
 - (3) "Certificate" means a document that evidences certification.
 - (4) "Certification" means approval by the Executive Secretary or the Board to perform decontamination of contaminated property under Title 19 Chapter 6, Illegal Drug Operations Site Reporting and Decontamination Act.
 - (5) "Certification Program" means the Division's process for issuing and revoking the Certification.
 - (6) "Confirmation Sampling" means collecting samples during a preliminary assessment or upon completion of decontamination activities to confirm that contamination is not above the decontamination standards outlined in R392-600, Illegal Drug Operations Decontamination Standards.
 - (7) "Decontamination" means treatment or removal of contamination by a decontamination specialist or as otherwise allowed in the Illegal Drug Operations Site Reporting and Decontamination Act to reduce concentrations so the results are not above the decontamination standards defined in R392-600 and to remove property from the contamination list specified in Subsection 19-6-903(3)(b).
 - (8) "Department" means the Utah Department of Environmental Quality.
 - (9) "Division" means the Division of Environmental Response and Remediation.
 - (10) "Executive Secretary" means the Executive Secretary (UST) of the Solid and Hazardous Waste Control Board or the Executive Secretary's designated representative.
 - (11) "Lapse" in reference to the Certification, means to terminate automatically.
 - (12) "UAPA" means the Utah Administrative Procedures Act, Title 63 Chapter 46b.

CHAPTER ONE

Introduction and Organization

CHAPTER 1 – Introduction

Introduction

The illegal manufacture of methamphetamine (“meth”) in clandestine drug laboratories (“clan labs”) has become a public health and environmental concern. Various processes and combinations of chemicals are used to manufacture (“cook”) meth. Each process produces gas or vapor at some point(s) during the cooking process.⁹ It is estimated that each pound of manufactured meth produces five to six pounds of hazardous waste that may be disposed of illegally in the environment.¹⁷ To make matters more challenging, many of these sites are in a residential setting meaning children and other occupants of the property may potentially be exposed to chemicals, harmful gases, hazardous materials and illegal drugs during and after the cooking process.

Clan labs must be cleaned up to protect current and future occupants. Active laboratories pose the greatest risk and must be safely neutralized and decommissioned before a permanent long-term solution to the potential health hazards associated with residual contamination may be contemplated. Under the current cleanup model employed in Utah, clan labs are often decommissioned and cleaned up in two general phases. The first phase involves law enforcement and other qualified first responders. The second phase or long-term cleanup involves property owners and/or other interested parties in the property.

In the first phase, bulk chemicals are removed and the laboratory is decommissioned. However, this activity should not be mistaken for the long-term cleanup of the property since the scope of work is generally limited to the abatement of illegal activity and any imminent threat to human health and the environment.

In response to this issue and the growing concern over the potential health effects associated with clan labs, the Utah State Legislature passed the Illegal Drug Operations Site Reporting and Decontamination Act during the 2004 General Session. In short, the law provides a mechanism for cleanup of contamination and certification by local health departments that a contaminated property has been cleaned up to established standards. The law also directs the Department of Health to make rules establishing sampling and decontamination standards and the Solid and Hazardous Waste Control Board to establish within the Department of Environmental Quality, Division of Environmental Response and Remediation (DERR) a certification program for any private person, firm or entity that may perform decontamination of contaminated property.

During the 2008 Utah Legislative General Sessions, Senate Bill 209 was passed. The Bill became effective on May 5, 2008 and amended the Illegal Drug Operations Site Reporting and Decontamination Act. The Bill required the Department of Health to develop scientific standards for methamphetamine decontamination. As a result, a new standard for methamphetamine was promulgated in December 2009. The old standard was 0.1 µg/100cm². The new standard is 1.0 µg/100cm².

The DERR has developed this manual as a study guide and reference for individuals that have interest in becoming a Utah-certified decontamination specialist. The document

provides information on applicable regulations, procedures and standards to prepare an applicant for the decontamination specialist certification examination administered by the DERR in accordance with R311-500-5, Illegal Drug Operations Site Reporting and Decontamination Act Decontamination Specialist Certification Program rules.

Limitations

This manual is not intended to be instructional text for a first responder at a clan lab nor is it designed to outline cleanup procedures for illegal drugs other than meth (for clan labs that produced drugs other than meth, please contact the DERR and Department of Health prior to cleanup). Rather, this manual is designed to prepare an applicant for the certification examination by summarizing current information relating to the cleanup of meth labs and detailing the decontamination procedures established in R392-600, Illegal Drug Operations Decontamination Standards.

In addition, methods of illegal drug manufacturing and the chemical hazards associated with this activity will likely change over time. The long-term chronic effects of exposure to methamphetamine and many of its by-products resulting from the manufacture are unknown. Assessment, sampling and decontamination procedures outlined in this document are based on current information. This manual will be updated as new information becomes available outlining the most effective and protective cleanup strategy for meth clan labs.

It is important to note that some Utah counties may have independent authority to require cleanup based on occupancy of the structure or other local health or building codes. Local health departments may choose to incorporate the decontamination standards set forth by the cleanup regulations into their local requirements or they may require that additional measures be taken before they allow re-occupancy. The DERR recommends that any individual involved in the cleanup of contaminated property work with the local health department to ensure regulatory requirements are met and the cleanup is protective of human health and the environment.

CHAPTER TWO

Clandestine Drug Labs

CHAPTER 2 – Clandestine Drug Labs

What is Methamphetamine?

Methamphetamine is a derivative of amphetamine, and is a powerful stimulant that affects the brain and central nervous system. Methamphetamine can be smoked, snorted, injected, or taken orally in a tablet form and is considered a Schedule II drug under the Controlled Substance Act of 1970.¹⁸ It is accessible in many different forms and may be identified by color, which ranges from white to yellow to darker colors such as red and brown. Methamphetamine comes in a powder form that resembles granulated crystals and in rock form known as “ice”.¹⁴

Methamphetamine can be easily produced in simple labs using readily available ingredients including over the counter drugs and household chemicals that are cooked to produce the drug. Precursor chemicals usually include ephedrine or pseudoephedrine.¹³

Clandestine laboratories often produce two chemical forms of methamphetamine, the free base (methamphetamine base) and the hydrochloride salt (methamphetamine hydrochloride).¹² The free base, which is the initial product of clandestine synthesis, is a liquid at room temperature. At alkaline pH, the free base of methamphetamine is soluble in organic solvents. The hydrochloride salt is produced from the free base by bubbling hydrogen chloride gas through a solution of free base. There are two stereoisomers of methamphetamine, “dextro or d” and “levo or l”. The dextro or d-isomer is the more potent, pharmacologically active stimulant of the two.¹⁸

What is a Clandestine Drug Laboratory?

Clandestine drug laboratories (also known as clan labs or meth labs) are concealed laboratories where illegal drugs are produced. Methamphetamine and potentially other drugs are made in these laboratories. Most clandestine drug laboratories are portable and easy to set up/dismantle and are often found in homes, apartments, motel rooms, trailers, mobile homes, rented storage spaces, car trunks and rural rentals with absentee landlords.^{13, 17}

The laboratories usually operate on an irregular basis rather than a consistent production schedule. Operators often produce a batch of finished product, disassemble the laboratory, and either store it (known as a boxed laboratory) or move it to another location while they acquire additional chemicals. Relocating the laboratory affords some protection against detection by drug law enforcement authorities. Storage facilities often are used to house or safeguard chemicals, glassware, and finished product. It is not uncommon for operators to have multiple laboratory sites.¹⁸

Contaminants at drug labs and lab waste abandonments range from highly volatile organic solvents and semi-volatile organic compounds, to highly corrosive inorganic acids and bases, the illicit drug itself, and other by-products.⁵ Residual methamphetamine and associated hazardous waste are released during the methamphetamine cooking process,

which is defined as the process of preparing individual chemicals to react with other chemicals and reagents to get to the end product of whatever illicit drug is desired. A functioning drug laboratory (in the process of cooking, blending and/or synthesizing chemical ingredients) presents the greatest risk of adverse health effects to occupants of the property.

There is potential for fire and explosion due to some of the solvents and chemical mixtures normally found at these active sites.¹⁷ A chemical spill could result in air concentrations strong enough to produce symptoms from inhalation of solvents. The cooking process, base-out and salt-out/final acidification stages could also generate sufficient amounts of acid gases, including phosphine and hydrogen chloride.¹² The level of airborne chemicals will vary considerably depending on the cooking method, quantity of chemicals present, size of the room, ventilation and duration of the process and could create adverse health effects to occupants during and immediately after cooking.

After an illicit laboratory has been decommissioned, residual amounts of some substances, including methamphetamine at concentrations potentially on the order of thousands of micrograms, may persist on building surfaces, wallboard, carpet, ductwork, furniture, appliances and other furnishings.^{12, 16, 19} Residues may be tracked around the property on shoes and clothing creating a wider distribution of contamination. The potential exposure to residues on surfaces and various articles depends upon:

- The exposure scenario: Residues in a kitchen, bathroom or bedroom may be contacted more frequently than residues in a non-residential building.
- Contaminants that may become airborne: The ventilation system may distribute contaminants throughout the property creating a wider distribution of impact.
- Occupants of the site: Many of these sites are in a residential setting. Children crawl on floors and carpets and are at greatest risk of hand to mouth behaviors than adults.

Wastes generated during the cooking process include potentially flammable extraction process sludges, phosphine gas, hydriodic acid, hydrogen chloride gas, phosphoric acid and yellow or white phosphorus.^{3, 13}



Clandes

Methods of Methamphetamine Production

The production of methamphetamine is a relatively simple process that can be carried out by individuals without specific knowledge or expertise in chemistry. Generally, methamphetamine is made using a recipe obtained from a publication or gathered from an acquaintance. Many of the agents used in the process can be found in local hardware stores or hobby shops. In addition, many are found in ordinary household agents such as lighter fluid or drain cleaner.

To define concerns associated with meth contamination, it is important to understand the nature of a clan lab, methods of production and the chemicals involved. While there are many methods used to produce meth, the Red Phosphorus method is one of the more common methods found in Utah. The following text provides some general information. It should be noted that it is not the intent of this section to provide a cookbook for meth production, only introduce the reader to common methods and associated chemicals.

Red Phosphorus Method

The Red Phosphorus method is also called “Red P”, “HI”, “Red, White and Blue” or “Ephedrine” method. This process uses ephedrine and pseudoephedrine as the primary ingredient and other chemicals as the reagents. Some chemicals potentially associated with the Red Phosphorus method include: ³

- ⇒ hydriodic acid;
- ⇒ hydrochloric (muratic) acid;
- ⇒ sulfuric acid;
- ⇒ sodium hydroxide (lye);
- ⇒ sodium chloride (salt);
- ⇒ red phosphorus (can be found in match book striker plates);
- ⇒ iodine;
- ⇒ isopropyl alcohol;
- ⇒ ethyl alcohol (ethanol);
- ⇒ methyl alcohol (methanol);
- ⇒ hydrogen peroxide;
- ⇒ naptha (coleman fuel);
- ⇒ charcoal lighter fluid (mineral spirits, petroleum distillate);
- ⇒ acetone;
- ⇒ benzene;
- ⇒ toluene;
- ⇒ ethyl ether (starting fluid);
- ⇒ freon;
- ⇒ hydrogen chloride gas; and

⇒ chloroform.

⇒ Other chemicals that may be used include acetic acid, methyl-ethyl-ketone and hypophosphorus acid.

Birch Method

The Birch method is also called the “Ammonia” or “Nazi” method. This technique uses ephedrine or pseudoephedrine, sodium or lithium and anhydrous ammonia. The Birch method has become increasingly popular because it is quick and inexpensive, requires less set up time and equipment and produces a high yield of methamphetamine. Some chemicals potentially associated with this method include: ³

⇒ anhydrous ammonia;
⇒ lithium metal;
⇒ sodium metal;
⇒ isopropyl alcohol;
⇒ ethyl alcohol (ethanol);
⇒ methyl alcohol (methanol);
⇒ hydrogen chloride gas;
⇒ hydrochloric (muriatic) acid;
⇒ sulfuric acid;
⇒ sodium chloride (salt);
⇒ toluene;
⇒ naphtha (coleman fuel);
⇒ freon;
⇒ ethyl ether;
⇒ chloroform, and
⇒ methyl ethyl ketone.

Another method of interest is the Amalgam method. This method primarily uses phenyl-2-propanone (P2P) and methylamine as precursors. Mercuric chloride, aluminum, hydrochloric acid, isopropyl alcohol, methanol, ethanol, acetone, benzene, chloroform and ether may also be associated with this manufacturing method.

Selected Chemicals Associated with Methamphetamine Production

Many of the chemicals encountered at a clandestine drug laboratory may be divided into four general categories that include:

- 1.) Solvents
- 2.) Corrosives/Irritants
- 3.) Inorganic Substances
- 4.) Precursors

The following information relates to a few common contaminants that may be found at clan labs.¹² The list is not all-inclusive due to the number of chemicals that may be used during the cook. Chemicals of concern should be established on a case-by-case basis.

Acetone (dimethyl ketone): Acetone is a colorless, mobile, flammable liquid with a mildly pungent and somewhat aromatic odor. Acetone is highly volatile and flammable and vapor is irritating to the eyes and nose in high concentrations. Inhalation of the vapor may cause dizziness, narcosis and coma. Acetone has legitimate use as a solvent and chemical intermediary for a variety of substances such as paints, lubricants, nail polish remover, glues, rubber cement and varnish removers.

Toluene (methylbenzene): Toluene is a refractive liquid solvent with a benzene-like odor. Toluene is flammable and highly volatile. Exposure to toluene may burn or irritate mucous membranes, eyes and respiratory tract and cause dizziness. Severe exposure may result in pulmonary edema. Toluene is used in the manufacture of benzoic acid, explosives, dyes and other organic substances. It can also be found in paints, thinners, lacquers and gasoline additives. Toluene is a solvent that can be used to extract methamphetamine base.

Coleman Fuel (petroleum ether, white gas): Coleman fuel is a complex mixture of light hydrocarbons (primarily aliphatic) produced by distillation of petroleum. Coleman fuel can form flammable mixtures in air and flash at room temperature. Acute exposure may be irritating to the eyes and skin. Prolonged exposure may also adversely affect the kidneys, liver and respiratory system or aggravate pre-existing conditions in these organs. Coleman fuel is petroleum based non-polar solvent used to extract methamphetamine base.

CORROSIVES/IRRITANTS

Ammonia (anhydrous ammonia): Anhydrous ammonia is a gas at room temperature and has a pungent suffocating odor. Ammonia is irritating to the upper respiratory tract, skin, and eyes. Ammonia reacts with strong oxidizers, acids, halogens, bleach and salt of heavy metals. Anhydrous ammonia may be used with an alkali metal (typically lithium or sodium) in the “Nazi Method” to convert ephedrine to methamphetamine. In clandestine drug labs, anhydrous ammonia is often stored in insulated coolers, small propane fuel cylinders and five-gallon propane tanks.

Hydriodic Acid (hydrogen iodide): Hydriodic acid is a corrosive acid, which is colorless when freshly prepared. With light exposure, it turns yellow to brown and vapors are irritating to the respiratory system, skin and eyes. The acid can dissolve flesh and the liquid causes severe burns to eyes and skin. If ingested, it may cause severe internal irritation and damage. Hydriodic acid is one of the main reducing agents in methamphetamine synthesis.

Hydrogen Chloride (aqueous solution - muriatic acid, hydrochloric acid): Anhydrous hydrogen chloride is a colorless to slightly yellow gas at room temperature. Hydrochloric acid is a colorless or slightly yellow fuming liquid. Hydrogen chloride and hydrochloric acid are highly corrosive. Inhalation of hydrogen chloride vapor or hydrochloric acid fumes may cause irritation and burning of the eyes, nose, throat, and larynx, shortness of

breath, labored breathing, chest pain and upper respiratory tract edema. Hydrogen chloride is used to produce the hydrochloride salt of methamphetamine and may be produced by combining sulfuric acid with sodium chloride.

Phosphine (hydrogen phosphide): Phosphine is a colorless gas at room temperature that contains a fishy or garlic-type odor generally associated with the presence of diphosphine and other impurities. Toxicity from this gas is usually via inhalation. Exposure may result in headache, fatigue, weakness, thirst, chest pain or pressure, shortness of breath, tremors, dizziness, gastrointestinal upset, convulsions or coma. Phosphine is a by-product generated during the synthesis of hydriodic acid from iodine and red phosphorus. It is produced when red phosphorus contacts caustics and/or acids, especially in the presence of metal.

Sodium hydroxide (caustic soda, soda lye): Sodium hydroxide is a solid, appearing like white granules, chips or pellets. Sodium hydroxide is strongly corrosive and a powerful irritant by all routes of exposure. It can cause severe burns and permanent damage to any tissue it contacts. Acute effects, resulting from short term exposure to high concentrations of sodium hydroxide, include irritation and burning of the skin, eyes, nose, windpipe and lungs. Sodium hydroxide is used to make sodium, an alkali metal that functions as a catalyst in the anhydrous ammonia/alkali metal method (Nazi method) that reduces ephedrine and/or pseudoephedrine to methamphetamine. The compound may also be used in the hydriodic/red phosphorus method to raise the pH of methamphetamine solutions that have an acid pH.

INORGANIC SUBSTANCES

Iodine (iodine crystals): Laboratory grade elemental iodine consists of heavy grayish-black to purple crystals that have a metallic luster. Laboratory grade iodine may also appear as a brown powder. At room temperature, iodine crystals readily volatilize to a violet gas. Iodine is an oxidizer and highly reactive. The direct acute toxicity of iodine is due to irritant properties. In excessive amounts elemental iodine is corrosive and irritates tissue via all routes of exposure. Elemental iodine is combined with red phosphorus to make hydriodic acid, an essential ingredient in the “HI/Red P” method for converting ephedrine to methamphetamine.

Red phosphorous: Red phosphorus is a flammable solid and is readily combustible. Its appearance can be opaque, amorphous, crystalline, granular or powder and may be orange-red, dark red, violet/dark red-purple or reddish brown. Red phosphorus in pure form does not usually represent a significant health hazard. But, in situations where it is contaminated with white phosphorus, and potentially other compounds, exposure may cause irritation of the skin, eyes, lungs and gastrointestinal tract. Red phosphorus is combined with elemental iodine to produce hydriodic acid, which is used to reduce ephedrine or pseudoephedrine to methamphetamine.

Lithium (lithium metal): Lithium is a soft, silvery-white metal that becomes yellowish upon exposure to moist air. Powdered lithium may react explosively with water. Nausea,

abdominal pain, vomiting, diarrhea, sedation and mild tremors characterize mild cases of acute toxicity following ingestion of lithium. Elemental lithium is used as a catalyst in the “Nazi method” to synthesize methamphetamine from ephedrine.

PRECURSORS

Phenyl-2-propanone (phenylacetone, methyl benzyl ketone): Phenyl-2-propanone is a clear, moderately viscous liquid that is irritating to the skin and eyes. Prior to 1980, P2P was the most widely used precursor in the synthesis of amphetamine/methamphetamine

Pseudoephedrine: Pseudoephedrine is a white powder often marketed as red, white or blue tablets for pharmaceutical uses. Pseudoephedrine is used to relieve the symptoms of nasal, sinus, and Eustachian tube congestion due to the common cold, hay fever or other allergies. Symptoms of acute exposure include increased blood pressure, irregular heartbeat, shortness of breath, increased breathing rate, or troubled breathing rate, unusual nervousness, restlessness or excitement or convulsions. Pseudoephedrine is a precursor in the synthesis of methamphetamine. In clandestine drug labs, the tablets may be ground up and partially dissolved in water or alcohol. The resulting sludge is filtered using coffee filters or other makeshift devices to proceed with the manufacturing of methamphetamine.

Ephedrine: Ephedrine appears as a waxy solid or as white to colorless granules, powders or crystals often marketed as red, white or blue tablets for pharmaceutical uses. Symptoms of high dose, acute ephedrine exposure include severe outbreaks of sweating, enlarged pupils, spasms, and elevated body temperature with heart failure and asphyxiation leading to death. Ephedrine, which is either derived from the ephedra plant or made synthetically, is the most important ingredient in the ephedrine-reduction method because it is just one step away from the final product. Ephedrine is chemically identical to methamphetamine already except the presence of one extra atom of oxygen, which is removed by combining ephedrine with hydriodic acid. Ephedrine is a precursor in the synthesis of methamphetamine. In clandestine drug labs, the tablets may be ground up and partially dissolved in water or alcohol. The resulting sludge is filtered using coffee filters or other makeshift devices to proceed with the manufacturing of methamphetamine.

For additional information and fact sheets related to many of these chemicals and their subsequent use in clan labs, please refer to Appendix A. All chemicals of concern should be evaluated individually prior to decontamination. Toxicological databases such as TOXNET, HSDB (Hazardous Substance Database), ATSDR (Agency for Toxic Substance and Disease Registry) or SIRI MSDS (Material Safety Data Sheet) should be surveyed and reviewed to obtain information, which may be useful as health and safety and decontamination procedures are developed.

Areas of Contamination

In accordance with R392-600, Illegal Drug Operations Decontamination Standards, areas of contamination include the presence of visible or olfactory signs indicative of contamination, locations in and around where illegal drug production occurred, hazardous materials were stored or suspected of being used to manufacture illegal drugs, areas that tested positive for contamination or other portions of the property that may be linked to processing or storage areas by way of the ventilation system or other activity that may cause contamination to be distributed across the property.

While some gases and solvents (ammonia, phosphine, naphtha, toluene) may dissipate after cooking operations have ceased, the source has been removed and/or the property has been actively ventilated for a period of time, other contaminants may be released as a vapor (iodine, red phosphorus, methamphetamine) and ultimately form a residue on surfaces, lasting until the property is cleaned up.

Areas of contamination associated with processing or cooking, hazardous material storage, illegal disposal and/or transport mechanisms that cause contaminants to be distributed across the property must be defined to maximize the nature/extent of decontamination and the effectiveness of the cleanup strategy over time. The Illegal Drug Operations Decontamination Standards set forth the procedures to assess and decontaminate the property.

Areas where contamination has been detected above cleanup standards must be investigated and subsequently decontaminated to remove property from the contamination list noted in the Illegal Drug Operations Site Reporting and Decontamination Act.



Possible chemical waste associated with drug production or use (Courtesy of: California Attorney Generals Crime and Violence Prevention Center)

CHAPTER THREE

Legislation and Rules

CHAPTER 3 – Legislation and Rules

The Illegal Drug Operations Site Reporting and Decontamination Act, Title 19 Chapter 6 Part 9, was passed during the 2004 Utah Legislative General Session setting forth the principles of a coordinated, cooperative effort to address illegal drug laboratory sites. A copy of the legislation is included in Appendix B.

LEGISLATION - Title 19 Chapter 6 Part 9

Illegal Drug Operations Site Reporting and Decontamination Act

The highlighted provisions of the bill are:

- Requires law enforcement agencies to report contaminated property locations to the local health department;
- Requires the local health departments to make these reports available to the public, as advisory information only;
- Requires the local health departments to notify the property owner of the report and also to notify the county or municipality if the property owner is not taking action regarding the contamination;
- Directs the Department of Health to make rules that include certification standards regarding decontamination of contaminated property;
- Requires the Department of Environmental Quality to establish certification program for decontamination specialist who provide evaluation sampling and cleanup of contaminated properties; and
- Requires cleanup of contamination and certification that a contaminated property has been cleaned up.

RULES - R392-600, Illegal Drug Operations Decontamination Standards

Persons who perform decontamination to remove property from the contamination list established in 19-6-903(3)(b) must meet the investigation, sampling and decontamination standards set forth in the rules. For further information, please contact the Utah Department of Health at (801) 538-6191. A copy of the rules is included in Appendix C.

RULES - R311-500, Illegal Drug Operations Site Reporting and Decontamination Act, Decontamination Specialist Certification Program

The Decontamination Specialist Certification Program is designed to assist in helping ensure that personnel in charge of decontamination are trained to perform cleanups and knowledgeable of established decontamination standards; to develop methods whereby an

applicant can demonstrate competency and obtain certification to become a certified decontamination specialist; to protect the public health and the environment; and to provide for the health and safety of personnel involved in decontamination activities.

The certification rules apply to individuals who perform decontamination of property on the contamination list specified in Section 19-6-903(3)(b) of the Illegal Drug Operations Site Reporting and Decontamination Act. For further information, please contact the Division of Environmental Response and Remediation at (801) 536-4100. A copy of the rules is included in Appendix D.

Important Elements of the Certification Program

The following sections briefly summarize elements of the program relating to application, eligibility criteria, performance standards and revocation issues.

1. Application for Certification

Any individual may apply for certification by paying applicable fees and submitting an application to the Executive Secretary to demonstrate that the applicant:

- Meets the eligibility requirements specified in R311-500-5; and
- Will comply with the performance standards specified in R311-500-8 after receiving a certificate.

A Decontamination Specialist Certification Application must be completed and submitted to the Division of Environmental Response and Remediation for approval no later than 10 working days prior to the scheduled examination. A schedule of exam dates may be found on the Division's home page at www.environmentalresponse.utah.gov.

2. Eligibility for Initial Certification

The following eligibility requirements must be met prior to certification.

- **Safety Training.** Each applicant must meet Occupational Safety and Health Agency requirements in accordance with 29 CFR 1910.120 and any other applicable safety training pertaining to the code as required by federal and state law.
- **Examination.** Each applicant must successfully pass a comprehensive examination administered by the Executive Secretary.

For further information on the exam, please refer to the meth cleanup link on the DERR's home page.

3. Performance Standards

An applicant who submits an application under R311-500-4 and obtains certification under R311-500 agrees to comply with the Performance Standards outlined in R311-500-8. The standards establish enforceable parameters for which work is conducted and set forth requirements that must be met in the event non-certified workers assist with the cleanup. Failure to comply could be cause for Department action and revocation of the Certificate.

To comply with Performance Standards, the decontamination specialist:

- Shall be certified prior to engaging in any decontamination activities for the purpose of removing the contaminated property from the list referenced in Section 19-6-903(3)(b) and display the certificate upon request;
- Shall perform work meeting applicable local, state and federal laws, including certification and licensing requirements for performing construction work;
- Shall oversee and supervise all decontamination activities and ensure any person(s) assisting with decontamination work at contaminated property meets Occupational Safety and Health Agency hazardous materials (HAZWOPER) safety training requirements in accordance with 29 CFR 1910.120;
- Shall disclose to any person(s) assisting with decontamination at contaminated property that work is being performed in a clandestine drug laboratory, inform the person(s) of the potential risk associated with this type of environment and ensure that the person(s) wears the necessary personal protective equipment as established by the decontamination specialist;
- Shall make all decisions regarding decontamination and be the only individual conducting confirmation sampling;
- Shall follow scientifically sound and accepted sampling procedures;
- Shall submit a Final Report to the local health department, which includes an affidavit stating that the property has been decontaminated to the standards outlined in R392-600;
- Shall maintain a current address and phone number on file with the Division;
- Shall not participate in fraudulent, unethical, deceitful or dishonest activity with respect to performance of work for which certification is granted; and
- Shall not participate in any other activities regulated under R311-500 without meeting all requirements of that certification program.

4. Denial of Application and Revocation of Certificate

The Executive Secretary may issue a notice denying an application or an initial order or notice of intent to revoke a certification. The initial order or notice shall become final unless contested as outlined in Utah Administrative Procedures Act (UAPA). Grounds for denial of an application or revocation of a certification may include any of the following:

- Failure to meet any of the application and eligibility criteria established in R311-500-4 and R311-500-5;
- Failure to submit a completed application;

- Demonstrated disregard for the public health, safety or the environment;
- Misrepresentation or falsification of figures, reports and/or data submitted to the local health department or the state;
- Cheating on a certification examination;
- Falsely obtaining or altering a certificate;
- Negligence, incompetence or misconduct in the performance of duties as a certified decontamination specialist;
- Failure to furnish information or records required by the Executive Secretary to demonstrate fitness to be a certified decontamination specialist; or
- Violation of any certification or performance standard specified in the rule.

The previous information was only designed to highlight a few key elements of the certification program. Ultimately, it is the responsibility of the decontamination specialist to be familiar with the current rules and regulations pertaining to the decontamination of clan labs. For a copy of the rules and the statute, please refer to the appendices in this document.

CHAPTER FOUR

Site Safety

CHAPTER 4 – Site Safety

General Site Health and Safety

Products used in the manufacture of methamphetamine can be toxic, flammable, explosive or ignitable. In addition, there is potential risk of exposure to infectious wastes (including human feces) in an un-kept environment and disease in the event of skin puncture by drug paraphernalia (including sharps/needles). Many chemicals can enter the body through inhalation, ingestion, injection or skin or eye absorption. Risk of injury or toxicity from chemical exposure is present, depending on the toxic properties of the chemicals, quantity and form, concentration, duration and route of exposure.

There is likely a greater risk of chemical exposure at a site where a laboratory is actively producing drugs than at a site where drugs were formerly processed. The decontamination specialist should be knowledgeable of the current environment to the extent possible prior to entering the property and performing the preliminary assessment and/or decontamination. Health and safety procedures at a clandestine drug laboratory are important for a number of reasons:

- Prevents work related injuries, illnesses and property damage;
- Prevents exposure of the public to harmful substances; and
- Increases overall productivity and maintains project schedules.

Cleanup personnel must establish appropriate personal protective equipment (PPE) for the site conditions before entering the property and practice basic hygiene and decontamination procedures at all times. Eating, drinking and smoking on the property is discouraged to prevent potential exposure. Maintaining a safe work environment is essential, whether the tasks be preliminary assessment, decontamination or sampling. All tasks need to be evaluated prior to performing them to assess the degree of potential hazard and possible routes of exposure. This hazard assessment should form the basis of the health and safety plan.

Health and Safety Regulations

A decontamination specialist and any worker(s) assisting the decontamination specialist must be certified under the OSHA Hazardous Waste Site Operations and Emergency Response (HAZWOPER) standard (29 CFR 1910.120) prior to performing work at contaminated property (a copy of the standard is included in Appendix E). This may require the individual or employer to:

- Develop a written program to address the hazards in a general manner as part of an employer program;
- Conduct a hazard assessment to identify the site-specific hazards and then respond to them appropriately;
- Provide employee training;

- Provide appropriate personal protective equipment; and
- Establish emergency response procedures.

Specific Health and Safety Requirements

The following sections outline a general approach that may be considered when developing health and safety requirements at a clan lab. The HAZWOPER standard does not provide specific training relative to clan labs so the requirements from the standard must be interpreted and applied using professional judgment. Ultimately, it is the responsibility of the decontamination specialist to assess the HAZWOPER standard with respect to the current environment and establish the necessary PPE and other health and safety requirements for the job.

Training

The HAZWOPER standard requires employers to provide 40 hours of hazard training at the time of initial assignment, eight hours of refresher training annually and a minimum of three days of actual field experience under the direct supervision of a trained, experienced supervisor. The training must cover such items as:

- | | |
|---------------------------------|---------------------------------|
| • Components of the standard | • Excavation and trenching |
| • Medical surveillance | • Hazard communication |
| • Hazard assessment | • Decontamination |
| • Personal Protective Equipment | • Drum Handling |
| • Site Control | • Illumination |
| • Site Characterization | • Emergency Response Procedures |
| • Air quality monitoring | |

This training must then be supplemented by site-specific training at the time of assignment to a project. This is essential to provide employees with the actual hazards to be encountered and the exposure control strategies to be followed.

Although the content of the annual refresher training can vary, it should provide meaningful update of the initial training. Items that may be included:

- OSHA News
- Changes in monitoring equipment
- Review of hazard assessment
- Contractor issues

Additional initial training is required for employees who may perform management or supervisory roles, or emergency response activities. The supervisory worker must attend at least eight additional hours of specialized training at the time of job assignment (29 CFR 1910.120(e)(4)). Emergency response workers shall be trained in how to respond to expected emergencies (29 CFR 1910.120(e)(7)).

Medical Surveillance

The HAZWOPER standard requires that certain categories of employees receive physical examinations at a minimum of three milestones: at initial assignment, annually (unless an occupational physician working closely with the company believes that the physical examination could be performed every other year and still sufficiently monitor employee health status), and at termination. The physical examination must be at no cost to the employee.

Firms or individual employers should work closely with an occupational physician that understands the firm or individual's area of work and hazards that employees are likely to face. The physical examination should then be tailored to address those exposures and the employer should be aware of any limitations placed on the employee as a result of the examination.

Health and Safety Plan

The HAZWOPER standard requires employers working on sites with hazardous substances and wastes to develop site-specific health and safety plans (HASPs) prior to entering the site. The following are a few key components of a HASP. The list is not all encompassing. A final hazard assessment and health and safety plan should be developed and implemented by the decontamination specialist in accordance with the applicable rules, regulations and established site conditions. The plan should be updated to reflect current and available information.

General Information – This section should include the name and location of the site, workplan objectives and proposed dates of work. The section should also list the names of all main project participants.

Planned Site Activities – This section should include a brief description of the proposed site activities (may include preliminary assessment, sampling and decontamination) and general scope of work. This can form the basis of a hazard assessment of the property. Next to each task, the author should list the hazard and proposed means to avoid the hazard.

Contaminant Characteristics – This section should describe the contaminants of concern and the hazards they pose to human health and the environment.

Site Description – A site description should describe the site, including current and historical uses of the property. Potential sources of contamination and hazards associated with the property should also be noted.

Hazard Evaluation and Mitigation – This section should include a list of known visible hazards, man-made or natural and any unseen, but suspected hazards. All aspects of hazard mitigation pertinent to the site should be addressed. This may include personal exposure to chemicals and other organic vapors, heat, cold stress, noise and fire.

Shoring Requirements – In the event substantial damage has been inflicted on the property, a structural assessment may be necessary. The decontamination specialist should vacate the property immediately and contract with a professional for this activity.

Personal Protection Equipment – This section should describe the level and types of personal protective equipment (may include gloves, protective clothing, and respiratory protection). Properly fitted air-purifying respirators equipped with the appropriate mechanical/chemical cartridge filter elements should be considered, unless conditions dictate otherwise. A change in on-site conditions may necessitate a change in PPE.

Monitoring/Surveillance Equipment – A list of all monitoring and surveillance equipment to be used at the site should be noted. Upon initial entry to areas of contamination, a Lower Explosive Limit/Oxygen (LEL/O₂) meter, Photo Ionization Detector (PID), or other appropriate meters may be used to gauge current conditions. All equipment employed at the site should be ignition proof.

Air Monitoring – For sites that have not been properly vented and/or a source of contamination remains on the property, airborne contaminants may be present. A monitoring plan should be developed to quantify the nature of contamination and potential exposures. This will allow PPE for all site workers to be upgraded by the decontamination specialist as necessary.

Decontamination – This section should discuss personnel and equipment decontamination procedures. For site personnel, contamination-reduction phases and personal hygiene for site operations, preliminary assessment and decontamination operations should be established (wash hands prior to eating, avoid hand to mouth contact, etc.). Decontamination procedures for equipment used in the cleanup are also necessary. Decontamination is required to prevent unnecessary exposures and cross contamination of areas that are clean or have been decontaminated.

Safety Equipment Checklist – A comprehensive list of all personal protection, monitoring, surveillance and decontamination equipment is necessary.

Site Safety Briefing Attendance Sheet – The purpose of this sheet is to document personnel assigned to the site, indicating the individuals have read the health and safety plan and attended the on-site safety briefing.

Emergency Information – Emergency information should include phone numbers and names and addresses of local and emergency resources (such a police, fire, hospital and poison control). A map outlining directions to the nearest hospital should be included.

Evacuation/Emergency Response Plan – This section should be clearly defined and available to allow for quick reference in the event of an emergency. Evacuation direction should be clear and tested prior to starting the project. The locations of hospitals and shelters and barriers to evacuation should all be noted and discussed.

Additional Information – This may include Material Safety Data Sheets or other information that may be used to help communicate the potential hazards associated with the project. It is the responsibility of the individual performing the decontamination to be familiar with all known hazards at the site.

Safety Meetings

Meetings should be planned to discuss safety. In fact, meetings are encouraged so workers and anyone assisting on the job view safety as an integral part of production and not something extra to be discussed if there is time.

Pre-Startup Meeting - This meeting should be used to discuss all aspects of the project in advance. This allows time for details to be worked out and additional safety equipment to be obtained, if necessary. Emergency contacts and health and safety personnel should be established.

Startup Meeting - This meeting is often held the day before or the day of the job. Time should be taken to discuss final safety requirements, describe the emergency response procedures, and lay out the PPE and air monitoring requirements.

Daily Meetings - A safety meeting should be held at the beginning of every day the project continues. The scope of the day's work should be described along with the associated hazards and safety precautions.

Incident Investigation

In the event of an incident, the investigation must focus on the root cause of the incident to keep the problem from occurring again in the future. Nearly all incidents occur as a result of insufficient training, tools, time management or motivation. Make safety a priority during all phases of the project.

CHAPTER FIVE

Preliminary Assessment

CHAPTER 5 – Preliminary Assessment

A preliminary assessment is required prior to decontamination to establish cooking methods and locations, chemicals of concern, drug and chemical storage areas, visual signs of contamination, areas contamination and areas that are not considered contaminated. Information obtained from the assessment is used to develop a strategy to decontaminate the site or, should contamination not be suspected due to lack of supporting evidence, demonstrate that contamination is not present above the decontamination standards established in R392-600. An effective cleanup cannot be performed without a good understanding of the cooking areas, contaminant transport mechanisms and layout of the property.

In short, the preliminary assessment is divided into two general tasks: information gathering and a site visit, consisting of a visual inspection of the property. However, prior to performing the preliminary assessment, the decontamination specialist should coordinate with local, state and federal law enforcement officials as well as the local health department to ensure the criminal investigation is complete and the property may be safely entered.

Information Gathering

To begin this process, the police department, Drug Enforcement Agency, narcotics task force, fire department, HAZMAT team, local health department or other first responders who were active at the site should be contacted. The decontamination specialist should request and review copies of any report relative to the clan lab as well as any material transport manifests (since they will generally list categories like solvents, corrosives, etc.) generated during the gross cleanup. The reports may help define areas of contamination and provide information relative to:

Method(s) of Illegal Drug Manufacturing: Methamphetamine can be produced using a number of different chemicals in a variety of ways. An understanding of the cooking process may help establish contaminants of concern.

Processing or cooking areas: Due to the nature of clandestine drug labs, there may be multiple processing or cooking areas on the property. Processing or cooking areas may be present in kitchens, bathrooms, bedrooms, closets, basements, utility sheds, storage sheds or other easily accessible, enclosed portions of the property. All these areas should be assessed. Gross contamination may be caused by spills, boil-overs, explosions, or by chemical fumes and gases created during the heating and distilling portions of the cooking process.³ Impacted areas, surfaces and materials may include furniture, carpeting, floors, walls, ceilings, counter tops, draperies and other textile products, plumbing fixtures and drains, appliances or the ventilation system or other rooms attached to the same ventilation system. Dishes and glassware may also be contaminated.

Disposal Areas: Illegal disposal of chemicals may occur on the property as a method to avoid detection or conceal evidence relating to the laboratory. Indoor disposal areas may

include sinks, toilets, bathtubs, plumbing traps, floor drains, vents, vent fans, and chimney flues. Outdoor disposal areas may include soil, surface water, dumpsters and/or the sewer, storm or septic systems. Burn pits and trash piles may also be present on the property and become areas of interest.

Hazardous Materials Storage Areas: Chemicals may be stored on the property to help streamline the manufacturing process. Contamination can result from improper storage, leaks or spills. Hazardous materials storage areas should be identified and may include cabinets, closets and vehicles.

Visual Inspection

A site visit should be performed once all the available information has been gathered from law enforcement and other officials/source(s) familiar with the property, procedures have been developed to safely enter the site and the local health department has granted access (if the property is placarded). The primary purpose of the site visit is to:

- 1.) Inspect all portions of the property;
- 2.) Determine if the property contains a septic system and whether there has been a release to the septic system;
- 3.) Assess the nature of the ventilation system and identify the components in areas of contamination;
- 4.) Conduct and document appropriate testing for corrosive, flammable, combustible and toxic atmospheres, as necessary; and
- 5.) Delineate areas of contamination.

Inspect all Portions of the Property: It is difficult to develop a comprehensive workplan and effective decontamination strategy without a good understanding of the history and physical layout of the property. In fact, many of the concerns (iodine and red phosphorus staining observed on a kitchen wall) and/or areas of concern (box lab discovered in the basement closet) identified in the general information search noted earlier in this chapter may not be verified or fully understood until the property is inspected completely. An assessment should be performed prior to the long-term cleanup to determine the manufacturing process, recipes and cooking methods employed, duration and location of the lab operation(s), chemicals of interest and the locations where hazardous materials were stored and processing or illegal drug activity took place.

The visual inspection should clearly identify the number, size and function of each room or enclosed space on the property and assess the use of each area, to the extent possible. The decontamination specialist should develop an inventory of the contents and current conditions to establish areas that require decontamination and what articles, surfaces, materials, furnishings or appliances must be removed or may be cleaned on-site. The inspection must also evaluate adjacent rooms, units, or structures if there is evidence that contamination spread across the property. For vehicles, it should include an evaluation of the entire vehicle, including the trunk.

As an example, if the initial report indicates that cooking and meth manufacture were performed in the basement of the structure, then this area should be thoroughly inspected and inventoried as to what materials can be cleaned on-site and what materials must be removed. Adjacent rooms (including those on the same ventilation system) must also be assessed. Any discolored, stained, degraded or burned surfaces should be noted to help define areas of contamination. Staining associated with red phosphorus and iodine can be clearly observed.

The decontamination specialist must use all available information to delineate areas of contamination for decontamination purposes. Processing, disposal and hazardous materials storage areas must be established to the extent possible since they are included in the areas of contamination.



**Potential impact associated with a clan lab
(photo courtesy of Salt Lake City Police
Department Meth Initiative)**

Illegal drug production or associated illegal activity may not be limited to the interior portion of the property. The visual inspection should be performed outside of any structure to identify stained soil, stressed vegetation, burn areas, trash pits or other potentially impacted areas of the property. Clues that may indicate illegal drug production include:

- Waste in trash piles from over the counter ephedrine or pseudoephedrine cold, diet or allergy pills;
- Empty containers from antifreeze, white gas, ether, starting fluids, Freon, lye, or drain openers, paint thinner or acetone;
- Camp stove fuel containers;
- Pyrex/glass/corning containers with dried chemical residue;
- Bottles or containers connected with rubber hosing and duct tape; and
- Coffee filters, pillowcases or bed sheets stained red (used to filter red phosphorous) or containing a white powdery residue.

Septic System: Waste products and sludge generated during the production of methamphetamine and other illegal drugs may be dumped down sinks, drains or toilets as a mechanism to dispose of the waste and avoid detection by law enforcement. If the property is on a septic system, this must be documented for further investigation.

On-site observations provide good evidence of a release to a utility on the property. Staining may be present around the drains and/or chemical odors may be emanating from the plumbing network. Each drain on the property should be assessed.

Ventilation System: The heating and cooling system may collect vapors, dust, chemical residues and methamphetamine. Intakes from the system can pull in vapors and other residues and redistribute them to every room attached to the system. Residues can accumulate in the ductwork, filter, and blower mechanism. Even the walls and ceilings near the ventilation system may become impacted during the production of illegal drugs.

The nature, location and distribution of the ventilation system must be defined when assessing the property. In motels, apartments, other multi-family dwellings or storage units, a ventilation system may serve more than one unit or structure. Each of the attached rooms and structures should be evaluated in a manner consistent with R392-600.

Initial Testing: Initial testing for corrosive, flammable, combustible and toxic atmospheres may be necessary upon entry of the property to validate the level of health and safety selected by the decontamination specialist. The information may also be used to help define areas of contamination.

Testing may be conducted with a photo ionization detector, lower explosive limit/oxygen meter or equivalent equipment and should be documented to support the decontamination process. Elevated PID readings may require property to be actively vented (by opening all windows or other reasonable means) prior to the start of remediation.

Identify Other Concerns: Methamphetamine contamination may not be limited simply to cooking and processing areas since it can be released as a vapor, which ultimately has the potential to form a residue on surfaces (lasting until the property is cleaned up). This kind of deposition allows it to be tracked across the property in clothes or distributed by way of the ventilation system to areas where contamination is not suspected. Methamphetamine contamination may not be easily discernable. Porous and adsorbent materials, such as carpeting, drapes, furnishings, wallboard and clothing, in and around areas where cooking was performed can absorb vapors and may collect dust and powder from methamphetamine and the chemicals involved in the manufacturing. This explains why a carpeted hallway and bedroom easily accessed from a kitchen where cooking operations occurred are often contaminated.

A decontamination specialist must gather the information specified in this chapter and R392-600-3. Contaminated areas and material are determined by sampling. Information from law enforcement regarding the drug lab operations, cooking process and layout of the property should be used in conjunction with observations during the visual inspection to label certain areas of the property contaminated and other portions uncontaminated. This designation of the property defines the cleanup criteria and confirmation sampling approach that must be employed per R392-600. An understanding of the site and clandestine drug lab operations is critical since the nature and extent of methamphetamine production directly influences the degree of potential contamination that may be

encountered. The decontamination specialist must notify the lead law enforcement agency if laboratory remnants or other evidence of illegal manufacturing are discovered that may have been overlooked during the gross removal and criminal investigation.

Sampling is not required during the preliminary assessment to delineate areas of contamination. In fact, the decontamination specialist may wish to consider investing the necessary resources into the cleanup of the property, rather than perform a preliminary assessment loaded with samples that simply verify that the property must be decontaminated.

However, the cleanup rules do not prohibit sampling during the preliminary assessment to help define contamination extent. In addition, R392-600-3 states that confirmation samples may also be collected during the preliminary assessment if decontamination is not anticipated due to the lack of supporting evidence of contamination. The need for sampling during a preliminary assessment is a business decision made by the decontamination specialist based on supporting information available at the time. All sampling shall be performed in accordance with R392-600.

For properties that reveal sample results are not above the decontamination standards, a final report must be prepared in accordance with R392-600-7. The report should be submitted to the local health department for review and concurrence that the property may be removed from the contamination list outlined in Section 19-6-903. If the property is contaminated above the standards, the property cannot be removed from the contamination list until decontamination standards have been met. The decontamination specialist must draft a workplan prior to initiating the proposed decontamination activities. In addition, the property must also be kept secure against any un-authorized access until the property has been decontaminated to the standards established in R392-600. The decontamination specialist is encouraged to work with the local health department to implement the appropriate steps.

CHAPTER SIX

Workplan

CHAPTER 6 – Workplan

Section 19-6-904 states that a certified decontamination specialist is required to report to the local health department the location of any property that is the subject of decontamination work by that decontamination specialist. The statute further states that the report shall include sufficient information to allow the local health department to investigate and verify the location of the property and include a workplan for decontaminating the property.

The following are key components of the workplan that should be considered when developing the document. A model template is included in the Appendix F for additional information and may be used in conjunction with the information in this section to help develop a workplan to decontaminate the property. The information in this section and the template are not all encompassing. The decontamination specialist is encouraged to contact the local health department to discuss the contents of the workplan prior to finalizing the document.

Identifying Information of the Property – This section should provide the street address and mailing address of the contaminated property, owner of record, legal description, county tax or parcel identification number and vehicle identification number, if the property is a mobile home, trailer, boat or other mobile source.

Decontamination Specialist Information – This section should include the name of the individual performing the decontamination and the current certification and certification number. If the owner of record is performing the cleanup and the owner consists of more than one individual, the workplan should include the name(s) of the individual(s) performing the cleanup.

Photographs – Include sufficient photographs to document areas of contamination, surfaces/materials that need to be decontaminated and locations where samples will be collected. All photos should be of high quality with the date and time.

Property Description – Describe the nature of the property, type of structures present, areas of contamination and portions of the property that are not considered contaminated. Information regarding areas where illegal drug processing or storage occurred, stained materials and surfaces were observed, potential chemical disposal occurred, and illegal drugs were stored are necessary to ensure the appropriate areas are decontaminated. It is also necessary to identify the ventilation system and indicate if it serves other units.

Contaminants of Interest – This section should provide a description of contaminants that may be present based on the cooking process. The information required in this section may be obtained from the Preliminary Assessment of the property or relevant law enforcement reports.

Preliminary Testing – Results of any testing or sampling, including testing for corrosive, flammable, combustible and toxic atmospheres that may have been performed during the

Preliminary Assessment should be provided to help establish the site conditions and justify proposed sampling locations.

Health and Safety – The necessary level of personal protection equipment should be worn during decontamination. This must be determined by the decontamination specialist performing the cleanup and must comply with 29 CFR 1910.120. The workplan should outline health and safety procedures to prevent worker exposure. For additional information, please refer to Chapter 4.

Shoring Plan – A shoring plan may be necessary if it was determined during the preliminary assessment that shoring and stabilization of the structure is appropriate prior to safely entering the property.

Decontamination Activities – A detailed summary of the proposed activities must be included in the workplan. The decontamination strategy should be based on the findings and conclusions of the Preliminary Assessment. For further information relating to decontamination procedures, please refer to Chapter 7.

- Note any and all surfaces, materials or articles to be removed from the property.
- Note any and all surfaces, materials and articles to be decontaminated on-site.
- Discuss all procedures to be employed to remove and/or clean contaminated surfaces. The discussion should include both areas of contamination and other portions of the property considered not contaminated.
- Note all locations where decontamination activities will be performed.
- Discuss other sampling that may be employed to assist with decontamination.

Confirmation Sampling – This section should include a discussion of the post-decontamination confirmation sampling, detailing sample locations and describing the techniques employed to collect the samples. Only a certified decontamination specialist may collect confirmation samples so the name of the individual collecting the samples should be provided. For further information relating to confirmation sampling procedures, please refer to Chapter 9.

Quality Assurance – Discuss the number and type of field blanks and/or field duplicates that will be collected to document appropriate field sampling. The plan should outline procedures to ensure field and laboratory quality assurance are maintained.

Laboratory – Provide the name of the laboratory, the analytical method proposed and a copy of the laboratory's standard operating procedures relating to the method.

Waste Disposal – The workplan should outline the disposal procedures and the anticipated disposal facility. Disposal procedures for meth-contaminated debris are set forth in R392-600-13 and Chapter 8.

Schedule – This section should include a schedule outlining each task and time frame to complete the proposed decontamination.

Figures and Attachments – Include the appropriate figures and attachments to help convey the proposed decontamination activities. Figures may include a site sketch, areas to be decontaminated and proposed confirmation sample locations. If possible, include copies of the law enforcement report(s) that provide information regarding the cooking method(s), chemicals present, manufacturing areas, chemical storage areas and known areas of contamination.

Prior to implementing the workplan, it must be approved in writing by the decontamination specialist who will execute the workplan and the owner of record and submitted to the local health department with jurisdiction in the county in which the property is located. Local health departments may review and approve the document prior to the start of fieldwork.

CHAPTER SEVEN

Decontamination

CHAPTER 7 – Decontamination

The decontamination specialist shall comply with all applicable federal, state and local rules, ordinances and regulations while decontaminating the property. For decontamination procedures that require another certification or license (such as a general contractors license to perform demolition activities), the decontamination specialist performing the activities subject to the additional licensing/certification must obtain the additional license/certificate as specified in R311-500-10. The Decontamination Specialist Certification Program rules do not supercede standards promulgated by other regulatory programs in the State of Utah.

General Decontamination Overview

Decontamination should proceed in a manner that prevents cross contamination from areas of contamination to portions of the property that are not considered contaminated. The following is a general cleanup sequence that may be considered (detailed discussions relative to the procedures are included in later portions of this chapter). Ultimately, however, it is the responsibility of the decontamination specialist to proceed in a manner that protects human health and the environment and obtains the cleanup standards set forth in R392-600. To proceed:

- Delineate areas of contamination as defined in the preliminary assessment/workplan and confirm all areas that must be decontaminated. Partition off these areas from other portions of the property that are not considered contaminated prior to the start of decontamination using at least 4-mil plastic sheeting or equivalent to prevent the spread of contamination. Turn off the ventilation system as soon as possible. Known mercury releases should be addressed as noted in this chapter.
- Remove all impacted materials from the property that have been identified for disposal. Materials may include furniture, carpeting, appliances, draperies, clothing, wallboard and other impacted materials that cannot be cleaned and subsequently demonstrated to meet the cleanup standards established in R392-600-6. Asbestos and lead based paint containing material must be disturbed, handled and disposed of in accordance with current rules and regulations.
- Decontaminate the ventilation system and all portions of the property attached to the system while the system is turned off.
- Wash all surfaces, materials and items that have not been removed, starting from the areas of contamination to areas not contaminated. Thorough decontamination of the cleaning tools and PPE must be employed to prevent cross contamination from one area to another.

- Upon completion of all cleaning and removal, collect confirmation samples to evaluate the effectiveness of the cleanup and compliance with the decontamination standards established in R392-600.
- Perform additional decontamination and collect confirmation samples as necessary until the property meets the decontamination standards.
- Replace discarded materials such as carpets, draperies and clothes only after it has been determined that cleanup efforts meet the standards set forth in R392-600.
- Repaint the structure, if necessary, upon completion of the decontamination process.

Each clandestine drug laboratory will present challenges not previously considered in this model so decisions relating to decontamination should be made site-specifically and only after the preliminary assessment has been completed.

Decontamination Preparation

The nature and extent of clandestine drug lab operations will directly impact the amount of decontamination required to address the property. On average, clan labs that have been functioning for an extended period of time will likely be more contaminated than those that have recently started operations. Laboratory processes, cooking areas, disposal locations, contaminant transport mechanisms and areas of contamination must be clearly understood, to the extent possible, before decontamination commences to ensure effective decontamination and adequate contaminant reduction.

To help with this process, the decontamination specialist is encouraged to develop a thorough checklist of issues related to the property, and equipment and supplies necessary for decontamination (the list may include items such as nitrile gloves, pH paper, field book, camera, pen, detergent, rags, roll-off bins, etc.) prior to commencing with the proposed activities. Equipment and supplies should be obtained from either a certified laboratory, laboratory supply-company and/or the necessary retail stores. Equipment and supplies should be clean and in proper working condition prior to use.

To increase efficiency when on-site, the decontamination specialist is encouraged to:

- Verify the workplan/decontamination strategy has been approved by the necessary individual(s) and/or regulatory agency in advance of the fieldwork;
- Review the approved plan in advance and determine what equipment/supplies are needed to conduct the decontamination (including appropriate personal protective equipment). Bring extra equipment for unexpected issues;
- Store all equipment in a secure, uncontaminated area which is readily available and accessible;

- Review the site, areas of contamination and cleanup procedures prior to performing decontamination and confirmation sampling; and
- Verify that all workers assisting with the decontamination are current on OSHA HAZWOPER certification and knowledgeable of decontamination procedures employed at the site. The certified decontamination specialist must be on-site at all times and supervise workers assisting with the cleanup as specified in R311-500-8.

DECONTAMINATION PROCEDURES

The procedures outlined in this section may be used for areas of contamination and those areas not considered contaminated.

Mercury

If information from the preliminary assessment suggests mercury was used in the cooking process, the decontamination specialist must assess the presence of mercury vapor and its source prior to decontaminating the meth residue on the property since the presence of mercury may alter the cleanup strategy. Sampling procedures are detailed in Chapter 9 and results should be compared to the decontamination standards set forth in R392-600. Cleanups of metallic mercury must be performed in a manner consistent with the EPA Region 5 Mercury Response Guidebook or equivalent document. The document can be located at <http://www.epa.gov/epaoswer/hazwaste/mercury/spills.htm>.

Gross Cleanup

First responders will generally remove bulk chemicals and other materials, including cylinders and HCL generators during seizure of the lab. However, the decontamination specialist should be prepared to address unexpected occurrences of bulk chemicals or other materials associated with the drug lab operations in the event this material was overlooked during the gross removal and criminal investigation. If laboratory remnants or other evidence of illegal manufacturing are discovered, the decontamination specialist must secure the area and notify the lead law enforcement agency for direction on this matter. The decontamination specialist must be prepared to coordinate with hazardous materials experts to assist with the removal of dangerous waste from the property.

Ventilation

A former lab site should be vented to promote volatilization. To proceed with this activity, the heating system should be turned up and/or the windows should be opened upon initial entry to the property, to the extent practical. The property should be ventilated until vapors have been mitigated and the decontamination specialist is ready to proceed with removal and on-site cleaning. At this point, the ventilation system should be turned off to prevent further contaminant transport. Windows may be opened throughout the cleanup except when venting may impede assessment and decontamination. Care must be taken that vapors are exhausted to the outdoors and not to the air intakes of adjacent structures.

Ventilation procedures should be established on a site-specific basis and only after information has been obtained about the lab.

Removal

In accordance with R392-600-5(3), the decontamination specialist shall conduct the removal of contamination from the property except for porous materials (defined in R392-600-2) from areas not contaminated or other material as allowed by rule that may be cleaned on-site. This means that materials easily penetrated or permeated by gases, liquids or powders such as carpets, draperies, beddings, mattresses, pillows, blankets, towels, clothing and/or any other material that is worn or not properly sealed must be removed from areas of contamination and properly disposed. Disposal procedures are discussed in detail in Chapter 8.

In addition, all visibly stained, discolored, burned or etched fixtures such as bathtubs, sinks, toilets, insulation, sheet rock, plaster, appliances or other household items should be removed and replaced unless they can be easily cleaned on-site as specified in R392-600 and subsequently sampled to demonstrate compliance with the decontamination standards. In some cases, removal of grossly stained sheet rock or wallboard may be more efficient and protective over time than multiple rounds of cleaning. Demolition activities may also be considered for old sheds and other structures where this is a feasible and cost effective remedy.

The decontamination specialist must take due care to avoid excessive dust during decontamination of the property and should wrap all materials that will be removed from the property in a protective cover to prevent the spread of contamination during transportation to the approved disposal facility. Photographs should be taken of each material or article removed from the property to document the decontamination. Asbestos or lead based paint containing material must be disturbed, handled or disposed of in accordance with current local, state and federal rules and regulations. For further information on lead based paint and asbestos regulations, please contact the Department of Environmental Quality, Division of Air Quality at (801) 536-4000.

On-Site Cleaning

Cleaning areas of contamination as well as those areas deemed not contaminated is important to reduce exposure over time. If a surface has visible contamination or staining, complete removal and replacement is necessary unless the material is smooth and easily cleanable.

Rule R392-600 allows cleaning on-site if the surfaces or materials identified for cleaning are smooth and easily cleanable. The rule states that these items shall be washed with a detergent (could include Simple Green or Trisodium Phosphate or other accepted detergent) and water solution and upon completion, this procedure must be repeated at least two additional times in the same area using new detergent solution and rinse water. As an example, all walls, ceilings, hard flooring, counter tops, cabinets, appliances, and other

materials not removed for disposal within an area of contamination must be cleaned. If there is no visible staining, methamphetamine may still be present. The decontamination specialist should wash the entire surface (from the top to the base in a uniform manner) using care to ensure that all portions of the surface are thoroughly washed, wiped down and dried. This procedure applies to all portions of the property that can be easily decontaminated on-site.

In cases where acids or bases are known to be present, potential health effects may be mitigated through neutralization of this material (acids may be neutralized with baking soda) prior to the cleaning requirements noted in this chapter. Surfaces that cannot be cleaned with detergent and water should either be removed, or if this is not practical, be dry vacuumed with a high efficiency particulate air (HEPA) filtered vacuum to allow for further decontamination. Porous materials (such as clothing, linens and other fabric items), dishes, flatware and other hard non-porous household goods from areas not contaminated with no evidence of contamination or staining may be laundered on-site, using care to machine wash each article or material three separate times in three separate loads with hot water and detergent.

All appliances must be removed and properly disposed of, unless the decontamination specialist determines that the appliance can be cleaned on-site to meet the decontamination standards. Cleaning should address the inside of the appliance (e.g., microwave, refrigerator, etc.) as well as the outside surfaces. Only smooth and easily cleanable surfaces may be decontaminated on-site.

Ventilation System Cleaning

The nature and location of the ventilation system and ventilation ducts must be defined when assessing the property since the system can harbor dust, vapors, chemical residues and methamphetamine and redistribute them throughout the property. The decontamination specialist should perform a walk-through of the structure prior to cleaning to establish a specific plan for decontamination, including walls, ceilings and flooring near the ventilation ducts. The cleaning procedures outlined below and in previous sections should be adopted to address the meth contamination. To proceed:

- Shut off the unit and lock out all air handler units before working on each air conveyance system.
- Place protective coverings in areas where work is being performed, including plastic or drop cloths around each area where the duct is penetrated.
- Connect a fan-powered HEPA filter collection machine to the ductwork to develop a negative air pressure.
- Remove and clean all air registers on the property no matter their location on the wall, ceiling or floor. Temporary filter media should cover all air register openings.

- Beginning with the outside air intake and return air ducts, clean the ventilation system using electrical agitators to agitate debris into an airborne state. Air lances, mechanical agitators or rotary brushes may be inserted into the ducts through the air register openings to loosen all dirt, dust and other materials. Use controls to ensure debris is not dispersed outside the air conveyance system during cleaning. After this task is complete, the openings must be covered by temporary filter media to prevent further contaminant migration.
- Inspect and clean all air handler units, including the return air housing, coils, fans, supply diffusers and drip pans.
- Clean the supply ductwork using the techniques described in previous bullets.
- Remove and dispose of all porous linings and filters.
- Clean the walls, floors and ceilings as noted in the On-site cleaning section of this chapter.

After cleaning, the ventilation system must be sealed off at all openings with at least 4-mil plastic sheeting or other barrier of equivalent strength and effectiveness to prevent further contamination of the property. The unit must not be turned on until confirmation samples have been collected and the decontamination standards have been met throughout the property.

Areas of Contamination

Noticeably or measurably impacted locations must be defined during the preliminary assessment, allowing cleanup of the most contaminated areas to proceed. This may include high traffic areas and pathways such as a hallway to and from the cooking area(s) since these areas can harbor elevated levels of meth. To proceed with the cleanup:

- All porous materials from areas where contamination was detected or there was signs of use or production must be removed from the site and properly disposed of. On-site cleaning of any porous materials that are not smooth and easily cleanable is not allowed by rule.
- All stained materials/surfaces from the illegal drug operations shall be removed and properly disposed of unless the decontamination specialist determines that cleaning and testing can be performed and can demonstrate based on results of confirmation sampling and testing that said materials meet the decontamination standards. Only smooth and easily cleanable materials/surfaces may be decontaminated on-site. Pitted or etched materials/surfaces may not be successfully cleaned and should be removed for disposal.
- All non-porous materials/surfaces may be cleaned to the point of stain removal using the on-site cleaning techniques outlined in this chapter. Non-porous is defined in R392-600-2. If the staining remains visible after cleaning, further cleaning should be performed or the material/surface should simply be removed and properly disposed of. Only smooth and

easily cleanable materials/surfaces may be decontaminated on-site as stated in previous sections.

- All exposed concrete surfaces shall be thoroughly cleaned using the decontamination procedures outlined in the rule and this chapter. If on-site cleaning is not successful, the concrete must be removed and properly disposed of.
- All appliances shall be removed and properly disposed of, unless the decontamination specialist determines that the appliance can be cleaned on-site to meet the decontamination standards. Cleaning should address the inside of the appliance (e.g., microwave, refrigerator, etc.) as well as the outside surfaces. Only smooth and easily cleanable surfaces may be decontaminated on-site. For appliance such as ovens that have insulation, a 100 square centimeter portion of the insulation must also be tested to ensure compliance with the decontamination standards.

Plumbing and Septic System

Waste products and sludge generated during the production of methamphetamine and other illegal drugs may be dumped in sinks, drains or toilets as a mechanism to dispose of the waste and avoid detection by law enforcement personnel. Field screening must be conducted to confirm or deny the presence of illegal drug lab waste. Plumbing inlets to the septic or sewer system, including sinks, floor drains, bathtubs, showers and toilets must be visually assessed for any staining or other observable residual contamination. Witness statements and other visual observations associated with the septic tank are also useful. Plumbing traps must also be assessed with a PID or mercury vapor analyzer as directed in Section R392-600-5(8). If there is no evidence that mercury was used in the cooking process, a mercury assessment is not required.

If the volatile organic, mercury vapor or other concentrations exceed the decontamination standards, the accessible plumbing and traps must be removed and properly disposed of. Rule R392-600 also states that accessible plumbing traps may be cleaned on-site and subsequently tested to meet the decontamination standards. If the standards are not achieved, further activities are necessary to obtain the decontamination standards.

To facilitate the investigation and cleanup of the plumbing and septic system, the decontamination specialist shall obtain documentation from the local health department or local wastewater company describing the sewer disposal system for the dwelling. If the dwelling is connected to an on-site septic system, a sample of the septic tank liquids must be obtained from a representative area and tested for volatile organics, and potentially metals (depending on the cooking method), unless the preliminary assessment indicates that contamination was unlikely to have occurred via this pathway.

Septic Tank Sampling and Testing Procedures

- Prior to sampling, the septic tank must be sufficiently excavated to assess whether the tank consists of one or two chambers.
- Samples from single chamber tanks must be collected from the baffle on the outlet end of the tank. Samples from dual chamber tanks must be collected from the baffle on the outlet end of chamber one.
- All samples must be representative of the waste from the septic tank. Sampling and testing must be performed in accordance with current EPA sampling and testing protocol for liquids. The decontamination specialist must be familiar with standard operating procedures prior to sample collection.
- The liquid in the septic tank must be sampled with a new clean bailer or similar equipment. The sampling device should be inserted into the tank until it hits the bottom.
- Upon sample collection, the liquid should be decanted or poured with minimal turbulence into three new 40 ml vials properly prepared and preserved by the analytical laboratory. The vials should be filled so that there are no air bubbles in the sealed container. If air bubbles are present, the vial must be emptied and refilled. For other samples, the specific volume and type of sample container should be determined based on the type of analysis desired.
- The samples must be properly labeled with at least the date, time, and sample location. The sample vials shall be refrigerated to maintain a temperature of 4° C until delivered to the analytical laboratory. All samples must be analyzed using EPA Method 8260B or equivalent for volatile organics and, if necessary, EPA methods in the 6000 and 7000 series for lead and mercury.

If sample concentrations are not above the standards identified in Table1, no additional work is required in the septic system area unless requested by the owner of the property.

Table 1 – Septic Tank Characterization Requirements

Septic Tank Liquid	Volatile Organic Compounds	Acetone	*Lead	*Mercury
	Groundwater Quality Standards - R317-6-2	700 ug/L	Groundwater Quality Standards - R317-6-2	Groundwater Quality Standards - R317-6-2
Soil	Volatile Organic Compounds	Acetone	*Lead	*Mercury
	EPA Region 9 Preliminary Remediation Goals	EPA Region 9 Preliminary Remediation Goals	EPA Region 9 Preliminary Remediation Goals or Background Concentrations	EPA Region 9 Preliminary Remediation Goals or Background Concentrations
Groundwater	Volatile Organic Compounds	Acetone	*Lead	*Mercury
	Groundwater Quality Standards - R317-6-2	700 ug/L	Groundwater Quality Standards - R317-6-2	Groundwater Quality Standards - R317-6-2

* Must be analyzed for unless there is clear evidence that these metals were not used in the manufacture of illegal drugs.

If contaminants are detected in the septic tank at concentrations exceeding the Utah Groundwater Quality Standards or exceeding 700 ug/L for acetone:

- The decontamination specialist shall notify the Utah Department of Environmental Quality/Division of Water Quality, Groundwater Protection Section in writing, if a release has occurred to a single family septic system or a multiple family system serving less than 20 people.
- The contents of the septic tank must be removed and properly disposed. Methamphetamine waste in septic tanks will not be considered a listed hazardous waste because the solvents have been used and there is too much uncertainty about the types, sources and original concentrations of solvents discovered in the septic tank. The decontamination specialist may still be required to determine if the waste is characteristic for toxicity, flammability, corrosivity or reactivity per accepted EPA methods prior to disposal.
- The decontamination specialist shall investigate the septic system discharge area for volatile organics and lead and mercury, unless there is clear evidence that lead and mercury was not used in the manufacturing of illegal drugs.
- The horizontal and vertical extent of any VOCs, mercury and lead detected in soil samples should be delineated to the standards in Table 1. If contamination has migrated to groundwater, the decontamination specialist shall delineate the extent of groundwater

contamination using standard and accepted techniques in the profession of groundwater assessment. After complete characterization of the release, the decontamination specialist shall remediate impacted soils and groundwater to the standards outlined Table 1. Specific investigation and remediation requirements should be determined through consultation with the local health department.

Burn Areas and Trash Piles

If burn areas, trash pits, debris or trash piles or stained soil are encountered on the property, these areas must be investigated (using sampling and necessary testing equipment such as a PID) and remediated, if necessary since the contamination could linger in the environment creating a potential risk to human health and the environment. The investigation must include the analysis of volatile organics and lead and mercury, unless there is clear evidence that lead and mercury was not used in the manufacturing of illegal drugs.

If contaminants are not above the standards identified in Table 2, no additional work is required in the area unless requested by the owner of the property.

Table 2 – Burn Area and Trash Pile Characterization Requirements

Soil	Volatile Organic Compounds	Acetone	*Lead	*Mercury
	EPA Region 9 Preliminary Remediation Goals	EPA Region 9 Preliminary Remediation Goals	EPA Region 9 Preliminary Remediation Goals or Background Concentrations	EPA Region 9 Preliminary Remediation Goals or Background Concentrations
Groundwater	Volatile Organic Compounds	Acetone	*Lead	*Mercury
	Groundwater Quality Standards - R317-6-2	700 ug/L	Groundwater Quality Standards – R317-6-2	Groundwater Quality Standards - R317-6-2

*** Must be analyzed unless there is clear evidence that these metals were not used in the manufacture of illegal drugs.**

If contaminants are detected in the burn areas or trash pits at concentrations exceeding the standards in Table 2, the horizontal and vertical extent of any VOCs, mercury and lead detected in soil and groundwater should be delineated and remediated to the standards outlined Table 2. All assessment and remediation must be performed using current and accepted techniques in the environmental field.

Areas Not Contaminated

Areas not contaminated are considered areas outside of the main location(s) where illegal drugs were produced and hazardous materials were stored or suspected of being used that do not reveal obvious visual or olfactory signs of contamination. To protect human health and the environment, these areas must also be addressed in a manner outlined in R392-600. It is the responsibility of the decontamination specialist to where residue may be and whether areas are contaminated or not contaminated during the preliminary assessment, determine which materials/surfaces may be considered porous and non-porous and decontaminate the property to the standards established in the rule. To proceed:

Porous materials with no evidence of staining or contamination may be cleaned on site by HEPA vacuuming and one of the following methods:

- **Steam cleaning:** To clean with this method, a party must inject hot water and detergent into the porous materials under pressure to agitate and loosen any potential contamination. The water and detergent must then be extracted by a wet vacuum to complete the first round of cleaning. This process should be repeated at least two additional times.
- **Detergent and water solution:** Porous materials may be washed in a washing machine with detergent and hot water for at least 15 minutes. To complete the cleaning, this process must be repeated at least two additional times. Materials may be dried on-site.

Non-porous materials/surfaces may potentially include sealed floors, walls, and ceilings and other features such as bathtubs and mirrors. These materials/surfaces must be cleaned as outlined in R392-600-5(11) and the “On-site” cleaning section of this chapter. This cleaning involves washing with a detergent and water solution and then thoroughly rinsing. Cleaning should be repeated at least two additional times using new detergent solution and rinse water to maximize the effectiveness. Note: It is important that all walls and surfaces that are smooth and easily cleanable be cleaned using the procedures established in R392-600 since all contamination may not be visible.

Spray-on acoustical ceilings should be sampled and tested for asbestos to determine whether asbestos abatement protocols are necessary, should the ceiling need to be removed due to excessive contamination.

After decontamination has been completed on portions of the property not considered contaminated, doors and other openings shall be partitioned off from all other areas with at least 4-mil plastic sheeting or equivalent to avoid cross contamination, if there is a need for further activities on the property.

Motor Vehicles

Motor vehicles used in the production of methamphetamine or other illegal drugs shall be decontaminated in accordance with R392-600 unless it is determined that the cleanup costs

exceed the value of the vehicle. In this case, an owner may choose the most cost effective course of action.

For property that cannot be cleaned in a manner consistent with the rule, the motor vehicle shall no longer be occupied and the property must be disposed in accordance with the current rules and regulations (such as a vehicle demolition facility).

Final Assessment

Upon completion of the cleanup, the decontamination specialist should conduct a final walk through of the property and assess the potential for additional contamination, including further staining and odors.

CHAPTER EIGHT

Waste Characterization and Disposal

CHAPTER 8 – Waste Characterization and Disposal

Bulk chemicals, powders, pressurized cylinders, contaminated debris, impacted materials and equipment used during the production of illegal drugs may be encountered at the property during the cleanup. This waste must be managed in a manner consistent with the current rules and regulations.

The Hazardous Waste Rules of R315-1 through R315-101, the Solid Waste Rules of R315-301 through R315-320 and the Illegal Drug Operations Decontamination Standards R392-600 regulate the management and disposal of hazardous waste and contaminated debris generated during decontamination.

The decontamination specialist shall comply with the above rules and meet the following criteria:

- No waste, impacted materials or contaminated debris from the decontamination of a illegal drug laboratory may be removed from the site or waste stream for recycling or reuse without the written approval of the local health department.
- All items removed from the illegal drug laboratory and waste generated during decontamination work shall be properly disposed.
- All liquid waste, powders, pressurized cylinders and equipment used during the production of illegal drugs shall be properly characterized by sampling or testing prior to making a determination regarding disposal or the waste shall simply be considered hazardous waste and disposed of properly pursuant to applicable regulations, except the waste shall not be deemed to be household hazardous waste.
- All impacted materials and contaminated debris that are not determined by the decontamination specialist to be a hazardous waste may be considered a solid waste and disposed of at a permitted solid waste landfill, provided approval from the landfill is obtained prior to disposal.
- All Infectious Waste shall be managed in accordance with Federal, State and local requirements.
- The disturbance, removal and disposal of asbestos must be done in compliance with all Federal, State, and local requirements including the requirements for Asbestos Certification, Asbestos Work Practices and Implementation of Toxic Substances Control Act, Utah Administrative Code R307-801.
- The removal and disposal of lead based paint must be done in compliance with all Federal, State, and local requirements including the requirements for Lead-Based Paint Accreditation, Certification and Work Practice Standards, Utah Administrative Code R307-840.

- The certified decontamination specialist and owner of record shall comply with all federal, state, municipal, county or city codes, ordinances and regulations pertaining to waste storage, manifesting, record keeping, waste transportation and disposal.

One of the most important steps in managing a waste stream associated with the decontamination process is to determine whether the waste is a hazardous waste (as defined in R315-2-3 of the hazardous waste rules) or a solid waste (as define in R315-2-2 of the hazardous waste rules). This determination is made by the decontamination specialist or owner of record and must be performed in a manner consistent with current EPA protocols and applicable federal, state and local regulations.

Solid Waste

Solid waste may be disposed of at a licensed facility. This includes any material, article or surface that is impacted with methamphetamine. Waste contaminated with meth is considered a solid waste and shall not be recycled. This means that procedures must be established by the decontamination specialist to prevent contaminated debris (e.g., a stained couch) from being placed on the road for curbside pickup or from being removed from the landfill upon subsequent disposal. The decontamination specialist is encouraged to work with the landfill to ensure contaminated debris brought to the facility is secured and managed as soon as possible.

Hazardous Waste

Each category of generator shall comply with the hazardous waste rules specific to that category. So for each cleanup, the decontamination specialist shall determine if hazardous waste is being generated, what amount of hazardous waste is being generated in the calendar month and what the management requirements are for that generator category.

The rules apply to both private companies and public agencies that generate hazardous waste in Utah. Each hazardous waste generator shall obtain an EPA identification number. This number is designated to a specific site and is not transferable from one site to another. Numbers are free of charge and may be obtained by contacting the Division of Solid and Hazardous Waste (801) 538-6170.

Any waste resulting from the decontamination is linked to the physical address, making the property owner the generator, not the decontamination specialist. The property owner may contract with the decontamination specialist to provide the services for the designation and/or transport of the waste to a permitted facility.

EPA defines three categories of hazardous waste generators based upon the quantity of hazardous waste they generate per month.

1. Conditionally exempt small quantity generators, which generate less than 220 pounds (100 kg) per month. Most small sites will likely fall under this category.

2. Small quantity generators, which generate between 220 pounds (100 kg) and 2,200 pounds (1,000 kg) per month.

3. Large quantity generators, which generate more than 2,200 pounds (1,000 kg) per month.

Conditionally exempt small quantity generators are exempt from most of the state and federal regulations if they remain within the following limits:

- Generate less than 220 pounds of hazardous waste or less than 2.2 pounds of certain pesticides or poisons each month or batch at a given site.
- Manage the waste in a manner that does not pose a threat to human health or the environment.
- Treat and dispose of the waste in accordance with the current rules and regulations.

Under this category, waste may be taken to an off-site treatment or disposal facility that is

- 1.) A state or federally regulated treatment, storage or disposal facility;
- 2.) A facility permitted, licensed or registered by a state to manage municipal or industrial solid waste (if permission is obtained);
- 3.) A facility that uses, reuses or legitimately recycles the waste; or
- 4.) A universal waste handler or destination facility subject to the universal waste requirements of R315-16 of the hazardous waste rules.

If the quantity of waste generated is greater than 220 pounds, the generator will either be a Small Quantity Generator or a Large Quantity Generator depending on the volume generated. This designation will require the generator to hire a licensed hazardous waste transporter to transport the waste to a Treatment, Storage and Disposal facility. The decontamination specialist may not be a licensed transporter of hazardous waste. Each shipment shall be accompanied by a hazardous waste manifest. A list of companies that provide this service may be obtained from the Division of Solid and Hazardous Waste.

Disposal of Wash Water

Wash water generated during decontamination should be containerized on-site to avoid improper disposal. Please contact the local Public Owned Treatment Works (POTW) to gather information regarding potential disposal to the sanitary sewer. This water should not be disposed of by dumping it on the ground.

CHAPTER NINE

Confirmation Sampling

CHAPTER 9 – Confirmation Sampling

Confirmation sampling means collecting samples during a preliminary assessment or upon completion of decontamination activities to confirm that contamination is not above the decontamination standards. Confirmation sampling is an important component of the decontamination strategy and is required in R392-600-6. The certified decontamination specialist must be the only individual collecting confirmation samples on the property as noted in R311-500-8 and R311-600-2.

Sample Preparation

The decontamination specialist is encouraged to develop a thorough checklist of equipment and supplies necessary for sampling (the list may include items such as cotton gauze, nitrile gloves, pH paper, field book, camera, pen, methanol, etc.).

Equipment and supplies should be obtained from either a certified laboratory, laboratory supply-company and/or the necessary retail stores. Equipment and supplies should be clean and in proper working condition prior to use.

To increase sampling efficiency and minimize contamination of sampling equipment and supplies, the decontamination specialist is encouraged to:

- a. Verify the necessary individual(s) and regulatory agency has approved the sampling plan;
- b. Review the approved plan and determine what equipment/supplies are needed to conduct the sampling project (including appropriate personal protective equipment). Bring extra sampling and related equipment for unexpected issues;
- c. Obtain necessary sampling supplies and prepare for sampling in advance;
- d. Pre-label sampling templates;
- e. Store all equipment in a secure, uncontaminated area using zip lock bags; and
- f. Prepare the field blank.

CONFIRMATION SAMPLING PROCEDURES

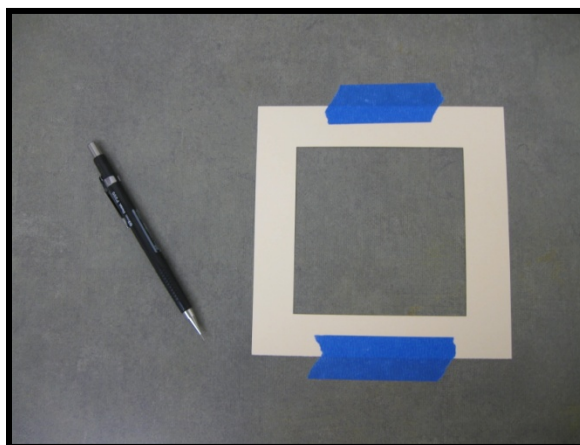
Methamphetamine, Ecstasy, Ephedrine, Pseudoephedrine

- Confirmation samples must be collected from all decontaminated areas and materials, areas not considered contaminated and surfaces that have not been removed in a manner consistent with R392-600 and this manual. The location of samples should be based on information gathered during the preliminary assessment (as an example, samples may be collected from a counter top, floor and wall directly impacted by cooking operations in the

kitchen). The procedures outlined in this chapter are applicable to areas of contamination, decontaminated areas, and areas not contaminated. Samples are not required from surfaces or materials that have been removed and replaced, unless there is evidence that the surface or material has been contaminated.

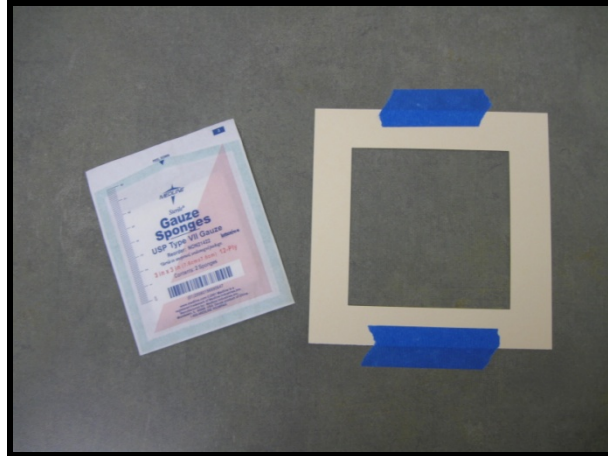
- In accordance with R392-600-6, wipe samples shall be used to determine the extent of contamination on non-porous surfaces and shall be biased toward areas where contamination is suspected or confirmed. Samples must not be collected where the potential for contamination is limited if other locations nearby, such as a former cooking, storage or waste disposal area, are more likely to be impacted. Confirmation samples are designed to assess the effectiveness of decontamination.
- All samples must be obtained from areas representative of the materials or surfaces being tested. Confirmation samples must not be collected from porous surfaces as it is difficult to obtain a representative sample. Samples collected from a porous surface may be rejected or qualified as screening only.
- Samples collected from areas of contamination may be discrete grab samples, meaning a sample is collected on one new cotton gauze only, or may be a composite sample as described below.
- Samples collected from areas not contaminated may be combined to form one composite sample per room or sampling area. The samples should consist of no more than three discrete samples and be collected in a manner that provides an accurate representation of the area sampled and highest potential for contamination. Composite sampling must consist of like media and similar surface area.

Each sample area shall be 10 centimeter x 10 centimeter (cm) as depicted in the figure. To define the sample area, place the disposable template or tape on the surface to be sampled using caution not to disturb the sampling area. The template may consist of a sheet of Teflon with a hole cut according to the required dimensions. Use tape or tacks to secure the template.



Typical methamphetamine sample area (10 cm x 10 cm) outlined within the template.

All wipe samples must be collected using 3" x 3" 12-ply or 4" x 4" 8-ply cotton gauze media contained in a sterile package. To handle the media, grasp the gauze with stainless steel forceps or gloved hand (using a new set of nitrile non-powdered gloves for each sample).

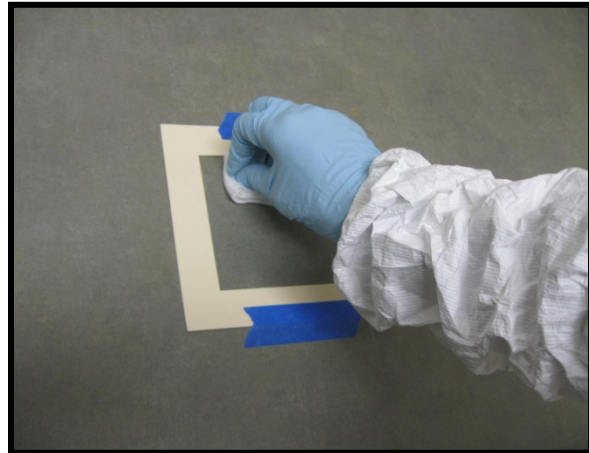


Sample set up using a template to define the sample area.

- Prior to sampling, the cotton gauze must be sufficiently wetted (but not dripping) with analytical grade methanol as described in R392-600-6 to enhance collection efficiency. The sample media may be prepared in advance and should be stored in a clean sample container in a manner that maintains the efficacy of the sample media. Cotton gauze that has dried out may not be used to collect samples.
- Since methanol is a toxic and flammable liquid, it must be handled and stored with all safety precautions related to toxic and flammable liquid.
 - Store small amounts of methanol and frequently replenish the supply.
 - Place a signed or initial chain-of-custody seal over the bottle top and neck.
 - Avoid inhalation of vapors.
 - Containers must be handled in a ventilated area.
 - Protective gloves should be worn when handling containers of methanol.
 - Keep away from open flames, areas of extreme heat and other ignition sources.
- Enough sample wipe media must be selected to provide for all laboratory media blanks, trip or field blanks, duplicate samples and quality control samples that will be required.
- To collect the sample, fold the pre-wetted gauze in half and then fold in half again. Press the sample media down firmly, but not excessively, with the fingers, being careful not to touch the sample surface with the thumb.
- The cotton gauze should be wiped uniformly at least five times in two perpendicular directions within the sampling area as shown in the following figures. Be sure that the sample technique allows coverage of the entire wipe area, while avoiding the template. After the first few passes, reverse the last fold so the exposed side of the gauze is facing inward and using a fresh surface of the gauze continue in the same manner as before. Do not allow the previous gauze sample area to come into contact with any other surfaces.

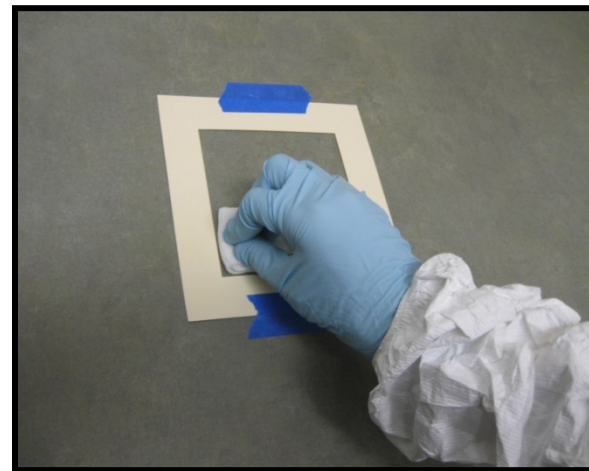
- Rougher surfaces should be blotted uniformly instead of wiping (prevents the threads of the gauze media from being snagged by the surface). To collect the sample, blot the areas within the template with at least five overlapping side to side horizontal passes beginning at the top and progressing to the bottom. Without allowing the gauze to touch any other surfaces, reverse the last fold so the exposed side of the gauze is facing inward. Using a fresh surface of the gauze, blot the area again with at least five overlapping top to bottom vertical passes beginning at the left and progressing to the right.

- Samples collected from areas of contamination may be grab samples or composite samples while samples collected from areas not contaminated may be composited to form one sample per room or sampling area.



Wipe samples collected within a sample template.

- The individual collecting the samples shall wear a new pair of nitrile gloves to obtain each sample.



Wipe samples collected within a sample template.

- After sampling, roll or fold the pad into a 50-mL polypropylene centrifuge tube or 40 ml glass vial. Place each sample in a new, clean sample container. Cap the sample container tightly and label it for identification on the chain-of-custody. Refrigerate the sample as soon as possible and keep refrigerated until delivered to an analytical laboratory. Plastic bags must not be used for sample storage, unless the sample is in a container as described above.

- The sample container must be properly labeled with the site or project identification number, date, time and actual sample location. The information and a description of the sample and sample area should also be recorded in a bound, all weather field log book for later correlation with the analytical results. The logbook should be dedicated to the project of interest and contain field data relative to project location, dates and times, instruments used, sample information (location, number and type), activities performed and pertinent observations.
- All samples must be maintained under chain-of-custody protocol in accordance with industry standards for the types of samples and analytical testing to be conducted. A chain-of-custody provides documentation of sample integrity from the time the sample is collected until it is received by the laboratory. It is recommended that the decontamination specialist use a custody record supplied by the analytical laboratory and provide all the information required on the form (analytical method, sample identification, turn around time, signatures, etc.) to ensure proper documentation and analysis. Place the form inside a waterproof, zip lock bag and include it with the samples.
- To preserve the integrity of the samples during transportation, place methamphetamine and other samples in a cooler filled with ice immediately after sampling. The samples should be packed in a manner that prevents breakage and water from melting ice entering the sample containers. Ensure the chain-of-custody is included in the sample cooler and a custody seal is placed on the outside of the cooler if the individual responsible for the samples does not hand deliver them to the analytical laboratory.
- One quality assurance field blank, treated in the same fashion as the real samples, but without wiping, should be submitted for every 10 samples collected. If there are less than 10 samples collected on the property, a blank should still be submitted with the sample load as a quality assurance measure.
- Samples should be delivered to the laboratory within 24 hours of sample collection and analyzed by a method approved by the Department of Health. Please refer to Quality Assurance/Quality Control section of this manual for additional information on analytical methods.
- All samples must be photographed as defined in R392-600 and logged with respect to the area on the property to document the location. This activity should be performed after the sample is collected, while the template remains in place.
- The confirmation sample order should include methamphetamine and associated compounds, volatile organics, mercury, if applicable, corrosives and lead, if applicable. Various confirmation sample techniques will be used for volatile organics, mercury and corrosives as specified in later portions of this chapter.

Areas of Contamination

An illegal drug laboratory may be found on any property, including single family residences, out buildings, garages, units of multiplexes, condominiums, apartment buildings, warehouses, hotels, motels, boats, motor vehicles, trailers, manufactured housing, shops or booths.

Since it is difficult to predict where a laboratory will be located, R392-600 establishes a general approach relative to the number and location of samples. The sampling requirements, number, frequency and location established are not limited strictly to a single-family house type setting. Professional judgment and consultation with the local health department should occur when establishing confirmation samples for any property.

The decontamination specialist should use all the information obtained from the preliminary assessment to guide sampling. Areas of contamination must be defined since this determines the sampling procedure and approach. Samples are not required from surfaces or materials that have been removed and replaced, unless there is evidence that the surface or material has been re-contaminated. In some cases, it may be more cost effective to simply remove the material than to decontaminate and sample to demonstrate compliance with cleanup standards. To proceed with sampling:

- Three samples must be collected from each room of the property where illegal drug processing occurred, hazardous materials were stored, and where staining or contamination was or is present. According to the rules, the samples shall be obtained from a non-porous section of the floor, wall, and ceiling in each room or any other location where contamination was or is present based on the decontamination specialist's professional judgment and site-specific information. As an example, samples may be collected from a counter top, floor and wall directly impacted by cooking operations in the kitchen. In a bathroom, samples may be collected from a counter top, wall, sink or floor to gauge the effectiveness of decontamination.
- If there are any appliances in the areas of contamination, one 10 cm x 10 cm area shall be sampled from the exposed portion of each appliance, which may include the inside of the appliance. If multiple appliances are present, each wipe sample may be a composite of up to three 100 square centimeter areas on three separate appliances, provided the samples are biased toward the areas most likely to be impacted.
- Three 10 cm x 10 cm areas of the ventilation system shall be sampled, unless the system serves more than one unit or structure. If the system serves more than one unit or structure, samples must be collected from a representative distribution of the system as well as the corresponding areas that it serves until the contamination has been delineated and decontaminated and the decontamination specialist has determined that the system is not impacted above the established cleanup standards.
- For any other enclosed space where contamination is a concern, three samples shall be collected from the surfaces most likely to be impacted based on information collected during the preliminary assessment or decontamination phase. This may include a motor

vehicle and any applicable portions of a motor home, trailer, storage unit, motel or other enclosed area not covered by the sampling requirements described in the previous sections.

Samples collected from impacted locations may be discrete grab samples or composite samples with an average or standardized result provided by the laboratory or calculated from the total recovery value.

Areas Not Contaminated

Areas not contaminated include any portion of the property that is not linked to or associated with areas that are deemed contaminated and that do not reveal obvious visual or olfactory signs of contamination, but may however, be impacted by the residue from other parts of the property.

To address the last part of this definition, confirmation sampling is necessary from areas that are not considered contaminated or considered decontaminated after cleaning is complete. To proceed:

- Three samples must be collected from each room of the property. The samples shall be obtained from a non-porous section of the floor, wall and ceiling in each room or any other location where contamination is suspected or highly likely based on the decontamination specialist's professional judgment and site-specific information.
- If there are any appliances, one 10 cm x 10 cm area shall be sampled from the exposed portion of each appliance, which may include the inside of a microwave. If multiple appliances are present, each wipe sample may be a composite of up to three 100 square centimeter areas on three separate appliances, provided the samples are biased toward the areas most likely to be impacted.
- Three 10 cm x 10 cm areas of the ventilation system shall be sampled, unless the system is the same one previously sampled to assess areas of contamination. All samples shall be collected from a representative distribution of the system as well as the corresponding areas that it serves until the contamination has been delineated, decontaminated and determined that the system is not impacted above the established cleanup standards.
- For any other enclosed space where illegal drug processing occurred, hazardous materials were stored or staining or contamination was present, three samples shall be collected from the surfaces most likely to be impacted based on information collected during the preliminary assessment or decontamination phase. These samples may be combined into a composite sample. This approach is designed to reduce uncertainty and must include professional judgment to ensure a representative distribution of samples are collected from the property.

Samples collected may be combined to form one composite sample per room or sampling area for both areas of contamination and areas not contaminated. The averaged or

standardized result of the composite sample should be provided by the laboratory or calculated from total recovery value. The sampling procedures outlined on previous pages of this document apply. All individual samples that make up a composite sample must be placed in one sample container and be representative of similar surfaces.

Volatile Organics

Residual contamination may be present on the property if the source of contamination has not been removed or the property has not been properly ventilated during decontamination. Confirmation sampling must be performed to evaluate the presence of volatile organics. Note: The decontamination specialist should use caution and professional judgment when sampling from an environment that contains household products not associated with the illegal drug production as these products may leak, therefore creating a false positive when screening the property.

Confirmation Sampling Procedures:

- A properly calibrated Photo Ionization Detector or Flame Ionization Detector capable of detecting volatile organics may be used for testing. The instrument should be calibrated according to the manufacture's specifications before any testing.
- Prior to the assessment, background concentrations of volatile organics must be obtained by testing three exterior areas of the property for one minute. The testing should be performed outside of areas of contamination and in areas with no known or suspected source of volatile organics. Samples should be collected from the adult and child breathing zones. The background readings should be recorded in the appropriate field notebook for later correlation with the analytical results. The logbook should be dedicated to the project of interest and contain field data relative to project location, dates and times, instruments used, sample information (location, number and type), activities performed and pertinent observations.
- At least three locations in a room where contamination was detected must be tested to assess the presence of volatile organics (confirmation samples with a PID must be collected from all decontaminated areas). To perform this activity, the testing equipment probe should be held in the sample location for approximately 30 seconds to obtain a reading. Testing should be performed in the breathing zone of an adult and child, and should be biased toward cooking areas, known spills and areas of previous contamination, including floors, walls and other household features (such as counter tops, tables, etc.) where contamination was present or suspected.

All accessible plumbing traps throughout the property should be tested for potential contamination. The testing equipment probe must be held in the plumbing pipe above the trap or near the drain for approximately 60 seconds to obtain a reading.



Testing a drain for volatile organics with a Photo Ionization Detector.

- To complete sampling, all locations must be photographed and logged with respect to the area on the property.
- Samples results should be compared to the standards set forth in Chapter 10.

Corrosives

Since acid vapors may be present during and after the cooking process, surfaces in areas of contamination should be tested to evaluate the pH.

The property should be screened prior to and upon completion of the decontamination process. Confirmation samples must be collected from all decontaminated areas and materials, and surfaces that have not been removed. Sample locations should be established based on information gathered from the preliminary assessment and biased toward areas where contamination is suspected or where decontamination was performed (such as a cooking area).

Confirmation sampling procedures:

- All samples must be obtained from areas representative of the materials or surfaces being tested. Confirmation samples must not be collected from porous surfaces.
- A new pair of nitrile gloves shall be donned for each sample.
- Surface pH measurements must be made using deionized water and standard pH test paper. The pH from the test strip should be compared to the readings on the outside of the container.

For liquids that are visible on a surface, the pH test strip shall be placed in the liquid for a minimum of 30 seconds and read.



Testing a liquid encountered on a surface with a pH test strip.

- For horizontal surfaces that contain no visible liquid, deionized water shall be applied to the surface and allowed to stand for at least three minutes. To assess the pH, the test strip must be placed in the water for a minimum of 30 seconds and read. The pH from the test strip should be compared to the readings on the outside of the container to determine the potential impact.
- For vertical surfaces, a cotton gauze, 3" x 3" 12-ply or 4" x 4" 8-ply, in sterile packages, shall be wetted with deionized water and wiped over a 10 cm x 10 cm area at least five times in two perpendicular directions. Be sure that the sample technique allows coverage of the entire wipe area. Do not allow the sample to come into contact with any other surfaces. Rough surfaces should be blotted uniformly instead of wiping.
- After the sample is collected from the vertical surface, the cotton gauze shall then be placed into a clean sample container and covered with deionized water that is poured in the container. Allow the cotton gauze to stand for at least three minutes. To gather a reading, place the pH test strip in the container for a minimum of 30 seconds. To assess the need for further action, the pH from the test strip must be compared to the readings on the outside of the container.
- According to R392-600-6, testing shall be conducted on at least three locations in each room within the areas of contamination. Sample locations may include counter tops, tables, stovetops and other surfaces that may have harbored contamination.
- To complete the sampling, all samples must be photographed and logged with respect to the area on the property. Sample results should be compared to the standards set forth in Chapter 10.

Lead

Lead sampling shall not be conducted at the property unless there is clear evidence that lead was used in the manufacture of meth. If there is no evidence, lead analysis is not required and this section is not applicable.

Confirmation samples must be collected from all decontaminated areas and materials, and surfaces that have not been removed. In accordance with R392-600-6, wipe samples shall be used to determine the extent of contamination on non-porous surfaces. Sample locations should be established based on information gathered during the preliminary assessment.

Confirmation sampling procedures:

- All samples must be obtained from areas representative of the materials or surfaces being tested. Confirmation samples must not be collected from porous surfaces.
- Samples collected from areas of contamination may be discrete grab samples, or composite samples where the averaged or standardized result is provided by the laboratory or calculated from total recovery value. Three samples shall be collected from each room or area of the property that is contaminated.
- Each sample area shall be 10 cm x 10 cm. To define the sample area, please refer to the procedures for methamphetamine sampling previously established in this chapter. The template should be paced directly adjacent to the methamphetamine wipe samples previously collected.
- All wipe samples must be collected using 3" x 3" 12-ply or 4" x 4" 8-ply cotton gauze contained in a sterile package. Grasp the gauze with stainless steel forceps or gloved hand using a new set of non-powdered gloves for each sample.
- Prior to sampling, the cotton gauze must be wetted with analytical grade three percent nanograde nitric acid as described in R392-600-6 to enhance collection efficiency. The sample media may be prepared in advance and should be stored in a clean sample container in a manner that maintains the efficacy of the sample media. Cotton gauze that have dried out may not be used to collect samples.
- Since nitric acid is an acid, it must be handled and stored in a manner consistent with all safety precautions related to acids.
 - Store small amounts of nitric acid and frequently replenish the supply.
 - Inhalation of vapors must be avoided.
 - Containers must be handled in a ventilated area.
 - Protective gloves should be worn when handling containers of nitric acid.
 - Keep away from open flames, areas of extreme heat, other ignition sources and products that may cause a severe reaction.

- To collect the sample, press the sample media down firmly, but not excessively, with the fingers being careful not to touch the sample media with the thumb. This will keep the gloved finger from contacting the sample area and thereby potentially affecting the sample results.
- The cotton gauze shall be wiped uniformly at least five times in two perpendicular directions within the sampling area as shown previous figures relating to methamphetamine sampling. Be sure that the sample technique allows coverage of the entire wipe area while avoiding the template. After the first few passes, reverse the last fold so the exposed side of the gauze is facing inward and using a fresh surface of the gauze continue in the same manner as before. Do not allow the sample to come into contact with any other surfaces.
- Rough surfaces should be blotted uniformly instead of wiping (prevents the threads of the gauze media from being snagged by the surface). To collect the sample, blot the areas within the template with at least five overlapping side to side horizontal passes beginning at the top and progressing to the bottom. Without allowing the gauze to touch any other surfaces, reverse the last fold so the exposed side of the gauze is facing inward. Using a fresh surface of the gauze, blot the area again with at least five overlapping top to bottom vertical passes beginning at the left and progressing to the right.
- After sampling, fold or roll the pad into a cylinder with the sample side in. Place each sample in a new, clean sample container. Cap the sample container tightly and label it for identification on the chain-of-custody. Recommended containers for sample storage and transport are 50-ml polypropylene disposable centrifuge tubes or 40-ml glass vials. Refrigerate the sample as soon as possible and keep refrigerated until delivered to an analytical laboratory. Plastic bags must not be used for sample storage unless the sample is in an approved container.
- The sample container must be properly labeled with the site or project identification number, date, time and actual sample location. The information and a description of the sample and sample area should also be recorded in a bound, all weather field logbook for later correlation with the analytical results. The logbook should be dedicated to the project of interest and contain field data relative to project location, dates and times, instruments used, sample information (location, number and type), activities performed and pertinent observations.
- All samples must be maintained under chain-of-custody protocol in accordance with industry standards for the types of samples and analytical testing to be conducted. A chain-of-custody provides documentation of sample integrity from the time the sample is collected until it is received by the laboratory. It is recommended that the decontamination specialist use a custody record supplied by the analytical laboratory and provide all the information required on the form (analytical method, sample identification, turn around time, signatures, etc.) to ensure proper documentation and analysis. Place the form inside a water proof, zip lock bag and include it with the samples.

- To preserve the integrity of the samples during transportation, place the samples in a cooler filled with ice immediately after sampling. The samples should be packed in a manner that prevents breakage and water from melting ice entering the sample containers. Ensure the chain-of-custody is included in the sample cooler and a custody seal is placed on the outside of the cooler if the individual responsible for the samples does not hand deliver them to the analytical laboratory.
- One quality assurance field blank, treated in the same fashion as the real samples, but without wiping, should be submitted for every 10 samples collected.
- The sample must be analyzed for lead using EPA method 6010 or equivalent at a laboratory approved by the Utah Department of Health.
- All samples must be photographed and logged with respect to the area on the property to document the location. This activity should be performed after the sample is collected, while the template remains in place.

Mercury

Mercury sampling shall not be conducted at the property unless there is clear evidence that mercury was used in the manufacture of methamphetamine. If there is no evidence, a mercury assessment is not required and this section is not applicable.

Sampling procedures:

- The property should be screened prior to and after the decontamination activities, since the presence of metallic mercury may affect the decontamination procedures.
- A properly calibrated mercury vapor analyzer (such as Lumex RA-915 MVA or Jerome MVA) shall be used to assess the presence of mercury. The instrument should be calibrated according to the manufacture's specifications prior to use.
- At least three locations in each room within areas of contamination must be tested for mercury vapor readings. To perform this activity, the testing equipment probe shall be held in the sample location for approximately 30 seconds to obtain a reading. Testing may be performed in the breathing zone of an adult and child, and should be biased toward cooking areas, known spills and areas of previous contamination, including floors, walls and other household items (tables, counter tops etc.) where contamination was present or suspected.
- In addition, all accessible plumbing traps shall be tested for mercury by holding the testing equipment probe in the plumbing pipe above the trap for at least 60 seconds. Refer to the volatile organics sampling procedures to gather a visual of this procedure.

- All readings should be recorded in the appropriate field notebook for later correlation with the analytical results. The logbook should be dedicated to the project of interest and contain field data relative to project location, dates and times, instruments used, sample information (location, number and type), activities performed and pertinent observations.
- To complete sampling, all locations must be photographed and logged with respect to the area on the property.
- Sample results should be compared to the standards set forth in Chapter 10. For mercury concentrations in excess of the standard, please refer to the mercury discussion in Chapter 7.

Septic Tank

Confirmation samples are not required from the septic tank unless there is evidence that a septic system is present on the property and disposal of chemicals occurred, which could impact the septic system. Please refer to the sampling procedures previously outlined in this document.

Quality Assurance/Quality Control

Quality Assurance/Quality Control is a critical element of an environmental cleanup. All sampling performed by the decontamination specialist to remove property from the contamination list must include a quality assurance program to ensure accurate, precise and representative data. This section outlines various techniques that may be employed to ensure the usability of data for decision-making purposes.

Field Quality Control - Field quality control samples are one component of a quality assurance program and typically consist of blanks, duplicates and equipment rinsate samples. The decontamination specialist must include field quality control samples in a manner consistent with R392-600.

Blanks: A blank is taken for methamphetamine wipe samples. The blank is prepared off-site by the decontamination specialist and consists of placing a wetted cotton gauze into a sample collection container and tightly securing the lid. The container is carried on-site, never opened and returned to the laboratory for analysis. A blank should be included during each sampling event.

Duplicate sample: A field duplicate consists of independent samples that are collected as close as possible to the same point in location and time. The duplicate and original sample should be considered two separate samples taken from the same source, stored in separate containers and analyzed independently. The frequency of field duplicates should be established in concert with the oversight authority.

Equipment rinsate: An equipment rinsate is a sample collected with distilled water after the equipment has been decontaminated. The rinse water is collected and analyzed to

demonstrate there is no cross contamination biasing the sample results. Field blanks should not be collected when dedicated sampling equipment is used.

Laboratory Quality Control – Laboratory quality control is another important component of a quality assurance plan. Although there is currently no accreditation process established in Utah for laboratories analyzing methamphetamine samples, the decontamination specialist is encouraged to submit samples to a laboratory that is state certified by the Bureau of Laboratory Improvement to analyze environmental samples. This provides information about the laboratory (the decontamination specialist may wish to obtain a copy of the lab's quality assurance plan for their records).

Laboratory Analytical Methods - Samples must be analyzed by NIOSH methods 9106, 9109 or equivalent methods approved by the Department of Health. For additional information regarding analytical methods and laboratories that may run the analytical methods, please contact the Department of Health at (801) 538-6191.

CHAPTER TEN

Decontamination Standards

CHAPTER 10 – Decontamination Standards

All decontaminated areas, materials, areas not contaminated and surfaces that have not been removed shall be sampled and meet the following criteria as established in R392-600-6 (Table 1 and Table 2):

Table 3 – Clandestine Drug Laboratory Decontamination Standards

Compound	Decontamination Standard
Red Phosphorus	Removal of stained material or cleaned pursuant to the rules in R392-600 such that there is no remaining visible residue
Iodine Crystals	Removal of stained material or cleaned pursuant to the rules in R392-600 such that there is no remaining visible residue
Methamphetamine	≤ 1.0 ug Methamphetamine/100 cm ²
VOCs in air	≤ 1 ppm
Corrosives	Surface pH between 6 and 8
Ecstasy	≤ 0.1 ug Ecstasy/100 cm ²
* Lead	≤ 4.3 ug Lead/100 cm ²
* Mercury	≤ 3.0 ug Mercury/m ³ air

* Must include samples for lead and mercury unless there is clear evidence that these metals were not used in the manufacture of illegal drugs.

If the standards are not achieved, additional decontamination must be performed and the area(s) must be re-sampled to confirm the surface, material and/or area meets the decontamination standards specified in the R392-600.

CHAPTER ELEVEN

Final Report

CHAPTER 11 – Final Report

In accordance with Section 19-6-904(3), a decontamination specialist is required to submit a report to the local health department within 30 days upon completion of the decontamination process. The final report is a technical document summarizing decontamination work performed at the property.

The following are key components of the final report that should be considered when developing the document. A model template is included in Appendix F for additional information and may be used in conjunction with the contents of this section to help develop the report. This section and the aforementioned template are not all encompassing. The decontamination specialist is encouraged to contact the local health department to discuss the contents of the final report prior to completing the document.

Location of the Property – This section should provide the street address and mailing address of the contaminated property, owner of record, legal description, county tax or parcel identification number and vehicle identification number, if the property is a mobile home, trailer or boat.

Decontamination Specialist Information – This section should include the name of the individual that performed the decontamination, including the individual's current certification and certification number.

Property Description – Describe the nature of the property, type of structures present, areas of contamination and portions of the property that are not considered contaminated. Information regarding areas where illegal drug processing, cooking or storage occurred, stained materials and surfaces were observed, potential chemical disposal occurred, and illegal drugs were stored are necessary to document decontamination of the property and justify cleanup activities.

Contaminants – This section should discuss contaminants of concern encountered on the property. The information may be obtained from the Preliminary Assessment or other sources, such as law enforcement reports.

Decontamination Activities – A detailed summary of decontamination activities performed on the property must be included in this section.

- Discuss in detail all procedures used to remove or clean the contamination. The discussion should include both areas of contamination and other portions of the property not considered contaminated.
- Discuss in detail any and all surfaces, materials or articles removed from the property.
- Discuss in detail any and all surfaces, materials and articles cleaned on-site.

- Discuss in detail all locations where decontamination activities were performed (this may include the ventilation and septic system as well).

Photographs – Include photographs documenting decontamination in areas of contamination and areas deemed not contaminated. Provide photographs of each decontaminated area and confirmation sample location on the property.

Confirmation Sampling – Discuss sample locations and methods, analytical methods and quality assurance/quality control employed during cleanup.

Waste Disposal – Include a summary of waste characterization/profiling conducted prior to disposal. Also, discuss materials removed from the site and provide documentation regarding final disposal (disposal manifests should be included).

Deviations – This section should discuss any deviations from the workplan.

Testing Results – This section should include the results of testing conducted on the property (includes PID, FID, pH and/or mercury readings).

Analytical Results – Provide all analytical results and data packages from the laboratory.

Figures – Include figures to document decontamination and confirmation sampling. Figures may include a drawing or sketch of areas of contamination, confirmation sample locations and decontaminated areas on the property.

Tables – Include tables summarizing sample results and sample locations. All tables should include the decontamination standards for comparative purposes.

Affidavit – The final report shall contain an affidavit from the decontamination specialist. The affidavit shall include a statement similar to: “I hereby certify that the statements on this final report are true and accurate to the best of my knowledge. I further certify that I have complied with the Performance Standards established in R311-500-8 and followed all the procedures established in R392-600. The property has been decontaminated to the standards set forth in the rules”. To view an example affidavit, please refer to the Report Template in Appendix F.

CHAPTER TWELVE

References

CHAPTER 12 – References

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<https://www.adeq.state.ar.us/poa/cscpc/pdfs/clandestine-lab-cleanup-standards.pdf>

³Colorado Department of Public Health and Environment, “Frequently Asked Questions on Methamphetamine-Affected Properties Regulations”,
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<https://www.colorado.gov/pacific/cdphe/methlabregs>

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⁶Kansas Department of Health and Environment, “Cleaning Up Former Methamphetamine Labs”. www.kdhe.state.ks.us/methlabs/

⁷KCI The Anti-Meth Site, “Cleaning up Former Methamphetamine Labs”.

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⁹Minnesota Department of Health, Clandestine Drug Labs General Cleanup Guidelines”, September 2003. www.health.state.mn.us/divs/eh/meth

¹⁰National Drug Intelligence Center, “Utah Drug Threat Assessment”, March 2003.

¹¹National Drug Intelligence Center, “Effects of D-Methamphetamine”, December 1996.

¹²National Jewish Medical and Research Center, “Chemical Exposures Associated with Clandestine Methamphetamine Laboratories”.
<http://www.utahdecalliance.org/pdf/ChemicalExposures.pdf>

¹³New Mexico Sentencing Commission, “Research Overview: Methamphetamine Production, Precursor Chemicals, and Child Endangerment”, January 2004.

¹⁴Office of National Drug Control Policy, “Fact Sheet: Methamphetamine”, November 2003.

¹⁵Salt Lake Valley Health Department, Health Regulation #32, “Chemically Contaminated Properties”, July 12, 2001.

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¹⁶Tennessee Department of Environment and Conservation “Reasonable, Appropriate, Protective Cleanup Response and Documentation Guidelines for Properties Quarantined due to Clandestine Drug Laboratory Activities Pursuant to P. Ch. 855 of the Acts of 2004”, Interim Final Guidance, June 2006.

http://www.tennessee.gov/assets/entities/environment/attachments/rem_Meth-Cleanup-Guidance.pdf

¹⁷United States Department of Justice, Community Oriented Policing Services, “Clandestine Drug Labs”.

¹⁸United States Drug Enforcement Administration, “Methamphetamine: A Growing Threat”.

¹⁹Washington State Department of Health, “Guidelines for Contamination Reduction and Sampling at Illegal Drug Manufacturing Sites”, Revised June 1996.

https://www.co.mason.wa.us/forms/Env_Health/CDLGUIDELNS.pdf

²⁰Washington State Department of Health, “Guidelines for Environmental Sampling at Illegal Drug Manufacturing Sites”, Revised January 2004.

<http://www.doh.wa.gov/portals/1/Documents/Pubs/334-106.pdf>

APPENDIX A

Selected Chemicals Associated with Methamphetamine Production



Ammonia



Vol. 1, No.1: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Ammonia

Appearance: Pure anhydrous (i.e., without water) ammonia is a colorless gas at room temperature.

Odor: Very sharp, pungent, and suffocating odor. Olfactory fatigue can occur fairly rapidly, making a person unaware of increasing concentrations in the surrounding air.

Odor Threshold: Minimum threshold: 5 ppm.

Odor Safety Class: C (less than 50% of distracted individuals perceive warning of threshold limit value).

Vapor Density: 0.59 (air = 1.0). Ammonia is lighter than air. But vapors from pressurized ammonia are initially colder and heavier so they may concentrate near the ground or in depressions until they warm to room temperature and rise.

Containers & Packaging

Anhydrous ammonia is a gas at room temperature but becomes liquid when pressurized. It is typically found in pressurized steel tanks in a liquid form (Figure 1). Anhydrous ammonia can be obtained from commercial chemical supply companies, farms that use it for fertilizer, or from blueprint operations.

Note: Direct contact with liquid anhydrous ammonia as it is released from pressurized tanks can cause severe frostbite.

Aqueous (liquid) ammonia for household cleaning (e.g., "Parson's Ammonia") is a solution containing 5-10% ammonia gas dissolved in water. Household ammonia is not used in methamphetamine synthesis.



Figure 1: Anhydrous ammonia gas is stored and transported as a liquid in pressurized gas containers. Note greenish-blue corrosion on valves and fittings. "Secondary" containers such as these were not designed to hold ammonia and may fail at any time. Photo Courtesy of CA Department of Justice.

Role in Drug Synthesis

Ammonia is used with an alkali metal, typically lithium or sodium, in the "Nazi" method to synthesize methamphetamine.

Health Hazards

Inhalation Exposure: Vapors at a concentration of 50-100 ppm cause nose, throat, and airway irritation. This may lead to wheezing, shortness of breath, and chest pain. Inhalation of concentrated vapors may result in respiratory tract burns. Exposure to moderate or high vapor concentrations may also cause swelling in the nasal and upper respiratory tissues and fluid build-up in the lungs. This could result in breathing difficulty or life-threatening respiratory failure.

Skin (Dermal) Exposure: Direct contact can result in chemical burns, which feel soapy due to the action of ammonia on fat in tissues. Blistering, deep penetrating burns, and cell and tissue death may result. Less severe injury is characterized by gray-yellow soft regions. In severe cases, the skin appears black and leathery. Frostbite may also result from contact with anhydrous ammonia as it is released from pressurized tanks.

Eye Contact: Vapors at concentrations of 50-100 ppm cause irritation, tearing, and inflammation. Higher concentrations can cause severe injury including burns or temporary blindness. Severe exposure can damage the iris and cause cataracts. Hemorrhage, extensive loss of eye pigment, and glaucoma may also result. Contact with concentrated aqueous ammonia solutions can cause permanent eye injury, including blindness. Damage extent may not be identified for up to one week after initial injury.

Ingestion: Aqueous ammonia solutions may cause nausea, vomiting, and swelling of the lips, mouth, and throat. Ingestion of concentrated solutions may result in burns to the lips, mouth, and esophagus. Oral exposure does not typically result in systemic poisoning.

Chronic Effects: Repeated exposure may cause chronic skin, eye, and respiratory irritation. Chronic cough, asthma, and lung fibrosis may occur.

Environmental Concerns

Air: Ammonia gas is readily removed from air via wet deposition (rainfall), dry deposition, reaction with gas-phase nitric acid to form ammonium nitrate, and reaction with aerosols to produce ammonium salts.

Soil: Soil microorganisms rapidly take up ammonia; some convert it to nitrate, which is highly mobile in water. In soil, ammonia is also rapidly converted to ammonium ions.

Ground Water: The amount of anhydrous ammonia typically required for methamphetamine synthesis is not likely to cause significant ground water contamination. However, if a large spill occurs, ground water contamination may result.

Surface Water: Plants and microorganisms rapidly take up ammonia in water. Bacteria readily convert ammonia to nitrate, creating a biochemical oxygen demand several days after contamination. This can lead to depletion of dissolved oxygen and result in death to aquatic organisms, but only if large spills occur and contamination is highly significant.

Indoors: Long-term contamination of indoor surfaces by anhydrous ammonia is not a concern. If spilled, liquefied anhydrous ammonia readily evaporates into the air. However, if sources of ammonia are present, such as with a leaking storage tank or cylinder, ammonia vapors can pose an immediate health concern.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)
 Short-Term Exposure Limit (STEL or ST): 35 ppm (24 mg/m³)
 8-Hour Time Weighted Average (TWA): 25 ppm (17 mg/m³)
 Immediately Dangerous (IDLH): 300 ppm

Preliminary Remediation Goals (PRGs)(U.S. EPA, Reg. 9):
 Air: 0.14 ppm (0.1 mg/m³)
 Soil & Water: not available

First Aid

Inhalation Exposure: Move to fresh air. Administer oxygen if needed. If breathing difficulty continues, get medical attention.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Seek immediate medical attention. Treat burns as directed by medical personnel.

Contact with Eyes: Flush exposed eyes with water or saline solution for at least 15 minutes. Remove contact lenses if possible. Seek medical attention.

Ingestion (Oral) Exposure: Do not induce vomiting or administer activated charcoal. Do not perform gastric lavage or attempt neutralization. Conscious victims should be given 4-8 ounces of water or milk. Seek immediate medical attention.

Special Concerns for Children: Children may inhale relatively larger amounts of ammonia vapors due to their faster breathing rates and greater lung size to body weight ratio. They may also receive higher doses due to their short stature. Ammonia vapors from compressed tanks may initially settle close to the ground in the typical breathing zone for children.

Handling & Safety



Chemical Hazards

Reactivity: Anhydrous ammonia reacts with strong oxidizers, acids, halogens, bleach, salts of silver, zinc, copper, and other metals. It is corrosive to copper and galvanized surfaces.

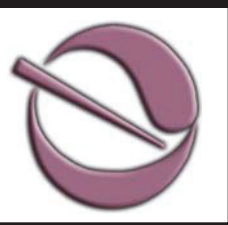
Flammability: Anhydrous ammonia is considered nonflammable; however, at very high concentrations in air [15-28% (150,000-280,000 ppm)], it will explode if ignited. Because of this, anhydrous ammonia should be treated as a flammable gas. Pressurized tanks of any kind may rupture if heated.

Chemical Incompatibilities: Anhydrous ammonia is incompatible with acids, aldehydes, amides, halogens, metals, oxidizers, plastics, and sulfur.

More Information

Office of Environmental Health
 Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
 Substances Control (DTSC)
www.DTSC.CA.Gov



Iodine



DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

Vol. 1, No. 2: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Iodine

Appearance: Laboratory grade elemental iodine appears as either a fine, dark powder or as grayish-black to purple crystals that have a metallic luster. At room temperature iodine crystals readily vaporize to a violet-colored gas (Figure 1).

Odor: Characteristically strong, sharp, biting, irritating odor.

Note: Odor is not a good indicator of the presence of iodine vapors and does not provide reliable warning of hazardous concentrations which occur at levels below odor detection.

Odor Threshold: 0.8 ppm (8 mg/m³)

Odor Safety Class: D (only 10-50% of attentive persons can detect the threshold limit value concentration in air).

Vapor Density: 8.8 (air = 1.0); iodine vapor is heavier than air, and it may concentrate near the ground or in depressions.

Containers & Packaging

Commercial Products: Pure iodine crystals in brown glass bottles can be obtained from chemical supply houses.

Veterinary iodine solutions, used as antiseptics, are packaged in opaque plastic bottles. Iodine may be obtained by mild heating of its salts (e.g. sodium iodide or potassium iodide). Iodine crystals may also be obtained from iodine solutions by the addition of 30% hydrogen peroxide.

Pharmaceutical Iodine Solutions:

These are typically dilute solutions that are brown in color. **Official USP Tincture** is a topical antiseptic solution made up of 2% iodine and 2.4% sodium iodide in 50% ethanol.

Lugol's Solution is stronger, made up of 5% iodine and 10% potassium iodide in water.



Figure 1: Pure iodine crystals, heated slightly, showing some solid iodine escaping directly to the air as obvious violet-colored vapors. Because of this "sublimation" property, exposures include dermal contact with solid crystals and inhalation of vapors which may not be quite as visible as this at room temperature. Photographer, Charles Salocks.

Health Hazards

Inhalation Exposure: Iodine vapor causes eye, skin, nose and throat irritation, coughing, wheezing, and laryngitis. Exposure to high concentrations may result in airway spasm, chest tightness, breathing difficulty, severe inflammation, and fluid accumulation in the voice box, upper airways, and lungs. Some people develop allergic hypersensitivity to iodine vapor.

Ingestion (Oral) Exposure: Iodine crystals, powder, and concentrated solutions can cause burns in the mouth and throat. Ingestion may cause vomiting, abdominal pain, and diarrhea. Severe poisoning may result in headache, delirium, or a drop in blood pressure. Ingestion of 2-4 grams of solid iodine can be fatal for an average adult.

Skin (Dermal) Contact: Burns, irritation, tissue damage, and skin rash result from contact with concentrated iodine. Dilute antiseptic solutions are low in toxicity, but in some cases contact results in a sensitization reaction that includes fever, skin eruptions, and rash. Iodine can be absorbed slightly through the skin and enter the blood.

Eye Contact: Concentrated iodine vapor causes brown staining and cornea cell damage. The threshold for eye irritation is about 0.2 ppm (2 mg/m³), which is much lower than the odor detection threshold. Dilute iodine solutions produce pain, inflammation, and can damage tissues.

Chronic Effects: Effects of long-term exposure to iodine vapor in humans are not known. Iodide is an essential micronutrient in the diet. It is required in small amounts for normal function of the thyroid gland. In laboratory animals, long-term inhalation of iodine vapors disrupts thyroid function and

reduces the ability of the lungs to take up oxygen. Chronic ingestion of amounts that exceed dietary requirements causes health problems such as dietary *iodism* and *goiter*.

Role in Drug Synthesis

Iodine is used to make hydriodic acid (HI) in the Red Phosphorus/HI methamphetamine synthesis method.

Clandestine Labs/ Methamphetamine:

Iodine

Environmental Concerns

Air: No information found.

Soil: No information found.

Ground Water: Contamination of ground water by iodine is unlikely since iodine (I_2) is rapidly converted to iodide (I^-) in the presence of organic materials. Iodide has low toxicity and, in small quantities, is an essential constituent in the human diet.

Surface Water: Naturally occurring background concentrations of iodine detected in surface waters range from 4 to 336 $\mu\text{g/liter}$. Iodine is hydrolyzed to iodate (IO_3^-) and reduced to iodide (I^-) ions in water. Iodine in drinking water contributes a small amount of the total daily intake. The recommended daily intake is 150 μg . Iodine toxicity is unlikely to result from drinking water unless the water source is highly contaminated. Studies of iodine's toxicity to non-mammalian species were not identified. The Suggested No Adverse Response Level (SNARL) for iodide (I^-) in drinking water is 1.2 ppm (1.2 mg/liter).

Indoors: Long-term contamination of indoor surfaces is not expected. Elemental iodine has a vapor pressure of 0.3 mm Hg at 25° C and readily volatilizes at room temperature. If present on indoor surfaces, iodine will be removed through volatilization. Inhalation exposure could occur under these circumstances. No standards for cleanup of indoor surface iodine contamination were identified.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Ceiling Limit: 0.1 ppm (1 mg/m³)

Immediately Dangerous (IDLH): 2 ppm (21 mg/m³)

Preliminary Remediation Goals (PRGs), (U.S. EPA, Reg 9):

Air, Soil & Water: not available

Handling & Safety



Inhalation Exposure: Move to fresh air. Administer oxygen if needed. If breathing difficulty occurs, get medical attention.

Contact with Clothing or Skin: Remove contaminated clothing. Flush exposed skin and hair with water for at least 5 minutes, and thoroughly wash when possible. Seek medical help if needed.

Contact with Eyes: Flush eyes with water or saline solution for at least 15 minutes. Remove contact lenses if easily removable. Seek medical help immediately.

Ingestion Exposure: Do not induce vomiting and do not administer activated charcoal. Do not perform gastric lavage and do not attempt neutralization. If victim is conscious, rinse mouth with water. Seek immediate medical attention.

Special Concerns for Children: Children may inhale relatively larger amounts of iodine vapors due to their larger lung size to body weight ratio and increased respiratory rates.

Children and others of short stature may receive higher doses, because iodine vapors are heavier than air and may concentrate near the ground in their breathing zone.

Chemical Hazards

Reactivity: Iodine is an oxidizer and is highly reactive.

Flammability: Iodine is not flammable. However, it is a strong oxidizer and supports combustion vigorously.

Chemical Incompatibilities: Iodine is incompatible with aqueous and gaseous ammonia, powdered aluminum, and active metals such as lithium, sodium, and potassium. Violent explosions may occur when mixed with acetaldehyde or acetylene gas. Large quantities of iodine may react with antimony, producing heat, flame, and explosion.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Lithium



DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

Vol. 1, No. 4: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Lithium

Appearance: Lithium is a soft, silvery-white metal that becomes yellowish upon exposure to moist air. It is soluble in liquid ammonia, producing a blue solution.

Odor & Odor Threshold: Not applicable. Lithium metal is odorless.

Vapor Density: Not applicable. Lithium is not volatile.

Odor Safety Class: Not applicable. Lithium is odorless. Therefore, odor provides no warning of hazard.

Containers & Packaging

Commercial: Lithium metal in the form of ribbon, wire, rod, ingot, granules, powder, or shot can be purchased from chemical supply houses. Rechargeable and non-rechargeable lithium batteries are frequently used to obtain elemental lithium for use in the illegal synthesis of methamphetamine (Figure 1, A & B).

Pharmaceutical: Lithium for pharmaceutical use contains lithium carbonate or lithium citrate, both of which are salts of elemental lithium, but lithium salts cannot be used to make metallic lithium and are not used for illicit synthesis of methamphetamine.

Role in Drug Synthesis

Elemental lithium is used as a catalyst to synthesize methamphetamine from ephedrine in the ammonia / alkali metal synthesis method commonly referred to as the "Nazi" method.

Health Hazards

General: Little information on the toxicity of elemental lithium is available. The greatest health concerns regarding lithium metal come from exposure to lithium hydroxide (LiOH); a strong, highly corrosive base formed when lithium reacts with water.

Inhalation Exposure: Since lithium metal is not volatile, inhalation is not typically a significant route of exposure for lithium metal. However, if finely divided lithium particles were inhaled, serious injury to the nasal passages, upper airways, and lungs due to formation of LiOH could result. Respiratory distress syndrome has been reported in cases of severe exposure resulting in shortness of breath, rapid breathing, and low arterial blood oxygen.

Skin (Dermal) Exposure: Dermal uptake of lithium is not likely to be a significant route of exposure. Absorption of solid lithium across the skin is poor, although contact with finely divided lithium or lithium powder might present a hazard because these forms

may react with skin moisture to form corrosive LiOH.

Eye Contact: Exposure to lithium particles may result in serious eye injury due to the formation of highly corrosive LiOH.

Ingestion: In large amounts, lithium would primarily affect the gastrointestinal (GI) tract, the central nervous system (CNS), and the kidneys. Acute GI effects include abdominal pain, nausea, vomiting, and diarrhea. CNS effects include tremors, loss of muscle coordination, muscle rigidity, lethargy, and exaggerated reflexes. Sedation, mental confusion, agitation, seizures, and coma may occur at high doses. Symptoms associated with kidney

toxicity are an initial increase in urine output, subsequent elevation in blood non-protein nitrogen, and finally, diminished urine output. Other potential adverse effects include cardiac arrhythmias, low blood pressure, and kidney toxicity.



Figure 1: Lithium is a light-weight silvery colored metal used to synthesize methamphetamine. It is collected from camera batteries [A] and other small button type batteries [B]. Once these batteries are broken open, the lithium [B.1.] immediately begins to react with air [B.2.]. Photographers, Charles Salocks and Caron Poole.

Clandestine Labs/ "Meth":

Lithium

Environmental Concerns

General: Only small amounts of lithium are required for synthesis of methamphetamine. For this reason, waste generated by a clandestine methamphetamine lab is unlikely to result in significant lithium contamination of soil, surface water, or ground water.

Soil: The earth's crust naturally contains lithium with varying concentrations depending upon location. As noted above, contamination of soil is unlikely.

Ground Water & Surface Water: No information available.

Drinking Water: California state standards for lithium compounds in drinking water have not been established.

Indoors: Lithium surfaces may become coated with a mixture of lithium hydroxide, lithium carbonate, and lithium nitride. Lithium hydroxide is extremely corrosive; however, since the amount of lithium used is small, the amount of lithium hydroxide formed will also be small.

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. If victim is not breathing, give artificial respiration. If victim has difficulty breathing, give oxygen. Keep victim in a half upright position. Get medical attention immediately.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Thoroughly wash with soap and water when possible. Seek medical attention if necessary.

Contact with Eyes: Flush exposed eyes with water for at least 30 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: If victim is conscious, give 2-4 cups of milk or water. Do not induce vomiting. Seek medical attention.

Special Concerns for Children: Children may not recognize the dangers associated with chemical exposures. They may therefore be more susceptible to accidental or purposeful exposures.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA & ACGIH)

Short-Term (STEL): not established.

Threshold Limit (TLV): not established.

Immediately Dangerous (IDLH): not established.

Preliminary Remediation Goals (PRGs):

Air: not established.

Soil: Residential: 1,600 ppm (1,600 mg/kg)

Industrial: 20,000 ppm (20,000 mg/kg)

Water: 730 ppb (730 µg/L)

Chemical Hazards

Reactivity: Lithium is less reactive than sodium and much less reactive than potassium. Freshly cut surfaces tarnish in air due to reaction with oxygen and nitrogen. Pieces of lithium metal react slowly with water to liberate hydrogen, a flammable gas.

Flammability: Lithium is a flammable solid. Finely divided and powdered lithium metal may ignite in air at ambient temperatures and reacts vigorously with water to form hydrogen gas and a strong caustic solution of lithium hydroxide. Since reaction with water may lead to spontaneous ignition, powdered or granular lithium should not be combined with water. If heated to its melting point (357 °F, or 181 °C), lithium is likely to ignite spontaneously.

Chemical Incompatibilities: Water and air.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Sodium



Vol. 1, No. 6: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Sodium

Appearance: Sodium is a soft, silvery, solid metal that can readily be cut with a knife. Lustrous when freshly cut (Figure 1, A.1.), it rapidly tarnishes to a dull gray in air (Figure 1, A.2.). Sodium may develop an outer crust of sodium oxide, which may appear sponge-like. Sodium dissolves in liquid anhydrous ammonia forming a blue solution. At higher concentrations, these solutions are copper colored and have a metallic luster.

Odor & Odor Threshold: Not applicable. Sodium is odorless.

Odor Safety Class: Not applicable. Sodium is odorless.

Vapor Density: Not applicable. Sodium is not volatile.

Containers & Packaging

Commercial: Sodium is available from commercial labs in the form of ingots, lumps, or sticks. It is packaged in containers filled with mineral spirits or kerosene, or packaged under nitrogen. It is also sold as 30-40% dispersions in toluene, mineral spirits, light oil, or paraffin wax. Operators of clandestine drug laboratories may produce "homemade" sodium by electrolysis of sodium hydroxide. The most common commercial source of sodium hydroxide is Red Devil® lye (Figure 1, B.).

Pharmaceutical: There are no pharmaceutical uses of elemental sodium.

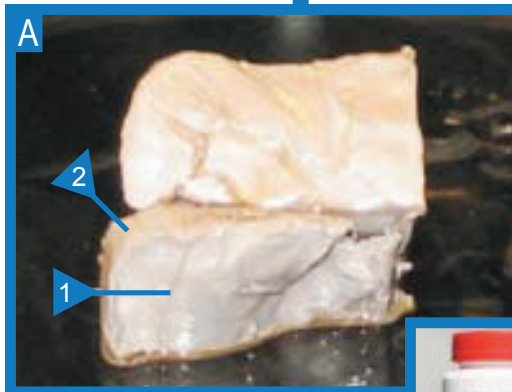


Figure 1: Pure sodium is soft, silvery in color, and shiny when first cut [A.1.]. Pure sodium rapidly forms a dull gray oxidation crust when exposed to air [A.2.]. Sodium metal can be obtained from electrolysis of sodium hydroxide containing products like the drain cleaner shown here [B.]. Photographers, Charles Salocks and Caron Poole.



Health Hazards

General: Sodium metal reacts with water to produce highly caustic sodium hydroxide (NaOH), which can cause severe chemical burns resulting in permanent damage to all biological tissues. Reaction of sodium with water also generates heat which may result in thermal burns. NaOH is effectively neutralized by contact with tissue and does not produce systemic toxicity. Short-term contact with small amounts of sodium, followed by rapid recovery, is not likely to cause long-term effects.

Inhalation Exposure: Inhalation of vapors is not a typical route of exposure to solid sodium. Inhalation of finely divided solid particles or liquid suspensions could produce burns in the nose, mouth, throat, and upper respiratory tract.

Skin (Dermal) Exposure: Direct contact with sodium can cause deep, serious burns which appear soft and moist and are very painful. Less severe exposures result in inflammation, redness, and swelling of the skin. Irritation may become apparent within minutes of exposure. Fatalities have occurred following contact with finely divided sodium dispersed in hydrocarbon solvents such as mineral oil or toluene.

Eye Contact: Direct eye contact can result in serious burns. Formation of lesions, destruction of cells and tissue, inflammation, and opacification of the cornea may result. Ulcerations may progress for several days following exposure. Potential effects include cataracts, glaucoma, adhesion of the eyelid to the eye, blindness, and eye loss.

Role in Drug Synthesis

Elemental sodium, an alkali metal, is used as a catalyst in the anhydrous ammonia / alkali metal "Nazi" method of methamphetamine synthesis to convert the precursor ephedrine or pseudoephedrine product to methamphetamine.

Ingestion: Once ingested, sodium will react vigorously with saliva in the mouth and esophagus to produce severe chemical and thermal burns of the mouth, esophagus, and stomach. Symptoms of serious injury to the esophagus include constricted airways, vomiting, drooling, and abdominal pain.

Environmental Concerns

General: Elemental sodium reacts immediately with water and a number of organic compounds to form sodium hydroxide (NaOH) and hydrogen gas (H_2). Unless it is protected from contact with moisture, sodium is unlikely to persist in the environment. Typically only small amounts of elemental sodium are needed for methamphetamine synthesis. Wastes generated by small scale clandestine methamphetamine labs are unlikely to contain sufficient amounts of sodium to result in significant contamination of air, soil, surface water, or ground water.

Indoors: Sodium may form an outer layer of solid NaOH on surfaces, which can remain very reactive and hazardous. Because of the formation of NaOH, corrosion and destruction of surfaces may be apparent in areas where sodium was spilled. If accessible surfaces were contaminated with sodium and resulting NaOH, potential routes of exposure include direct skin contact and ingestion resulting from hand-to-mouth activity.

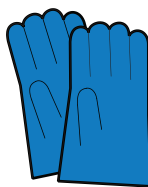
Chemical Hazards

Reactivity: Sodium reacts violently with water, including moisture in the air, and dilute acids to form caustic NaOH and highly flammable hydrogen gas. The reaction generates considerable heat, melting the sodium and frequently igniting the hydrogen gas. Sodium reacts explosively with dilute sulfuric acid. It also reacts with organic compounds containing oxygen, nitrogen, sulfur, fluorine, chlorine and bromine, carboxyl, or hydroxyl groups. In general, finely divided sodium reacts much more quickly and more vigorously than large pieces of sodium.

Flammability: Sodium ignites spontaneously if heated to temperatures above 120°C (250°F). Finely divided sodium may ignite at much lower temperatures. Since sodium melts at 98°C, transition from a solid to a liquid is an indication that sodium is approaching its auto-ignition temperature. Combustion of sodium produces sodium oxide smoke, which is hazardous and highly irritating.

Chemical Incompatibilities: Water and organic compounds containing reactive groups noted above.

Handling & Safety



* If in finely divided powder form.



First Aid

General: If exposed to sodium metal, in general it is critically important to seek medical attention immediately.

Inhalation Exposure: Move to fresh air. If victim has difficulty breathing, give oxygen. If victim is not breathing, give artificial respiration. Keep victim in a half upright position.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed areas with water for 15 minutes or more and wash thoroughly when possible. Treat burns as directed by medical personnel.

Contact with Eyes: Flush exposed eyes with water for at least 15 minutes. Remove contact lenses if possible.

Ingestion (Oral) Exposure: Do not induce vomiting. Conscious victims should be given water.

Special Concerns for Children: Toxic effects may be greater since gastric acid in children

is not strong enough or present in great enough amounts to neutralize even small amounts of strongly alkaline compounds. Children may not recognize the dangers associated with chemical contact and may therefore be more susceptible to accidental and/or purposeful exposures. Children may think pure sodium metal is food since it may be confused with cream cheese or even chewing gum.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Short-Term Exposure Limit (STEL): not established
8-Hr Time Weighted Average (TWA): not established
10-Hr Time Weighted Average (TWA): not established
Immediately Dangerous (IDLH): not established

Preliminary Remediation Goals (PRGs) (U.S. EPA, Reg. 9):

Air, Soil, & Water: not established

More Information

Office of Environmental Health
Hazard Assessment (OEHHA)
www.OEHHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Red Phosphorus



Vol. 1, No. 12: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing "Red-P"

Appearance: Red phosphorus (Red-P) is a solid at room temperature. It is found as crystalline or amorphous granules, or as pills or powder (Figure 1, A.). The color varies from orange-red, to violet, dark red-purple, or dark reddish brown.

Odor & Odor Threshold: Not applicable. Red-P is not volatile. It is odorless at room temperature.

Odor Safety Class: Red-P is odorless. **Note:** Odor provides no warning of hazard.

Containers & Packaging

Commercial: Red-P is a component of matchbook strike plates (Figure 1, B.). Clandestine methamphetamine lab cooks may use scrapings from matchbook strike plates as a source of Red-P. Red-P is available from chemical supply houses (Figure 1, C.), but it is a U.S. Drug Enforcement Agency List I chemical and sales are subject to record keeping and reporting requirements. Red-P is also used in electroluminescent coatings, in flame retardants for polymers, in the production of safety matches, pyrotechnics, incendiary shells, smoke bombs, and tracer bullets; as well as in the manufacture of fertilizers, pesticides, and semiconductors. It is also used in organic synthesis reactions and in the manufacture of phosphoric acid, phosphine gas and other phosphorus-containing chemicals.

Pharmaceutical: There are no pharmaceutical uses of Red-P.

Role in Drug Synthesis

Red phosphorus is combined with elemental iodine to produce hydriodic acid (HI). HI is used to convert pseudoephedrine or ephedrine to methamphetamine.

Health Hazards

General: Pure Red-P does not usually represent a significant health hazard. It is essentially non-volatile, insoluble in water, and poorly absorbed into the body. Red-P does react with water vapor and oxygen in air to form extremely toxic phosphine gas, phosphorus oxyacids, white phosphorus, and phosphoric acid. Red-P may also be contaminated with white phosphorus (White-P) and/or yellow phosphorus (Yellow-P), which are toxic. Yellow-P is a form of White-P that contains impurities.

Inhalation Exposure: Inhalation of Red-P dust causes respiratory tract irritation, coughing, and bronchitis. If contaminated with White-P, it can also cause liver or kidney damage.

Skin (Dermal) Exposure: Prolonged and/or repeated contact with Red-P may cause irritation or dermatitis. If White-P is present, deep, slow healing chemical burns may result. If ignited, Red-P may cause thermal burns.

Eye Contact: Red-P can produce eye irritation and corneal injury. If White-P is present, severe irritation and burns may result.

Ingestion: Pure Red-P is considered non-toxic. However, if contaminated with White-P, it may cause systemic poisoning. Systemic symptoms include a garlic odor on the breath, irritation of the digestive tract, stomach pains, vomiting, diarrhea, liver and kidney damage, anemia and other blood disorders, and cardiovascular effects, or death. Long term ingestion of Red-P contaminated

with White-P may cause jaw bone degeneration ("phossy-jaw").

Special Concerns for Children: Children may not recognize the chemical dangers and may be more susceptible to accidental or purposeful exposures.



Figure 1: Red phosphorus is easily recognizable as a dark red to purple solid powder [A]. It can be obtained from scrapings off match box strike plates [B] and other incendiary products or from commercial chemical supply companies [C]. Photos Courtesy of CA Department of Justice. Photographer, Charles Salocks.

Clandestine Labs/ "Meth":

Red Phosphorus

Chemical Hazards

Reactivity: Red-P reacts with water vapor and oxygen in air to form extremely toxic phosphine gas, phosphorus oxyacids, white phosphorus, and phosphoric acid. These reactions are accelerated by higher temperatures or trace amounts of metals, including those found in household plumbing.

Flammability: Red-P is a flammable solid and may pose a moderate explosion hazard by chemical reaction or on contact with organic materials. Though stable, it is readily combustible. It will not ignite spontaneously, but may be ignited by heat, friction, static electrical spark, oxidizing agents, or physical impact. It may re-ignite after being extinguished. The auto ignition temperature for Red-P is 260°C (500°F). At high temperatures, even in the absence of air, Red-P can burn, producing White-P.

Chemical Incompatibilities: Red-P reacts with oxidizing agents, reducing agents, peroxides, strong alkalies (e.g., sodium hydroxide or potassium hydroxide), halogens, halides, and organic matter. If it comes in contact with oxidants (e.g., chlorine, fluorine, or bromine), Red-P may burn spontaneously or explode. Red-P reacts vigorously with cesium, lithium, potassium, rubidium, sodium, and sulfur. It explodes when combined with ammonium nitrate and moist chlorates. Red-P is incompatible with metals including aluminum and magnesium powders, beryllium, copper and copper containing alloys, manganese, metal oxides (copper oxide manganese dioxide, lead oxide, mercury (II) oxide, silver oxide, and chromium trioxide), metal peroxides (lead peroxide, potassium peroxide, and sodium peroxide), and metal sulfates (barium sulfate and calcium sulfate). Red phosphorus is also incompatible with nitric acid.

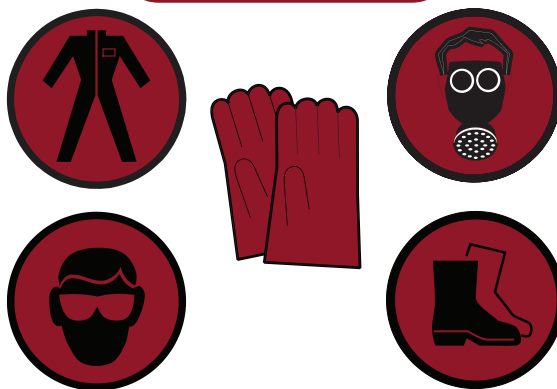
Conditions to Avoid: Avoid light, ignition sources, dust generation, excess heat, oxidizers, flammable materials, friction, and physical impact. Under wet alkaline conditions, red phosphorus slowly releases phosphine gas, which is highly toxic and highly flammable.

Environmental Concerns

General: Red phosphorus will slowly degrade to highly toxic phosphine gas (PH_3) and phosphorus acids in the environment. Phosphine is reactive and usually undergoes rapid oxidation. The final products, phosphates, are harmless. In wastewater, Red-P will adsorb to sewage sludge. Red phosphorus is harmful to aquatic organisms.

Indoors: If contamination occurs, Red-P would be expected to persist. On indoor surfaces it would be found as a solid where spilled. Skin contact and ingestion resulting from hand-to-mouth activity could occur.

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. If victim has difficulty breathing, give oxygen; if not breathing, give artificial respiration. Keep victim in a half upright position. Get medical attention immediately.

Contact with Eyes: Flush eyes with water for at least 15 minutes. Get medical attention.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing and shoes. Flush exposed areas with water for 15 minutes or more. Get medical attention.

Ingestion (Oral) Exposure: Do not induce vomiting. If victim is conscious, give 2-4 cups of water or milk. Seek immediate medical attention.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH): not established.

Preliminary Remediation Goals (PRGs)
(U.S. EPA, Reg. 9): Air, Soil & Water: not established

More Information

Office of Environmental Health
Hazard Assessment (OEHHA)
www.OEHHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Coleman Fuel



Vol. 1, No. 9: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Coleman Fuel

Synonyms: petroleum ether, petroleum naphtha, light hydrotreated petroleum distillates, white gas, Amsol 10, Kensol 10, VM&P (varnish makers & painters) naphtha, camp fuel, and petroleum benzin.

Appearance: Clear, colorless liquid.

Odor: Similar to the odor of rubber cement.

Odor Threshold and Odor Safety Class: Not available.

Vapor Density: 3.0 (air = 1.0). Coleman Fuel vapors are heavier than air. They may collect near the ground or in depressions.

Containers & Packaging

Coleman Fuel represents a class of commercially available petroleum-based products that are often marketed under the following names: Amsol 10, Kensol 10, White Gas, VM&P Naphtha, Ozark Trail®, Camp Fuel, and Coleman Fuel®. These products are complex mixtures of light hydrotreated petroleum distillates containing up to 25% n-hexane, 15% cyclohexane, and less than 0.001% benzene by weight. Light hydrotreated petroleum distillates are typically packaged in metal cans (Figure 1, A & B) but may also be found in chemically resistant plastic bottles or jugs.



Figure 1: Coleman Fuel [A], designed for use in camp stoves, lanterns and heaters, is a petroleum-based organic solvent used to illegally synthesize methamphetamine. Similar commercial camp fuel products are sold under different brand names such as Ozark Trail® [B]. These and other organic solvents are readily found in hardware and sporting goods stores. Photos Courtesy of CA Department of Justice.

Role in Drug Synthesis

Coleman Fuel and other light hydrotreated petroleum distillates are petroleum-based, nonpolar solvents, which are used in the Hydriodic Acid/Red Phosphorus, Nazi and other methods of methamphetamine synthesis to extract methamphetamine base from the reaction solution.

Health Hazards

General: Coleman Fuel and petroleum distillates are acute irritants that cause moderate burning, redness, and swelling of body tissues upon contact. Regardless of exposure route, these also act as central nervous system depressants causing light-headedness, dizziness, nausea, headache, giddiness, loss of appetite, muscle weakness, impaired motor function, loss of coordination, blurred vision, and drowsiness.

Inhalation Exposure: Inhalation of Coleman Fuel and other petroleum distillates may cause severe respiratory tract irritation, pulmonary edema (swelling and fluid build up), loss of consciousness, and suffocation. Potentially fatal chemical pneumonitis can also result from aspiration of Coleman Fuel into the lungs.

Skin (Dermal) Exposure: Short-term contact results in mild irritation. Long-term exposure can result in chronic dermatitis and localized defatting of the skin. Systemic toxicity may also result from absorption through the skin.

Eye Contact: Direct contact may result in burning, tearing, redness, and swelling. If untreated, tissue damage may result.

Ingestion: Ingestion of Coleman Fuel or other

petroleum distillates can cause burning and irritation in the mouth, esophagus, stomach, and intestines.

Chronic Effects: Repeated exposure to Coleman Fuel and its constituents, such as n-hexane, over a period of weeks to months can result in damage to sensory and motor nerve cells. Effects include burning, numbness, or tingling in the feet, legs or hands, paralysis, and even permanent brain damage. Prolonged exposure may also damage the kidneys, liver, and respiratory system.

Clandestine Labs/ "Meth":

Coleman Fuel

Environmental Concerns

No environmental data are available specifically for Coleman Fuel. The following sections are based on petroleum ether.

Air: In the atmosphere petroleum ether will exist primarily as a vapor. It will be readily degraded by reaction with sunlight. Removal from the air may also occur through wet deposition.

Soil: Petroleum ether readily evaporates from wet and dry soils and is expected to quickly biodegrade. Petroleum ether and Coleman Fuel are both complex hydrocarbon mixtures. Their adsorption to sediment and mobility within soil will vary based on the estimated ability of their chemical components to bind to carbon in soil (K_{oc} values of 81 to 650). Chemicals with short chain structures (5-6 carbon atoms) and lower molecular weights will migrate more quickly through soil than heavier compounds. Lighter molecules have greater potential to contaminate groundwater.

Surface Water: When released to water, petroleum ether is expected to biodegrade as well as evaporate into air. Accumulation in aquatic organisms is not likely to be a concern.

Ground Water: In cases of large spills, Coleman Fuel may migrate down into the soil before it evaporates. There it may continue on to contaminate ground water sources.

Indoors: Long-term contamination of indoor surfaces by petroleum ether hydrocarbon mixtures is not a concern, because these light hydrocarbon chemicals quickly evaporate.

Exposure Limits

For Petroleum Distillates, Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Ceiling Limit (C) (15-minutes): 444 ppm (1800 mg/m³)

8-Hr Time Weighted Average (TWA): 500 ppm (2000 mg/m³)

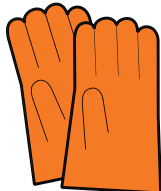
10-Hr Time Weighted Average (TWA): 86 ppm (350 mg/m³)

Immediately Dangerous (IDLH): 1100 ppm (4455 mg/m³)

Preliminary Remediation Goals (PRGs)

(U.S. EPA, Reg. 9): Air, Soil, & Water: not established

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. Administer oxygen if needed. If breathing difficulty occurs, get medical attention.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 5 minutes, and wash with soap and water if possible. Seek medical attention if irritation or rash appears.

Contact with Eyes: Flush exposed eyes with water for at least 15 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: Do not induce vomiting. Seek immediate medical attention. If vomiting occurs, keep head below hips to reduce chances of aspiration into lungs.

Special Concerns for Children: Children may inhale relatively larger amounts of vapors due to their faster respiratory rates and greater lung size to body weight ratio. Children may

also receive higher doses due to their short stature since Coleman Fuel vapors, being heavier than air, may concentrate near the ground.

Chemical Hazards

Reactivity: Coleman Fuel is stable under normal conditions but can be an explosion hazard if fumes come in contact with ignition sources, heat, or intense sunlight.

Flammability: Coleman Fuel can form flammable mixtures with air and flash at room temperature. The lower explosive limit (LEL) for n-hexane is 1.2% (by volume, room temperature); the upper explosive limit (UEL) is 7.5%. Similar explosive ranges have been reported for petroleum distillates and Amsol 10. Coleman Fuel vapor is heavier than air. Vapor may travel considerable distances to a source of ignition and flash back.

Chemical Incompatibilities: Strong oxidizers.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Phosphine



Vol. 1, No. 5: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing Phosphine

Appearance: Phosphine is a colorless gas at room temperature.

Odor: Disagreeable, garlic-like, or decaying fish odor when found in commercial products. Pure phosphine gas is odorless.

Odor Threshold: Minimum: 0.03 ppm Average: 0.5 ppm.

Odor Safety Class: D (only 10-50% of distracted individuals perceive warning of the permissible exposure level). **Note:** *Odor is not a good indicator of the presence of phosphine vapors and does not provide reliable warning of hazardous concentrations which occur at levels below odor detection.*

Vapor Density: 1.2 (air = 1.0). Phosphine is slightly heavier than air.

Containers & Packaging

Commercial: Aluminum and zinc phosphide release phosphine gas when exposed to moisture. Both products are used as rodenticides. Aluminum phosphide is also used as a grain fumigant. Commercial pesticides containing aluminum phosphide are Celphos, Phostoxin, and Quick Phos. Phosphine gas for air monitoring instrument calibration is available from chemical supply companies in pressurized containers.

Pharmaceutical: There are no pharmaceutical uses of phosphine gas.

Role in Drug Synthesis

Phosphine gas is an unintended, undesirable, and potentially lethal by-product produced during the manufacture of methamphetamine using the Hydriodic Acid/Red-Phosphorus method (Figure 1).

Health Hazards

Inhalation Exposure: Inhalation is the primary route of exposure for phosphine gas. Effects from short-term exposure to high concentrations (greater than 2 ppm) may result in severe lung irritation, cough, and chest tightness. Neurological effects include dizziness, lethargy, convulsions, and coma; agitation and psychotic behavior are often present as well. Signs of phosphine toxicity include rapid and/or irregular heart rate, low blood pressure, shock, nausea, abdominal pain, vomiting, diarrhea, and cardiac arrest. Most acute symptoms occur within the first few hours after exposure; however, the onset of liver and kidney toxicity and severe fluid accumulation in the lungs (pulmonary edema) may be delayed for up to 72 hours. For this reason, persons with known exposure to phosphine gas should be hospitalized and observed for several days.

Skin (Dermal) Exposure: Direct skin contact is not likely to be a significant route of exposure for phosphine gas.

Eye Contact: Direct eye contact may cause irritation, tearing, pain, swelling, and sensitivity to light.

Ingestion: If ingested, certain types of waste generated by clandestine methamphetamine labs may result in the release of phosphine gas in the stomach. Symptoms of chemicals that produce phosphine internally when ingested are similar to those that occur following acute inhalation of phosphine gas.

Chronic Effects: Long-term exposure to low concentrations (0.5 to 2 ppm) include anemia, bronchitis, nausea, vomiting, abdominal pain, diarrhea, tremors, double vision, impaired gait, and difficulty speaking. Liver and kidney damage, structural changes in chromosomes of peripheral blood cells, and chemical-induced asthma may also occur.



Figure 1: Photo of a heat-resistant vessel containing a hydriodic acid / red phosphorus methamphetamine synthesis reaction mixture. Phosphine gas is an unwanted potentially lethal by-product generated during the synthesis. Phosphine may be present in the air space above the liquid reaction mixture. *Photo Courtesy of CA Department of Justice.*

Clandestine Labs/ "Meth":

Phosphine

Environmental Concerns

Air: Phosphine is extremely volatile. It is found as a gas at room temperature and will readily disperse in the atmosphere. Any residue of phosphine present in or generated by solid or liquid waste should quickly disperse in the air.

Soil and Water: Large amounts of buried phosphorus-containing waste may generate phosphine gas in large enough quantities to present a significant source of soil and ground water contamination. However, the amount of phosphine gas produced by a typical clandestine laboratory does not represent a significant threat to soil or ground water. Due to its extreme volatility, any release of phosphine to surface water would quickly evaporate to the surrounding air.

Indoors: Phosphine will not likely accumulate on indoor surfaces but may be present as a gas in indoor environments.

Natural Occurrence: Phosphine is formed in small amounts from the putrefaction of organic matter. Detection of low concentrations of phosphine in drains, sewers, or septic systems would not be unexpected and should be noted if found.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Short-Term Exposure Limit (STEL): 1 ppm (1.4 mg/m³)

8-Hr Time Weighted Average (TWA): 0.3 ppm (0.4 mg/m³)

10-Hr Time Weighted Average (TWA): 0.3 ppm (0.4 mg/m³)

Immediately Dangerous (IDLH): 50 ppm

Preliminary Remediation Goals (PRGs)

(U.S. EPA, Reg. 9):

Air: 0.31 µg/m³

Soil, residential: 18 mg/kg

Soil, industrial: 180 mg/kg

Tap Water: 11 µg/m³

More Information

Office of Environmental Health
Hazard Assessment (OEHHA)
www.OEHHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov

Handling & Safety



First Aid

General: People have died from exposure to phosphine gas at methamphetamine labs. There is no specific antidote for this chemical. Medical treatment is generally supportive.

Inhalation Exposure: Move to fresh air. If victim has difficulty breathing, give oxygen. If victim is not breathing, give artificial respiration. Get medical attention immediately.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Thoroughly wash with soap and water when possible. Get medical attention immediately.

Contact with Eyes: Flush eyes with water for at least 30 minutes. Get medical attention immediately.

Ingestion (Oral) Exposure: Do not induce vomiting. Seek immediate medical attention.

Special Concerns for Children: Children may inhale relatively larger amounts of phosphine gas due to their faster

respiratory rates and greater lung size to body weight ratio. Children may also receive higher doses due to their short stature. Phosphine is slightly heavier than air and may settle close to the ground in the breathing zone typical for children.

Chemical Hazards

Reactivity: Phosphine combines violently with oxygen and halogenated compounds. Phosphine also reacts with copper, silver, gold, and salts of these metals as well as with air, oxidizers, chlorine, acids, and moisture.

Flammability: NFPA flammability rating = 4 (very flammable). The lower explosive limit in air = 1.8 % (26 g/m³). Phosphine is very flammable and potentially explosive. It may ignite spontaneously on contact with air.

Chemical Incompatibilities: Phosphine reacts with air and moisture along with copper, halogenated hydrocarbons, chlorine, oxidizers, and acids.



Sodium Hydroxide



Vol. 1, No. 7: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing "NaOH"

Appearance: Sodium hydroxide (NaOH) is found as solid white granules, chips, or pellets. Solid forms rapidly absorb water vapor from the air. This process generates heat and results in the formation of concentrated solutions of NaOH. Concentrated solutions of NaOH in water are clear in color.

Odor & Odor Threshold: Not applicable. NaOH is not volatile and is odorless at room temperature.

Odor Safety Class: NaOH is odorless. **Note:** Odor provides no warning of hazard. Irritation of the nose and throat provides an indication of exposure to a concentration of dust, or fumes if heated, that is sufficient to produce initial symptoms of toxicity.

Containers & Packaging

Commercial: NaOH is one of several alkaline materials referred to as "lye". It is also packaged as caustic soda or soda lye. Commercial products in solid form include Red Devil® Lye and Drano® drain opener (Figure 1, A & B), while liquids include Easy Off® oven cleaner and Liquid-Plumner® drain opener. Concentrated solutions of sodium hydroxide in water are available from commercial chemical supply companies.

Pharmaceutical: There are no pharmaceutical uses of sodium hydroxide.

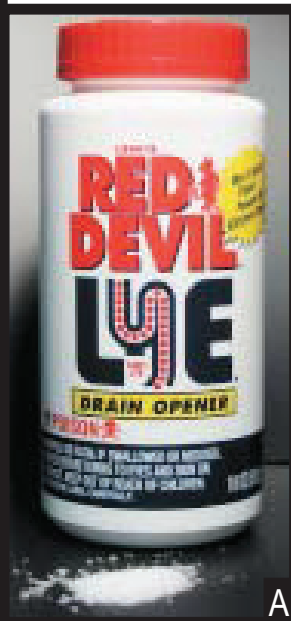


Figure 1: Commercial drain openers such as Red Devil® Lye [A] and Drano® [B] contain sodium hydroxide which can be used in the illegal synthesis of methamphetamine. Photographers, Charles Salocks and Caron Poole.

Role in Drug Synthesis

Sodium hydroxide is used to make sodium, an alkali metal that functions as a catalyst in the anhydrous ammonia/ alkali metal ("Nazi") method. NaOH is also used in a number of synthesis methods to raise the pH of methamphetamine reaction solutions.

Health Hazards

General: NaOH is highly corrosive. It is a powerful irritant by all routes of exposure. Low level exposure causes irritation, burning, and inflammation of the skin, eyes, nose, throat, windpipe and lungs. Higher level exposure causes severe burns resulting in permanent damage to all tissue it contacts. The mechanism of damage is two-fold: 1) thermal burns result from heat generated when NaOH combines with moisture in the body, and 2) chemical burns result from reaction with organic molecules. NaOH produces damage on contact, often very quickly; but, it does not go on to cause systemic toxicity, i.e., damage other places in the body.

Inhalation Exposure: Acute, high concentration exposures cause severe burns, swelling of the voice-box, lung edema (accumulation of fluid), and irreversible obstructive pulmonary disease. Long-term lower level exposure can result in chest pains, shortness of breath, ulceration of the nasal passages, persistent hoarseness, and reactive airway dysfunction syndrome (RADS), a chemical-induced asthma.

Skin Exposure: Concentrated NaOH causes deep, serious, painful, soft, and moist burns. Dilute solutions may not produce pain initially but can result in serious burns if allowed to remain

on the skin. Chronic effects include dermatitis.

Eye Contact: Tissue damage, inflammation, and opacification of the cornea may occur. Cataracts, glaucoma, adhesion of the lid to the eye, eye loss, and blindness may result. Damage may progress for 72 hours or more following exposure.

Ingestion: Severe injury to the mouth, esophagus, and stomach may result. Symptoms of injury include vomiting, drooling, pain, rapid and feeble pulse, collapse, and shock.

Clandestine Labs/ "Meth":

Environmental Concerns

General: As a contaminant in surface water, NaOH would be expected to raise the pH. NaOH is highly reactive and is rapidly neutralized by organic chemicals in soil. For this reason, it is not expected to significantly contaminate ground water or soil. Sodium hydroxide in air is subject to wet deposition (washout by rainfall) and dry deposition. NaOH readily combines with water vapor. The resulting aerosol or mist is corrosive.

Indoors: Sodium hydroxide may be found as a solid or a concentrated liquid on indoor surfaces. Solid forms may slowly "melt" by absorbing water vapor from air, forming a highly concentrated solution. If contamination occurs, NaOH would be expected to persist. The persistence of solid or liquid residues will depend on the nature of the surface and to what degree it is porous. Skin contact and ingestion resulting from hand-to-mouth activity could occur. Clean-up standards for NaOH on surfaces have not been established.

Chemical Hazards

Reactivity: Mixed with water, solid forms and concentrated solutions (>40%) of NaOH may generate enough heat to ignite combustible materials. NaOH reacts with all mineral and organic acids, forming the corresponding salts. The heat generated may be sufficient to raise the temperature of liquids above the boiling point. This could result in sporadic, dangerous "bumping" of solutions. NaOH reacts with metals, such as aluminum, tin, and zinc generating flammable hydrogen gas.

Flammability: Sodium hydroxide is noncombustible. However, if solid NaOH is mixed with water or acid it may generate enough heat to ignite combustible materials.

Chemical Incompatibilities: Sodium hydroxide is corrosive to most metals. Sodium hydroxide is incompatible with acids, halogenated organic compounds, and nitromethane. Mixing NaOH with acid may generate substantial heat. Reaction with trichloroethylene (TCE) spontaneously forms dichloroacetylene, which is flammable. Reaction with metals, such as aluminum, tin, and zinc generates flammable hydrogen gas.

Sodium Hydroxide

First Aid

Inhalation Exposure: Move to fresh air. If victim has difficulty breathing, give oxygen. If not breathing, give artificial respiration. Keep victim in a half upright position. Get medical attention immediately.

Contact with Clothing or Skin (Dermal Exposure): Rapid decontamination is critical. Remove contaminated clothing and shoes. Flush exposed skin and hair with water for 15 minutes or more. Get medical attention.

Contact with Eyes: Flush eyes with water for at least 15 minutes. Get medical attention immediately.

Ingestion (Oral) Exposure: Do not induce vomiting. If victim is conscious, give 4-8 ounces water or milk. Do not administer activated charcoal or attempt to neutralize. Seek immediate medical attention.

Special Concerns for Children: Stomach acid in children may not be not strong enough or present in great enough

amounts to neutralize even small amounts of NaOH. Therefore, toxic effects in children may be greater. The behavior patterns of children may also result in more frequent contact with contaminated surfaces.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Ceiling Limit (C): 2 mg/m³

Short-Term Exposure Limit (STEL): not established

8-Hr Time Weighted Average (TWA): 2 mg/m³

10-Hr Time Weighted Average (TWA): not established

Immediately Dangerous (IDLH): 10 mg/m³

Preliminary Remediation Goals (PRGs)

(U.S. EPA, Reg. 9): Air, Soil, & Water: not established

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Hydrogen Chloride

DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

Vol. 1, No. 3: Clandestine Drug Labs/ Methamphetamine

February 2004

Recognizing "HCl"

Appearance: Anhydrous hydrogen chloride (HCl) gas is colorless to slightly yellow at room temperature. When exposed to air, HCl gas condenses with moisture in the air to produce dense, white, and corrosive hydrochloric acid vapors.

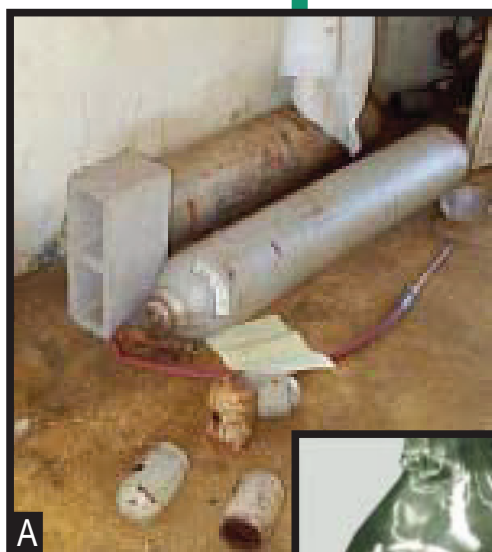
Hydrochloric acid is a colorless or slightly yellow fuming, aqueous liquid formed by dissolving HCl gas in water. Yellowing is caused by trace amounts of iron, chlorine, or organic matter impurities.

Odor: Pungent. Immediately irritating at 5 ppm (7.5 mg/m³).

Odor Threshold: 0.26 ppm (0.4 mg/m³).

Odor Safety Class: C (less than 50% of distracted individuals perceive warning of threshold limit).

Vapor Density: 1.3 (air =1.0). Hydrogen chloride gas is heavier than air and may accumulate close to the ground or in depressions.



A



B

Figure 1: Anhydrous hydrogen chloride gas is stored as a liquid in pressurized containers [A]. Aqueous solutions of hydrogen chloride are called hydrochloric acid or muriatic acid [B] and are found in commercial chemical or swimming pool supply houses. Photos: Courtesy of CA Department of Justice.

Containers & Packaging

Anhydrous HCl is a gas at room temperature but becomes liquid when put under pressure. Anhydrous (e.g. without water) HCl gas is typically stored and transported as a liquid in pressurized tanks (Figure 1, A). Aqueous solutions of hydrogen chloride are called hydrochloric or muriatic acid (Figure 1, B). Hydrochloric acid is used as an ingredient in toilet bowl cleaners. HCl solutions can also be purchased at pool supply and hardware stores as an acidifier, cleaner, and disinfectant.

Role in Drug Synthesis

HCl is used to produce the solid hydrochloride salt of methamphetamine. Both aqueous and gaseous forms can be used, but HCl gas is more effective.

Health Hazards

General: HCl is severely corrosive and irritating to all body tissues. Prolonged exposure may cause permanent effects.

Inhalation Exposure: HCl gas causes burning and irritation of the nose and throat, coughing, choking, sneezing, breathing difficulty, chest pain, and headache. Inhalation of anhydrous HCl gas can be fatal if exposure to concentrations of 0.1% in air occur even for a few minutes. Exposure to high concentrations of liquid or gaseous HCl can result in constriction of the airways, swelling, fluid build up and tissue death in the lungs, rapid breathing and pulse, shock, decreased blood pressure, tooth discoloration, gum and nosebleeds. HCl vapor is heavier than air. Asphyxiation might occur in confined, un-ventilated areas.

Skin (Dermal) Exposure: Direct contact with fumes or liquid can cause corrosive burns. Irritation, pain, inflammation, and ulceration can result. Frostbite may occur with exposure to anhydrous HCl as it is released from tanks.

Eye Contact: Fumes can cause extreme irritation. Contact with liquid HCl can result in pain, swelling, corneal erosion, tissue death, and may cause permanent eye damage.

Ingestion: HCl ingestion can cause pain, irritation, nausea, vomiting, thirst, difficulty swallowing, salivation, corrosive burns, ulceration, and perforation of the gastrointestinal tract, which can be fatal.

Other effects include chills, fever, and kidney inflammation.

Special Concerns for Children: Children may inhale larger doses of HCl due to their greater lung size to body weight ratio and increased inhalation rates. Short stature may also be a risk since vapors may concentrate near the ground.

Clandestine Labs/ "Meth":

Hydrogen Chloride

Environmental Concerns

Air: HCl gas is subject to wet deposition (washout by rainfall). HCl gas readily combines with water in the air to form HCl acid.

Soil: Anhydrous HCl gas readily combines with soil moisture to form HCl acid. HCl acid, an aqueous solution, can infiltrate soil and dissolve minerals, especially carbonates. This process typically results in neutralization of the HCl acid. However, if large amounts of HCl acid are spilled, infiltration and downward migration through the soil column may occur.

Ground Water: HCl acid can readily move through soil spaces where it may come in contact with, and may acidify, ground water. If significantly neutralized by organic and mineral components in the soil, or if diluted with sufficient amounts of water, ground water contamination can be minimized.

Surface Water: HCl dissociates almost completely in water to form acidic hydronium ions. Acidified water can be neutralized with agricultural lime (CaO), crushed limestone (CaCO₃), or sodium bicarbonate (NaHCO₃).

Indoors: Long-term contamination of indoor surfaces by anhydrous HCl is not likely a concern since it is a gas at room temperature and will typically dissipate. Care should be taken not to inhale HCl gas or vapors from HCl acid. If spilled on indoor surfaces, HCl acid can be neutralized by the addition of common bases, such as sodium bicarbonate. Spills should be addressed as recommended for hazardous materials cleanup of aqueous acids.

Exposure Limits

Occupational Exposure Limits (NIOSH & ACGIH)

Ceiling Limit: 2 ppm

8-Hr Time Weighted Average (TWA): not established

Immediately Dangerous (IDLH): 50 ppm (75 mg/m³)

Preliminary Remediation Goals (PRGs)(U.S. EPA, Reg. 9):

Air: 14 ppb (21 µg/m³). Soil & Water: not established

Handling & Safety



First Aid

Inhalation Exposure: Remove affected person to fresh air. Monitor for respiratory distress. Administer oxygen and assist ventilation as required. Seek medical attention immediately. Severe respiratory tract irritation can progress to pulmonary edema, the onset of which may be delayed up to 24 to 72 hours after exposure.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed areas with water for at least 5 minutes. Thoroughly wash with soap and water when possible. Seek medical attention if needed.

Contact with Eyes: Flush exposed eyes with water or saline solution for at least 15 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: Do not induce vomiting, do not give activated charcoal, and do not attempt to neutralize. Give 4-8 oz. of water or milk. Seek medical attention.

Chemical Hazards

Reactivity: HCl acid is highly corrosive and reacts with nearly all metals. It reacts with oxidizers releasing chlorine gas. When mixed with water, it releases large amounts of heat.

Flammability: HCl is not flammable, but in contact with strong bases (e.g., ammonium hydroxide or sodium hydroxide), an explosive reaction can occur. Flammable hydrogen gas can be produced when HCl contacts metals. Containers holding HCl gas or hydrochloric acid may explode when heated and corrosive HCl fumes may result. Water used to control a fire may become corrosive or toxic due to HCl acid contamination.

Chemical Incompatibilities: HCl is incompatible with alkalis, amines, copper, copper alloys, hydroxides, zinc, sulfuric acid, and organic materials.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov

Methamphetamine

"Meth"

Vol. 1, No. 8: Clandestine Drug Labs/ Methamphetamine

September 2003

Recognizing "Meth"

Appearance: The hydrochloride salt of methamphetamine (Meth-HCl) is a yellow or white crystalline powder. Street grade Meth may occur in any number of colors depending on how it was manufactured and what impurities exist in the final product. (Figure 1, A-D). Street Meth-HCl is also found as "Ice", which appears as bright clear crystals of high purity. The free base of methamphetamine (Meth-base) is a yellow to brown liquid, which is soluble in organic solvents (e.g., Coleman Fuel). Meth-base liquid can be converted to Meth-HCl solid by bubbling hydrogen chloride gas through the Meth-base layer.

Chemical Forms: There are two isomeric chemical forms of methamphetamine, *d*- and *l*-Meth. The *d*- form is a potent central nervous system (CNS) stimulant. Meth produced by clandestine labs is usually found as the *d*- isomer. *l*-Meth has little CNS activity and is used for the temporary relief of nasal congestion.

Pharmaceutical Products: *l*-Meth is found as the active ingredient in over-the-counter products including Vicks® Vapor Inhaler®. When used as directed, *l*-Meth does not represent a significant health

hazard. *d*-Meth is a controlled substance, Drug Enforcement Agency, Schedule II, but it is legally available by prescription for

treatment of attention deficit disorder with hyperactivity and for short-term treatment of obesity.

Odor: Meth-HCl is odorless but has a bitter taste. Meth-base has a sharp biting odor resembling geranium leaves. Meth-base is volatile at room temperature.

Health Hazards

Routes of Exposure & General Effects: Meth-HCl can be smoked (inhaled), snorted, injected, or ingested. The route of exposure primarily affects the rate of absorption and onset of effects. Injection and inhalation produce the most rapid effects. Meth is a central nervous system stimulant. Once absorbed it produces the same physiological effects regardless of exposure route.

Acute Effects: Meth is irritating to skin, eyes, mucous membranes, and the upper respiratory tract. Eye contact may cause pupil dilation and retraction of the upper lid. Acute intoxication can cause dizziness, headache, dry mouth, a metallic taste, anorexia, insomnia, tremor, rash, chest pain, difficulty breathing, fainting, blurred vision, dilated pupils, impotence, bluish skin color, lung congestion, convulsions, and coma. Overdose may cause exaggeration of reflexes, rapid breathing, confusion, panic states, aggressiveness, hallucinations, brain oxygen loss, elevated body temperature, skeletal muscle wasting, fatigue, depression, acute paranoia, and a schizophrenic-like state. Other effects include nausea, vomiting, diarrhea, cramps, irregular heartbeat, high or low blood pressure, and circulatory collapse.

Chronic Effects: Long-term exposure may cause severe skin conditions, insomnia, irritability, poor concentration,

hyperactivity, personality changes, weight loss, teeth grinding and tooth loss, ulcers of the lips and tongue, physical and psychological dependence, anxiety, fear, compulsive behavior, delirium, disorientation, hallucinations, or a psychotic schizophrenic-like condition with possible self-injury.

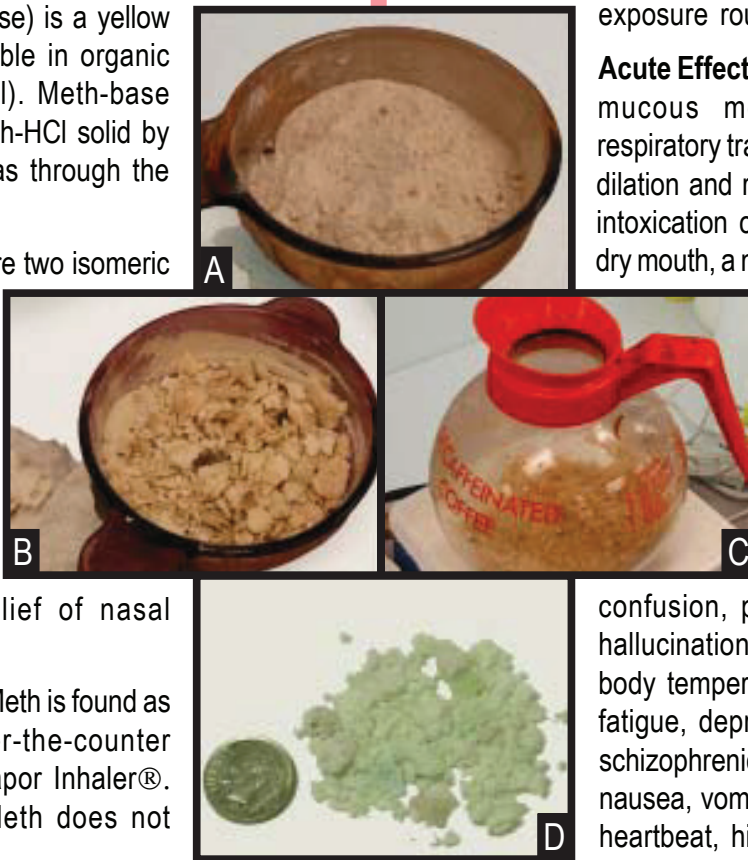


Figure 1: In the final synthesis stages, a methamphetamine-HCl slurry is often dried in heat-resistant household or restaurant style glass dishes [A-C]. The drug is typically found as a solid cake or in broken chunks in these dishes. Street grade Meth varies greatly in color depending on the type and quality of the synthesis method used [D]. Photos Courtesy of CA Department of Justice.

Clandestine Labs “Meth”:

Methamphetamine

Environmental Concerns

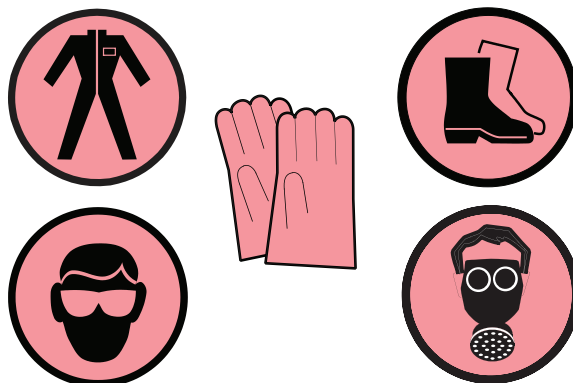
Air & Soil: No information available.

Ground Water & Surface Water: No information available.

Indoors: Meth-base is volatile. Depending on environmental conditions it may persist on indoor surfaces for several days. Meth-HCl is a stable solid and may persist on surfaces for months or longer. Several states in the U.S. have developed clean-up standards for Meth contamination of indoor surfaces. These range from 0.1 to 5 μg Meth /100 cm^2 surface area.

None of these standards is based on toxicity criteria or on estimates of potential exposure that might result from contact with Meth-contaminated surfaces. If funding were provided, the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment could develop a risk-based advisory standard for Meth residues on indoor surfaces and could continue to evaluate field sampling and analysis methods for measuring levels of methamphetamine contamination on indoor surfaces and other areas around dwellings.

Handling & Safety



First Aid

Inhalation Exposure: Move to fresh air. Give artificial respiration if not breathing. If breathing difficulty occurs, give oxygen and seek medical attention.

Contact with Clothing or Skin (Dermal Exposure): Remove contaminated clothing. Flush exposed skin and hair with water for at least 15 minutes. Thoroughly wash with soap and water when possible. Methamphetamine can be absorbed through the skin. Seek medical attention if needed.

Contact with Eyes: Flush exposed eyes with water or saline solution for at least 15 minutes. Remove contact lenses if possible. Seek immediate medical attention.

Ingestion (Oral) Exposure: Contact the local poison control center or a physician immediately. Wash out mouth with water if person is conscious. Do not make an unconscious person drink fluids or vomit. If vomiting does occur, keep head lower than hips to help

prevent aspiration. If unconscious, turn person's head to the side to help prevent aspiration.

Special Concerns for Children: Meth-base is volatile and may pose an inhalation hazard. Children may inhale relatively larger amounts of vapors due to their faster respiratory rates and greater lung size to body weight ratio. Meth-HCl found on surfaces may be absorbed through the skin or inhaled as solid “dust” particles in the air. Long-term use of stimulants in children can cause growth suppression. Methamphetamine passes into breast milk and can be detected in a breast-fed infant's urine.

Exposure Limits

Occupational Exposure Limits (NIOSH, OSHA, & ACGIH)

Ceiling Limit (C): not established

Short-Term Exposure Limit (STEL or ST): not established

8-Hr Time Weighted Average (TWA): not established

10-Hr Time Weighted Average (TWA): not established

Immediately Dangerous (IDLH): not established

Preliminary Remediation Goals (PRGs) (U.S. EPA, Reg. 9):

Air, Soil & Water: not established

Chemical Hazards

Reactivity: Meth-HCl is stable at normal temperature and pressure.

Flammability: Meth-HCl is a slight fire hazard. Dust in air may ignite or explode. Hazardous combustion or decomposition products include carbon monoxide, carbon dioxide, and nitrogen oxides. Combustion of meth-HCl may produce hydrogen chloride gas.

Chemical Incompatibilities: Strong oxidizing agents.

More Information

Office of Environmental Health
Hazard Assessment (OEHA)
www.OEHA.CA.Gov

Department of Toxic
Substances Control (DTSC)
www.DTSC.CA.Gov



Technical Support Document: Toxicology Clandestine Drug Labs/ Methamphetamine

Volume 1, Number 13

EPHEDRINE and PSEUDOEPHEDRINE

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Introduction

The clandestine synthesis of methamphetamine (meth) and other illegal drugs is a growing public health and environmental concern. For every pound of meth synthesized there are six or more pounds of hazardous materials or chemicals produced. These are often left on the premises, dumped down local septic systems, or illegally dumped in backyards, open spaces, in ditches along roadways or down municipal sewer systems. In addition to concerns for peace officer safety and health, there is increasing concern about potential health impacts on the public and on unknowing inhabitants, including children and the elderly, who subsequently occupy dwellings where illegal drug labs have been located.

The Office of Environmental Health Hazard Assessment (OEHHA), in cooperation with the Department of Toxic Substances Control (DTSC), has been charged with assisting in identifying and characterizing chemicals used or produced in the illegal manufacturing of methamphetamine, which pose the greatest potential human health concerns. To address in part this growing environmental problem and the need for public health and safety professionals to make appropriate risk management decisions for the remediation of former methamphetamine laboratory sites, OEHHA has developed two types of chemical-specific information documents.

The first set, technical support documents (TSDs), are referenced, multi-page publications, which contain important health and safety data, exposure limits, and key information for recognizing chemicals used or produced during the manufacturing of methamphetamine. These documents will likely be most helpful to health and safety officers, industrial hygienists, or others interested in more detailed toxicological information. The second set, two-page fact sheets, contain much of the same information as the corresponding TSDs; however, the details are presented in a more succinct, graphical format. The fact sheets will be helpful to individuals, including the public, who want to be able to quickly recognize potential chemicals of concern found in illegal methamphetamine labs in order to avoid inadvertent exposures and resulting health impacts.

For more information or to obtain copies of these and other documents, contact:

DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

P.O. Box 806
Sacramento, CA 95812-0806

www.dtsc.ca.gov/SiteCleanup/

OFFICE OF ENVIRONMENTAL
HEALTH HAZARD ASSESSMENT

P.O. Box 4010
Sacramento, CA 95812-4010

www.oehha.ca.gov

I. Chemical Name

A. EPHEDRINE & PSEUDOEPHEDRINE (C₁₀H₁₅NO)

NOTE: This Technical Support Document summarizes information on the health hazards of ephedrine and pseudoephedrine. Where information pertains solely to one drug, it is so noted. Ephedrine and pseudoephedrine are stereoisomers, i.e., they have the same molecular formula (C₁₀H₁₅NO) and the same sequence of bonds, but different three dimensional spatial arrangements. At the molecular level, ephedrine and pseudoephedrine each consist of a pair of non-super imposable mirror images, which are called *d*- and *l*- enantiomers. Each enantiomer has slightly different pharmacological potency and biological effects. Pharmaceutical formulations of ephedrine and pseudoephedrine may contain only the *d*- enantiomer, only the *l*- enantiomer, or a mixture of the *d*- and *l*- enantiomers.

B. Synonyms

Ephedrine: α -[1-(methylamino) ethyl]benzene-methanol, α -[1-(methylamino)ethyl]benzyl alcohol, 2-methylamino-1-phenyl-1-propanol, 1-phenyl-1-hydroxy-2-methylaminopropane, 1-phenyl-2-methylaminopropanol, α -hydroxy- β -methylaminopropylbenzene, Ma Huang.

dl-Ephedrine: racemic ephedrine, racephedrine.

dl-Ephedrine hydrochloride: racephedrine hydrochloride, Ephetonin, Ephedral, Sanedrine.

dl-Ephedrine sulfate: racephedrine sulfate.

l-Ephedrine: l-erythro-2-(methylamino)-1-phenylpropan-1-ol.

dl-Pseudoephedrine: dl-threo-2-(methylamino)-1-phenyl-propan-1-ol.

d-Pseudoephedrine: d-isoephedrine.

d-Pseudoephedrine hydrochloride: Galpseud, Novafed, Rhinalair, Otrinol, Sinufed, Sudafed.

d-Pseudoephedrine sulfate: Afrinol (Merck, 1996).

II. Role in Clandestine Drug Synthesis: Methamphetamine

Ephedrine and pseudoephedrine are precursors in the synthesis of methamphetamine (Turkington, 2000).

III. Chemical Description

A. Appearance

Ephedrine appears as a waxy solid or as white to colorless granules, powder, or crystals (HSDB, 2002A; Turkington, 2000). Pseudoephedrine is a white powder (Acros, 2000B). The powders may become yellow upon standing (Turkington, 2000).

For pharmaceutical uses, Ephedrine and pseudoephedrine are often marketed as white, red, or blue tablets (e.g., Sudafed®). In clandestine methamphetamine labs, the tablets may be ground up and partially dissolved in water or alcohol. The resulting sludge is filtered using coffee filters or any makeshift filtering device such as a mop bucket wringer. In clandestine laboratories that are engaged in large scale production of methamphetamine, ephedrine and pseudoephedrine may be contained in fiberboard shipping drums.

B. Taste

Bitter.

C. Odor

None; however, ephedrine and pseudoephedrine may smell musty upon standing (Turkington, 2000).

D. Odor Threshold

Not applicable.

E. Irritancy Threshold

Not available.

F. Odor Safety Class

Not applicable.

G. Vapor Pressure and Density

Ephedrine and pseudoephedrine are solids at room temperature and are not volatile.

IV. Containers and Packaging

A. Commercial Products

Ephedrine and pseudoephedrine are sold over-the-counter in tablet or liquid form. See section II, B.

B. Pharmaceutical Use

Ephedrine has been used as a bronchodilator, nasal decongestant, mydriatic (pupil dilator), and a central nervous system stimulant. It has also been used to counteract hypotension associated with anesthesia and in the treatment of enuresis (urinary incontinence) and myasthenia gravis (a neurodegenerative disease involving voluntary muscles) (USP, 1998; Merck, 1996). Ephedrine occurs naturally in Ma Huang, which is in herbal medicines and supplements (Merck, 1996).

Pseudoephedrine is used to relieve the symptoms of nasal, sinus, and eustachian tube congestion due to the common cold, hay fever, or other respiratory allergies (USP, 1998; PDR, 2002). Pseudoephedrine is also used with other medications in the treatment of allergic rhinitis, croup, sinusitis, acute otitis media and acute tracheobronchitis (USP, 1998).

V. Chemical Hazards

A. Reactivity

Ephedrine and pseudoephedrine are stable under normal temperatures and pressures (Acros, 2000A; Acros, 2000B).

B. Flammability

Dusts of *l*-ephedrine hydrochloride at sufficient concentrations can form explosive mixtures with air (Acros, 2000A). Hazardous decomposition products include nitrogen oxides, carbon monoxide, carbon dioxide, nitrogen, and hydrogen chloride gas (for the hydrochloride forms) (Acros, 2000A; Sigma, 1997; Sigma, 2002A; Sigma, 2002B).

C. Chemical Incompatibilities

Ephedrine and pseudoephedrine are incompatible with strong oxidants (Acros, 2000A; Sigma, 2002B).

VI. Health Hazards

A. General

Ephedrine is a central nervous system stimulant that may produce nervousness, anxiety, apprehension, fear, tension, agitation, excitation, restlessness, weakness, irritability, talkativeness, or insomnia (HSDB, 2002A). Large doses of ephedrine may result in dizziness, lightheadedness, tremor, hyperactive reflexes, hypertension (high blood pressure), and vertigo (HSDB, 2002A; PDRHM, 1998). Large parenteral (routes other than oral) doses of ephedrine may cause confusion, delirium, hallucinations, or euphoria. In addition, paranoid psychoses and visual auditory hallucinations may occur at extremely high doses. Ephedrine may also cause the following: throbbing headache; respiratory difficulty; fever or a feeling of warmth; paleness; dryness of the nose and throat; chest pain; sweating; mild abdominal discomfort; vomiting; palpitation; tachycardia (rapid heartbeat); potentially fatal arrhythmias (alteration in heartbeat), including ventricular fibrillation; acute urinary retention or difficulty in urination; hypertension (high blood pressure), which may result in intracranial hemorrhage; nausea; and loss of appetite (HSDB, 2002A). Ephedrine has been known to cause allergic sensitization. *l*-Ephedrine hydrochloride may have a local anesthetic effect on exposed skin (Lewis, 2002). *l*-Ephedrine hydrochloride may cause skin, eye, mucous membrane, upper respiratory tract, and digestive tract irritation (Acros, 2000C; Sigma, 1997).

Symptoms of toxicity associated with pseudoephedrine include convulsions, hallucinations, irregular or slow heartbeat, shortness of breath, trouble breathing, an increase in blood pressure, nervousness, restlessness, excitement, trouble sleeping, difficult or painful urination, dizziness, lightheadedness, drowsiness, fast or pounding heartbeat, increased sweating, nausea, vomiting, trembling, unusual paleness, or weakness (USP, 1998; HSDB, 2002B). *d*-Pseudoephedrine hydrochloride exposure may cause eye, skin, and digestive tract irritation, as well as neurological and central nervous system effects (Acros, 2000B).

B. Acute Effects

Symptoms of high dose, acute ephedrine exposure include severe outbreaks of sweating, enlarged pupils, spasms, and elevated body temperature, with heart failure and asphyxiation leading to death (PDRHM, 1998).

Symptoms of acute pseudoephedrine exposure include increased blood pressure; increased, decreased or irregular heartbeat; shortness of breath, increased breathing rate, or troubled breathing; unusual nervousness, restlessness or excitement; and convulsions. The most common symptoms of pseudoephedrine overdose include mydriasis (dilated pupils), tachycardia (rapid heartbeat), hypertension (high blood pressure), hallucinations, arrhythmias (irregular heartbeat), agitation/anxiety, tremors/hyperreflexia, and vomiting (HSDB, 2002B). Acute exposure to pseudoephedrine hydrochloride may also cause nausea, constipation, dizziness, sedation, itching, anxiety, tenseness, weakness, paleness, difficulty in urination, insomnia, convulsions, central nervous system depression, and cardiovascular collapse with hypotension (low blood pressure) (Sigma, 2002A).

C. Chronic Effects

Tolerance to ephedrine may develop with prolonged or excessive use (USP, 1998).

Prolonged or repeated exposure to *d*- pseudoephedrine hydrochloride can cause hallucinations, central nervous system stimulation, psychic abnormalities such as anxiety, depression and excitability, and possibly coma (Acros, 2000B).

D. Skin Contact

I- Ephedrine hydrochloride may have a local anesthetic effect on exposed skin (Lewis, 2002).

E. Eye Contact

Ephedrine, when applied locally to the eye, may cause brow ache, headache, blurred vision, allergic conjunctivitis and dermatitis, irritation, and tearing (HSDB, 2002A).

F. Inhalation

Inhalation of dusts containing ephedrine or pseudoephedrine may cause respiratory tract irritation (Acros, 2000A; Acros, 2000C).

G. Ingestion

Ingestion is the most common route of exposure to ephedrine and pseudoephedrine. Information summarized in sections VI, A, B, and C (above), except where specifically noted, describe symptoms reported following ingestion of both drugs.

H. Predisposing Conditions

Ephedrine may induce anginal pain in persons with coronary insufficiency and/or ischemic heart disease. Ephedrine and pseudoephedrine are contraindicated in individuals with hypertension (high blood pressure), arteriosclerosis (thickening and hardening of the arterial walls), chronic heart disease, diabetes, cardiovascular disease, hyperthyroidism (increased thyroid functioning), prostatic hypertrophy (excessive growth of prostate gland), or a predisposition to glaucoma. Additionally, individuals sensitive to other sympathomimetics (e.g., albuterol, amphetamines, norepinephrine) and those receiving monoamine oxidase inhibitors (MAOI), myocardial-sensitizing anesthetics, or digitalis may be more susceptible to the adverse health effects of ephedrine and pseudoephedrine (HSDB, 2002A; USP, 1998; HSDB, 2002B).

I. Special Concerns for Children

Pseudoephedrine presents an increased risk of adverse effects for newborn and premature infants. Use of ephedrine and pseudoephedrine by nursing mothers is not recommended as pseudoephedrine passes into breast milk (HSDB, 2002A; USP, 1998).

VII. First Aid

The central nervous system effects of ephedrine may be mitigated by administration of a sedative or tranquilizer (HSDB, 2002A).

A. Eyes

Flush eyes immediately with water for at least fifteen minutes, occasionally lifting lower and upper lids, and obtain medical attention promptly (Acros, 2000A; Sigma, 1997; Acros, 2000B).

B. Skin

Exposed skin should be washed thoroughly with soap and water for at least fifteen minutes, and immediately remove contaminated clothing and shoes. Obtain medical assistance if irritation or rash appears (Acros, 2000A; Sigma, 1997; Acros, 2000B).

C. Ingestion

Do not induce vomiting. If conscious, rinse the mouth and drink 2-4 cups of milk or water. Never give anything by mouth to an unconscious person. Obtain medical aid (Acros, 2000A; Sigma, 1997; Acros, 2000B).

D. Inhalation

If inhaled, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, give oxygen. Obtain immediate medical attention (Acros, 2000A; Sigma, 1997; Acros, 2000B).

VIII. Standards for Inhalation Exposure

A. Occupational Exposure Limits (NIOSH, 1997; ACGIH, 1994)

- | | |
|--|------------------|
| 1. Ceiling Limit (C) (not to be exceeded at any time): | Not established. |
| 2. Short-Term Exposure Limit (STEL or ST): | Not established. |
| 3. 8-Hour Time Weighted Average (TWA): | Not established. |
| 4. 10-Hour Time Weighted Average (TWA): | Not established. |
| 5. Immediately Dangerous to Life & Health (IDLH): | Not established. |

Important Definitions Follow:

Ceiling Limit (C) is a concentration that must not be exceeded during any part of the workday.

Short-Term Exposure Limit (STEL or ST) is a 15-minute time-weighted average concentration that should not be exceeded during any part of the workday.

8-Hour Time Weighted Average (8-hour TWA) concentration is an exposure standard that must not be exceeded during any 8-hour work shift of a 40-hour workweek. 8-Hour TWA exposure standards established by the Occupational Safety and Health Administration (OSHA) are called Permissible Exposure Limits (PELs). 8-Hour TWA exposure standards established by the American Conference of Governmental Industrial Hygienists (ACGIH) are called Threshold Limit Values (TLVs).

10-Hour Time Weighted Average (10-hour TWA) concentration is an exposure standard that must not be exceeded during a 10-hour workday of a 40-hour workweek. 10-Hour TWA exposure standards developed by the National Institute for Occupational Safety and Health (NIOSH) are called Recommended Exposure Limits (RELs).

Immediately Dangerous to Life & Health (IDLH) defines a concentration which poses a threat of death or immediate or delayed permanent health effects, or is likely to prevent escape from such an environment in the event of failure of respiratory protection equipment. IDLH values are developed by the National Institute for Occupational Safety and Health (NIOSH).

“Skin” notation (NIOSH): significant uptake may occur as a result of skin contact. Therefore, appropriate personal protective clothing should be worn to prevent dermal exposure.

B. Emergency Response Planning Guidelines (1 hour or less) (AIHA, 2002)

- | | |
|--|------------------|
| 1. ERPG-1 (protective against mild, transient effects): | Not established. |
| 2. ERPG-2 (protective against serious adverse effects): | Not established. |
| 3. ERPG-3 (protective against life-threatening effects): | Not established. |

Emergency Response Planning Guidelines (ERPGs) are developed by the American Industrial Hygiene Association (AIHA) to assist in planning and preparation for catastrophic accidental chemical releases. ERPGs allow emergency response planners to estimate the consequences of large-scale chemical releases on human health, and evaluate the effectiveness of prevention strategies and response capabilities. ERPGs assume that the duration of exposure is one hour or less. They are not intended to be used as limits for routine operations and are not legally enforceable.

Definitions for the three ERPG levels are:

ERPG-1: an estimate of the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor.

ERPG-2: an estimate of the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

ERPG-3: an estimate of the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

C. Acute Reference Exposure Level (1-hour exposure) (OEHHA, 1999)

Level protective against mild adverse effects:

Not established.

D. Chronic Reference Exposure Level (multiple years) (OEHHA, 2002)

Level protective of adverse health effects:

Not established.

Reference Exposure Levels (RELs) are developed by the California EPA's Office of Environmental Health Hazard Assessment (OEHHA). A REL is a concentration at or below which no adverse health effects are anticipated, even in the most sensitive members of the general population (for example, persons with pre-existing respiratory disease). RELs incorporate uncertainty factors to account for information gaps and uncertainties in the toxicological data. Therefore, exceeding a REL does not necessarily indicate an adverse health impact will occur in an exposed population. Acute RELs are based on an assumption that the duration of exposure is one hour or less. Chronic RELs are intended to be protective for individuals exposed continuously over at least a significant fraction of a lifetime (defined as 12 years).

E. Chronic Reference Concentration (lifetime exposure) (IRIS, 2003)

Level protective of adverse health effects:

Not established.

IX. Environmental Contamination Concerns

A. Surface Water

No information available. Ephedrine and pseudoephedrine are not likely to result in significant surface water contamination unless very large quantities are spilled. The pH of a 1:200 aqueous solution is 10.8 (HSDB, 2002A; HSDB, 2002B).

B. Groundwater

No information available. Ephedrine and pseudoephedrine are not likely to result in significant groundwater contamination unless very large quantities are spilled. The pH of a 1:200 aqueous solution is 10.8 (HSDB, 2002A; HSDB, 2002B).

C. Drinking Water

Suggested No Adverse Response Level (NAS, 1980): Not established.

Preliminary Remediation Goal for Tap Water (U.S. EPA, 2002 Region IX): Not established.

D. Soil

No information available. Ephedrine and pseudoephedrine are not likely to result in significant soil contamination unless very large quantities are spilled. The pH of a 1:200 aqueous solution is 10.8 (HSDB, 2002A; HSDB, 2002B).

Preliminary Remediation Goal for Residential Soil (U.S. EPA, 2002 Region IX): Not established.

E. Air

No information available. Ephedrine and pseudoephedrine are not volatile. In powdered form, ephedrine and pseudoephedrine are potentially problematic indoors. Ephedrine and pseudoephedrine will be removed from the air by wet and dry deposition.

Preliminary Remediation Goal for Ambient Air (U.S. EPA, 2002 Region IX): Not established.

F. Indoor Surface Contamination

Ephedrine hydrochloride and pseudoephedrine hydrochloride are non-volatile salts and are relatively stable under typical indoor residential environmental conditions. Both compounds are reported to undergo gradual decomposition on exposure to light (HSDB, 2002A; HSDB, 2002B). Standards for cleanup of ephedrine and pseudoephedrine contamination on indoor surfaces have not been developed.

X. Personal Protective Equipment

Wear protective eyeglasses/chemical safety goggles, rubber boots, heavy rubber gloves, protective clothing, and a self-contained breathing apparatus. Launder contaminated clothing and shoes before reuse (Acros, 2000A; Acros, 2000B; Sigma, 1997).

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Technical Support Document: Toxicology Clandestine Drug Labs/ Methamphetamine

Volume 1, Number 10

METHANOL

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Introduction

The clandestine synthesis of methamphetamine (meth) and other illegal drugs is a growing public health and environmental concern. For every pound of meth synthesized there are six or more pounds of hazardous materials or chemicals produced. These are often left on the premises, dumped down local septic systems, or illegally dumped in backyards, open spaces, in ditches along roadways or down municipal sewer systems. In addition to concerns for peace officer safety and health, there is increasing concern about potential health impacts on the public and on unknowing inhabitants, including children and the elderly, who subsequently occupy dwellings where illegal drug labs have been located.

The Office of Environmental Health Hazard Assessment (OEHHA), in cooperation with the Department of Toxic Substances Control (DTSC), has been charged with assisting in identifying and characterizing chemicals used or produced in the illegal manufacturing of methamphetamine, which pose the greatest potential human health concerns. To address in part this growing environmental problem and the need for public health and safety professionals to make appropriate risk management decisions for the remediation of former methamphetamine laboratory sites, OEHHA has developed two types of chemical-specific information documents.

The first set, technical support documents (TSDs), are referenced, multi-page publications, which contain important health and safety data, exposure limits, and key information for recognizing chemicals used or produced during the manufacturing of methamphetamine. These documents will likely be most helpful to health and safety officers, industrial hygienists, or others interested in more detailed toxicological information. The second set, two-page fact sheets, contain much of the same information as the corresponding TSDs; however, the details are presented in a more succinct, graphical format. The fact sheets will be helpful to individuals, including the public, who want to be able to quickly recognize potential chemicals of concern found in illegal methamphetamine labs in order to avoid inadvertent exposures and resulting health impacts.

For more information or to obtain copies of these and other documents, contact:

DEPARTMENT OF TOXIC
SUBSTANCES CONTROL

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Sacramento, CA 95812-0806

www.dtsc.ca.gov/SiteCleanup/

OFFICE OF ENVIRONMENTAL
HEALTH HAZARD ASSESSMENT

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I. Chemical Name

A. METHANOL (CH₃OH)

B. Synonyms

Wood alcohol, methyl alcohol, carbinol, columbian spirits, pyroligneous spirit, wood naphtha, wood spirit, HEET®, colonial spirit, methyl hydrate, methyl hydroxide, monohydroxymethane, pyroxylic spirit, methylol.

II. Role in Clandestine Drug Synthesis: Methamphetamine

Methanol is primarily used as a solvent for the extraction of ephedrine from pharmaceutical tablets. It is also used to make methamphetamine from phenyl-2-propanone and methylamine (Turkington, 2000).

III. Chemical Description

A. Appearance

Clear, colorless liquid.

B. Taste

Not available. Taste, like odor, may depend on solvent purity, ranging from alcoholic to pungent or repulsive.

C. Odor

Pure methanol has a faintly sweet or slight alcoholic odor, while crude methanol may be repulsive and pungent (Meditext, 2003).

D. Odor Threshold

The odor threshold is highly variable depending on purity; estimates of 10 ppm to 20,000 ppm have been reported (Meditext, 2003; AIHA, 2002).

E. Irritancy Threshold

Exposure for a period of at least one hour to concentrations of methanol in excess of 200 ppm has been reported to cause eye irritation (AIHA, 2002).

F. Odor Safety Class

C (Amoore & Hautala, 1983); less than 50% of distracted individuals perceive warning of the Threshold Limit Value. *Therefore, odor and irritation are not adequate warnings of overexposure to methanol.*

G. Vapor Density

The vapor density of methanol is 1.1 (air = 1); therefore, methanol vapor is slightly denser than air.

H. Vapor Pressure

92 mmHg at 20° C (AIHA, 2002).

IV. Containers and Packaging

A. Commercial Products

Methanol is used as an industrial solvent; antifreeze for automotive radiators and air brakes; an ingredient in gasoline and diesel oil antifreezes; an octane booster in gasoline; fuel for picnic stoves and soldering torches; a softening agent for pyroxylin plastics; solvent for shellac and some paints and varnishes; a component of paint removers (Hardman et al., 1996); an additive in windshield washing fluid, de-icing solution, duplicating fluids, solid canned fuels, model airplane fuels, embalming fluids, lacquers, and inks (OEHHA, 1999); a denaturant for ethanol (ACGIH, 1991); and as an alternative motor fuel (OEHHA, 2001). Methanol constitutes approximately 3-5% of denatured alcohol.

B. Pharmaceutical Use

No pharmaceutical uses for methanol were identified.

V. Chemical Hazards

A. Reactivity

Methanol is stable under normal conditions of use and storage (Mallinckrodt, 2001).

B. Flammability

Methanol is a moderate explosion hazard and dangerous fire hazard; avoid heat, flames, and ignition sources (Mallinckrodt, 2001). Static electrical discharge may cause ignition of vapors (Mallinckrodt, 2001; Meditext, 2003). Methanol vapors can flow along the ground to distant ignition sources and flash back (Mallinckrodt, 2001). Vapors may also spread and collect in low or confined areas (HSDB, 2002). Containers with methanol residues may be hazardous even when empty (Mallinckrodt, 2001). Non-sparking tools should be used when opening and closing containers of methanol (Meditext, 2003). Methanol may form carbon dioxide, carbon monoxide, and formaldehyde when heated to decomposition. The lower explosive limit and upper explosive limit (by volume) are 6% and 36%, respectively (Mallinckrodt, 2001).

C. Chemical Incompatibilities

Methanol is incompatible with strong oxidizing agents (e.g., nitrates, perchlorates, sulfuric acid), acids (e.g., perchloric acid, nitric acid), acid chlorides, acid anhydrides, alkali metals, reducing agents, and magnesium (Mallinckrodt, 2001; Sigma, 2002; Meditext, 2003). Methanol may react with metallic aluminum at high temperature generating hydrogen gas. Methanol also attacks some plastics, rubber, and some coatings (Meditext, 2003).

VI. Health Hazards

A. General

Methanol is readily absorbed following ingestion, inhalation, or dermal exposure, and the toxicity is the same regardless of the route of exposure (Reprotext, 2003; OEHHA, 1999). It is a mild eye, respiratory tract, and mucous membrane irritant (Reprotext, 2003). Methanol is also a defatting agent causing skin to become dry and cracked (Mallinckrodt, 2001). Signs of systemic poisoning may be delayed 8-36 hours after initial exposure (Hardman et al., 1996). It can cause permanent damage to the optic nerve and central and peripheral nervous system with just a single acute exposure. Methanol can also have cumulative toxicity with repeated exposures (Reprotext, 2003). Visual disturbances and metabolic acidosis are characteristic of methanol

poisoning, which can lead to coma, respiratory or circulatory arrest, and death (ACGIH, 1991; Hazardtext, 2003). Visual disturbances include dilated or un-reactive pupils, dim vision, and bilateral blindness, which is usually permanent (Hardman et al., 1996). Other signs and symptoms of methanol poisoning include headache, vertigo, vomiting, severe upper abdominal pain, back pain, difficulty breathing, cold extremities, narcosis, prostration, lethargy, and incoordination (ACGIH, 1991; Hardman et al., 1996). The most common permanent consequences following severe poisoning are optic neuropathy, blindness, Parkinsonism, toxic encephalopathy (degenerative brain disease), and polyneuropathy (a disease process involving several peripheral nerves) (Meditext, 2003). Additional signs and symptoms resulting from acute methanol poisoning include roaring in the ears, insomnia, symptoms similar to ethanol "hangover," anorexia, vertigo, nerve inflammation (neuritis), degenerative brain disease (acute encephalopathy), and hemorrhagic necrosis in several regions of the brain, inflamed pancreas (acute necrotizing pancreatitis), disintegration of muscle (rhabdomyolysis), confusion, lethargy, diarrhea, constipation, and death (Merck, 1996; Reprotex, 2003; Meditext, 2003).

B. Acute Effects

Toxic effects from acute methanol exposure may occur by ingestion, inhalation, or dermal absorption (Meditext, 2003). Acute methanol poisoning has three stages: 1) a rapid narcotic effect involving drowsiness or fatigue, and mild irritation of the eyes and mucous membranes 2) a latent period of 10-48 hours, followed by 3) more severe CNS effects including nausea, vomiting, dizziness, headache, abdominal and muscle pain, weakness, disturbances of consciousness, and visual disturbances, accompanied by metabolic acidosis (accumulation of acid in the body) and deep respirations (Reprotex, 2003; TOXLINE, 1997).

Nervous System: Loss of coordination (ataxia), shock, convulsions, seizures, coma, and hyperactivity of the deep tendon reflexes can result from methanol poisoning (Reprotex, 2003; Merck, 1996; Meditext, 2003). The last stage of acute methanol poisoning may cause permanent effects (i.e., damage to central, motor, and optic nerves), even from a single exposure (Reprotex, 2003). The most common permanent consequences following severe poisoning are optic neuropathy, blindness, Parkinsonism, toxic encephalopathy, and polyneuropathy. Permanent Parkinsonian-like syndrome, which usually does not appear until several months to two years after methanol exposure, has been described (Meditext, 2003).

Circulatory system and heart: Signs and symptoms resulting from acute methanol poisoning include high ammonia level in the blood (hyperammonemia), circulatory collapse, rapid heartbeat (tachycardia), slow heartbeat (bradycardia), cardiac failure, severely low blood pressure (hypotension), low magnesium content in the blood causing neuromuscular irritability (hypomagnesemia), low potassium content in the blood characterized by neuromuscular disorders (hypokalemia), decreased phosphates in the blood (hypophosphatemia), increase in the number of leukocytes in the blood (leukocytosis), coagulation disorder, and abnormal increase of blood sugar (hyperglycemia) (Meditext, 2003; Reprotex, 2003; Merck, 1996). Metabolic acidosis may be delayed for 18-24 hours, or longer if methanol has been ingested in combination with ethanol (Meditext, 2003).

Kidneys: Symptoms of acute methanol poisoning may include cessation of urine excretion (anuria), acute renal failure, and blood in the urine (hematuria) (Meditext, 2003; Reprotex, 2003).

Eyes: If methanol is splashed into the eyes, it may cause rapid eye movements (nystagmus) and dilated pupils (mydriasis) (Reprotex, 2003). Visual disturbances generally develop between 12-48 hours after ingestion, and range from mild photophobia and blurred vision to complete blindness (TOXLINE, 1997).

Skin: Skin contact with methanol may cause itching, eczema, and dermatitis (Reprotext, 2003).

Respiratory: Inhalation of acutely toxic concentrations of methanol vapor may cause respiratory failure, rapid respiration (tachypnea), difficulty breathing (dyspnea), abnormally rapid and deep breathing (hyperventilation), cessation of breathing (apnea), and accumulation of fluid in the lungs (pulmonary edema) (Meditext, 2003; Merck, 1996).

C. Chronic Effects

Methanol can have cumulative toxicity with repeated exposures. Methanol is a defatting agent and can cause dermatitis with dryness and cracking upon repeated skin exposure (Reprotext, 2003). Other symptoms of chronic exposure include eye irritation, headache, giddiness, insomnia, gastrointestinal problems, and especially visual difficulties (Reprotext, 2003; OEHHA, 2001). Effects from chronic exposure are similar to, but less severe than, those occurring after acute exposure (OEHHA, 2001).

D. Skin Contact

Methanol is a defatting agent and direct contact may cause skin to become dry and cracked. Methanol can be absorbed through the skin causing symptoms of systemic toxicity similar to those experienced with inhalation exposure (Mallinckrodt, 2001). Repeated skin contact with methanol can result in visual disturbances and blindness (ACGIH, 1991).

E. Eye Contact

Direct eye contact with methanol may result in mild irritation, pain, swelling, tearing, and sensitivity to light (photophobia) (Meditext, 2003).

F. Inhalation

Methanol is slightly irritating to mucous membranes. Inhalation may cause headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma, and death (Mallinckrodt, 2001). See section VII, B (Acute Effects) for additional signs and symptoms.

G. Ingestion

Ingestion is the most common route of accidental poisoning (Reprotext, 2003). Abdominal pain, anorexia, nausea, and vomiting may occur after ingestion. Acute necrotizing pancreatitis has been reported in severe poisonings (Meditext, 2003). See section VII, B (Acute Effects) for additional signs and symptoms (Mallinckrodt, 2001).

H. Predisposing Conditions

Pre-existing skin disorders, eye problems, respiratory problems, neurological conditions, or impaired liver or kidney function may predispose individuals to the adverse effects of methanol (Mallinckrodt, 2001; OEHHA, 1999). Concurrent exposure to formaldehyde or formic acid may increase sensitivity, while prior ingestion of ethanol may decrease sensitivity to the effects of methanol (OEHHA, 1999).

I. Special Concerns for Children

Children have a greater ratio of lung surface area to body weight as compared to adults. Similarly, the ratio of respiratory minute volume to body weight is greater in children than adults. Therefore, at any given concentration of methanol in air, children will probably receive a larger

dose than adults will. In addition, the vapor density of methanol is greater than that of air. Therefore, higher concentrations of methanol are likely to be found closer to the ground. Children may be exposed to higher concentrations of methanol gas than adults because of their short stature. Children may be more susceptible to the toxic effects of methanol because they are often less likely to leave an area where a release has occurred.

VII. First Aid

A. Eyes

Immediately flush eyes with water for at least fifteen minutes, lifting lower and upper eyelids (Mallinckrodt, 2001). If irritation, pain, swelling, lacrimation, or photophobia persists, obtain medical attention (Meditext, 2003).

B. Skin

Immediately flush skin with water for at least fifteen minutes. Obtain medical attention. Remove contaminated clothing and shoes. Wash clothing and thoroughly clean shoes before reuse (Mallinckrodt, 2001).

C. Ingestion

It is unclear whether or not to induce vomiting. In cases of severe poisoning, give ethanol, as it partially inhibits the formation of toxic metabolites of methanol. Obtain medical attention immediately (Meditext, 2003).

D. Inhalation

Seek fresh air. If not breathing, give artificial respiration, and if breathing is difficult, give oxygen. In cases of severe poisoning, give ethanol, as it partially inhibits the formation of toxic metabolites. Obtain medical attention immediately (Mallinckrodt, 2001; Meditext, 2003).

VIII. Standards for Inhalation Exposure

A. Occupational Exposure Limits (NIOSH, 1997; ACGIH, 1994)

- | | |
|--|--|
| 1. Ceiling Limit (C) (not to be exceeded at any time): | Not established. |
| 2. Short-Term Exposure Limit (STEL or ST): | 250 ppm (325 mg/m ³)[skin] |
| 3. 8-Hour Time Weighted Average (TWA): | 200 ppm (260 mg/m ³) |
| 4. 10-Hour Time Weighted Average (TWA): | 200 ppm (260 mg/m ³) |
| 5. Immediately Dangerous to Life & Health (IDLH): | 6000 ppm (7860 mg/m ³) |

Important Definitions Follow:

Ceiling Limit (C) is a concentration that must not be exceeded during any part of the workday.

Short-Term Exposure Limit (STEL or ST) is a 15-minute time-weighted average concentration that should not be exceeded during any part of the workday.

8-Hour Time Weighted Average (8-hour TWA) concentration is an exposure standard that must not be exceeded during any 8-hour work shift of a 40-hour workweek. 8-Hour TWA exposure standards established by the Occupational Safety and Health Administration (OSHA) are called Permissible Exposure Limits (PELs). 8-Hour TWA exposure standards established by the American Conference of Governmental Industrial Hygienists (ACGIH) are called Threshold Limit Values (TLVs).

10-Hour Time Weighted Average (10-hour TWA) concentration is an exposure standard that must not be exceeded during a 10-hour workday of a 40-hour workweek. 10-Hour TWA exposure standards developed by the National Institute for Occupational Safety and Health (NIOSH) are called Recommended Exposure Limits (RELs).

Immediately Dangerous to Life & Health (IDLH) defines a concentration which poses a threat of death or immediate or delayed permanent health effects, or is likely to prevent escape from such an environment in the event of failure of respiratory protection equipment. IDLH values are developed by the National Institute for Occupational Safety and Health (NIOSH).

"Skin" notation (NIOSH): significant uptake may occur as a result of skin contact. Therefore, appropriate personal protective clothing should be worn to prevent dermal exposure.

B. Emergency Response Planning Guidelines (1 hour or less) (AIHA, 2002)

- | | |
|--|----------|
| 1. ERPG-1 (protective against mild, transient effects): | 200 ppm |
| 2. ERPG-2 (protective against serious adverse effects): | 1000 ppm |
| 3. ERPG-3 (protective against life-threatening effects): | 5000 ppm |

NOTE: There is a significant discrepancy between the IDLH concentration (6000 ppm) and the ERPG-3 concentration (5000 ppm). Both values are intended to provide an estimate of a life-

threatening concentration. OEHHA recommends using the ERPG-3 value as an estimate of a potential lethal concentration.

Emergency Response Planning Guidelines (ERPGs) are developed by the American Industrial Hygiene Association (AIHA) to assist in planning and preparation for catastrophic accidental chemical releases. ERPGs allow emergency response planners to estimate the consequences of large-scale chemical releases on human health, and evaluate the effectiveness of prevention strategies and response capabilities. ERPGs assume that the duration of exposure is one hour or less. They are not intended to be used as limits for routine operations and are not legally enforceable.

Definitions for the three ERPG levels are:

ERPG-1: an estimate of the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor.

ERPG-2: an estimate of the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

ERPG-3: an estimate of the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

C. Acute Reference Exposure Level (1-hour exposure) (OEHHA, 1999)

Level protective against mild adverse effects: 21 ppm (28 mg/m³)

D. Chronic Reference Exposure Level (multiple years) (OEHHA, 2001)

Level protective of adverse health effects: 3 ppm (4 mg/m³)

Reference Exposure Levels (RELs) are developed by the California EPA's Office of Environmental Health Hazard Assessment (OEHHA). A REL is a concentration at or below which no adverse health effects are anticipated, even in the most sensitive members of the general population (for example, persons with pre-existing respiratory disease). RELs incorporate uncertainty factors to account for information gaps and uncertainties in the toxicological data. Therefore, exceeding a REL does not necessarily indicate an adverse health impact will occur in an exposed population. Acute RELs are based on an assumption that the duration of exposure is one hour or less. Chronic RELs are intended to be protective for individuals exposed continuously over at least a significant fraction of a lifetime (defined as 12 years).

E. Chronic Reference Concentration (lifetime exposure) (IRIS, 2001)

Level protective of adverse health effects: Not established.

IX. Environmental Contamination Concerns

A. Surface Water

Methanol readily biodegrades in water with a half-life between one and ten days (Mallinckrodt, 2001). Volatilization half-lives for a model river (1m deep) and an environmental pond have been

estimated at 4.8 days and 51.7 days, respectively. Volatilization from surface waters may be significant based upon Henry's Law constant (HSDB, 2002). Bioaccumulation is not expected to be significant in aquatic organisms; methanol is only slightly toxic to aquatic organisms (OPPT, 1994).

B. Groundwater

Methanol has the potential to leach into groundwater, but significant contamination is unlikely given the rapid rate for biodegradation (Mallinckrodt, 2001).

C. Drinking Water

Suggested No Adverse Response Level (NAS, 1980): Not established.

Preliminary Remediation Goal for Tap Water (U.S. EPA, 2002 Region IX): 18 mg/l

D. Soil

Methanol is expected to biodegrade and evaporate from soil (Mallinckrodt, 2001). It is also expected to have high mobility in soil based on its miscibility in water and log K_{ow} (-0.77) (HSDB, 2002).

Preliminary Remediation Goal for Residential Soil (U.S. EPA, 2002 Region IX): 31,000 mg/kg

E. Air

Methanol is degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals with a half-life between ten and thirty days (Mallinckrodt, 2001). This reaction produces formaldehyde. In polluted air, methanol can also react with nitrogen dioxide to form methyl nitrite. Methanol is a volatile organic compound (VOC) that can contribute to the formation of photochemical smog in the presence of other VOCs (OPPT, 1994). Physical removal from the atmosphere can occur via rainfall, i.e., wet deposition. At ambient temperature, methanol is expected to exist almost entirely in the vapor phase (HSDB, 2002).

Preliminary Remediation Goal for Ambient Air (U.S. EPA, 2002 Region IX): 1.8 mg/m³

F. Indoor Surface Contamination

Methanol has a high vapor pressure indicating that rapid evaporation from surfaces will occur (HSDB, 2002).

X. Personal Protective Equipment

Avoid prolonged or repeated exposure with eyes and skin, especially skin that has been cut or scratched (Sigma, 2002). Wear gloves (Butyl, Teflon, Viton, PE/EVAL), impervious boots (Butyl, Teflon), chemical safety goggles, and coveralls (Saranex, Responder, Trelchem, Tychem) (Mallinckrodt, 2001; NIOSH, 2001B). Wash skin exposed to methanol and immediately remove any methanol soaked clothing (NIOSH, 1997). Do not wear contact lenses when working with methanol (HSDB, 2002). If ambient concentrations of methanol exceed the 200ppm Threshold Limit Value, wear a positive pressure self-contained breathing apparatus (SCBA) (NIOSH, 2001A; Mallinckrodt, 2001).

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APPENDIX B

**Title 19, Chapter 6, Part 9 – Illegal Drug
Operations Site Reporting and
Decontamination Act**

**Title 26, Chapter 51 – Methamphetamine
Decontamination Act**

Title 19, Chapter 6, Part 9 – Illegal Drug Operations Site Reporting and Decontamination Act

Amended by Chapter 38, 2008 General Session

19-6-901. Title.

This part is known as the "Illegal Drug Operations Site Reporting and Decontamination Act."

19-6-902. Definitions.

As used in this part:

(1) "Board" means the Solid and Hazardous Waste Control Board, as defined in Section 19-1-106, within the Department of Environmental Quality.

(2) "Certified decontamination specialist" means an individual who has met the standards for certification as a decontamination specialist and has been certified by the board under Subsection 19-6-906(2).

(3) "Contaminated" or "contamination" means:

(a) polluted by hazardous materials that cause property to be unfit for human habitation or use due to immediate or long-term health hazards; or

(b) that a property is polluted by hazardous materials as a result of the use, production, or presence of methamphetamine in excess of decontamination standards adopted by the Department of Health under Section 26-51-201.

(4) "Contamination list" means a list maintained by the local health department of properties:

(a) reported to the local health department under Section 19-6-903; and

(b) determined by the local health department to be contaminated.

(5) (a) "Decontaminated" means property that at one time was contaminated, but the contaminants have been removed.

(b) "Decontaminated" for a property that was contaminated by the use, production, or presence of methamphetamine means that the property satisfies decontamination standards adopted by the Department of Health under Section 26-51-201.

(6) "Hazardous materials":

(a) has the same meaning as "hazardous or dangerous materials" as defined in Section 58-37d-3; and

(b) includes any illegally manufactured controlled substances.

(7) "Health department" means a local health department under Title 26A, Local Health Authorities.

(8) "Owner of record":

(a) means the owner of real property as shown on the records of the county recorder in the county where the property is located; and

(b) may include an individual, financial institution, company, corporation, or other entity.

(9) "Property":

(a) means any real property, site, structure, part of a structure, or the grounds surrounding a structure; and

(b) includes single-family residences, outbuildings, garages, units of multiplexes,

condominiums, apartment buildings, warehouses, hotels, motels, boats, motor vehicles, trailers, manufactured housing, shops, or booths.

(10) "Reported property" means property that is the subject of a law enforcement report under Section 19-6-903.

19-6-903. Law enforcement reporting and records -- Removal from list.

(1) (a) When any state or local law enforcement agency in the course of its official duties observes any paraphernalia of a clandestine drug laboratory operation, including chemicals or equipment used in the manufacture of unlawful drugs, the agency shall report the location where the items were observed to the local health department.

(b) (i) The law enforcement officer shall make the report under Subsection (1)(a) at the location where the observation occurred, if making the report at that time will not compromise an ongoing investigation.

(ii) If the report cannot be made at the location, the report shall be made as soon afterward as is practical.

(c) The report under Subsection (1)(a) shall include:

(i) the date of the observation;

(ii) the name of the reporting agency and the case number of the case that involves the location of the observation;

(iii) the contact information of the officer involved, including name and telephone number;

(iv) the address of the location and descriptions of the property that may be contaminated; and

(v) a brief description of the evidence at the location that led to the belief the property at the location may be contaminated.

(2) The law enforcement agency shall forward to the local health department copies of the reports made under Subsection (1).

(3) (a) Upon receipt of a complaint or a report from law enforcement regarding possibly contaminated property, the local health officer or his designee shall determine if reasonable evidence exists that the property is contaminated.

(b) The local health department shall place property considered to be contaminated on a contamination list.

(4) The local health departments shall maintain searchable records of the properties on their contamination lists and shall:

(a) make the records reasonably available to the public;

(b) provide written notification to persons requesting access to the records that the records are only advisory in determining if specific property has been contaminated by clandestine drug lab activity; and

(c) remove the contaminated property from the list when the following conditions have been met:

(i) the local health department has monitored the decontamination process and, after documenting that the test results meet decontamination standards, has authorized the removal of or purging of the contamination information from the department's records; or

(ii) a certified decontamination specialist submits a report to the local health department stating that the property is decontaminated.

19-6-904. Decontamination specialist reporting to local health departments.

(1) A certified decontamination specialist is required to report to the local health department the location of any property that is the subject of decontamination work by that decontamination specialist. The report shall be submitted prior to commencement of the decontamination work.

(2) The report under Subsection (1) shall include:

(a) sufficient information to allow the local health department to investigate and verify the location of the property, including the address and description of the property; and

(b) a proposed work plan for decontaminating the property.

(3) Upon completion of the decontamination process, a report certifying that the property is decontaminated shall be submitted to the local health department within 30 days.

19-6-905. Notification of property owner -- Notification of municipality or county.

(1) (a) If the local health department determines a property is contaminated, it shall notify the owner of record that the property has been placed on the contamination list and shall provide to the owner information regarding remediation options and the requirements necessary to clean up the property, obtain certification that the property is decontaminated, and remove the property from the contamination list.

(b) The notification shall include a deadline for the owner to provide to the local health department information on how the owner plans to address the contamination.

(c) This part does not require that decontamination be conducted by a certified decontamination specialist. However, upon completion of the decontamination, the property must be determined to be decontaminated in accordance with Subsection 19-6-903(4)(c) in order to be removed from the contamination list.

(2) If the local health department does not receive a response from the owner of record within the time period specified in the notice, or the owner of record advises the local health department that the owner does not intend to take action or that the reported property will be abandoned, the local health department shall notify the municipality in which the reported property is located, or the county, if the location is in an unincorporated area, of the owner of record's response or lack of response.

19-6-906. Decontamination standards -- Specialist certification standards -- Rulemaking.

(1) The Department of Health shall make rules under Title 63G, Chapter 3, Utah Administrative Rulemaking Act, in consultation with the local health departments and the Department of Environmental Quality, to establish:

(a) decontamination and sampling standards and best management practices for the inspection and decontamination of property and the disposal of contaminated debris under this part;

(b) appropriate methods for the testing of buildings and interior surfaces, and furnishings, soil, and septic tanks for contamination; and

(c) when testing for contamination may be required.

(2) The Department of Environmental Quality Solid and Hazardous Waste Control Board shall make rules under Title 63G, Chapter 3, Utah Administrative Rulemaking Act, in

consultation with the Department of Health and local health departments, to establish within the Department of Environmental Quality Division of Environmental Response and Remediation:

(a) certification standards for any private person, firm, or entity involved in the decontamination of contaminated property; and

(b) a process for revoking the certification of a decontamination specialist who fails to maintain the certification standards.

(3) All rules made under this part shall be consistent with other state and federal requirements.

(4) The board has authority to enforce the provisions under Subsection (2).

Title 26, Chapter 51 - Methamphetamine Decontamination Act

Updated: 1 July 2010

26-51-101. Title.

This chapter is known as the "Methamphetamine Decontamination Act."

26-51-201. Scientific standards for methamphetamine decontamination.

(1) The department shall make rules adopting scientifically-based standards for methamphetamine decontamination.

(2) A local health department, as defined in Title 26A, Local Health Authorities, shall follow rules made by the department under Subsection (1) in administering Title 19, Chapter 6, Part 9, Illegal Drug Operations Site Reporting and Decontamination Act.

26-51-202. Public education concerning methamphetamine contamination.

The department shall conduct a public education campaign to inform the public about potential health risks of methamphetamine contamination.

APPENDIX C

R392-600 – Illegal Drug Operations Decontamination Standards

R392. Health, Disease Control and Prevention, Environmental Services.

R392-600. Illegal Drug Operations Decontamination Standards.

R392-600-1. Authority and Purpose.

- (1) This rule is authorized under Section 19-6-906.
- (2) This rule sets decontamination and sampling standards and best management practices for the inspection and decontamination of property contaminated by illegal drug operations.

R392-600-2. Definitions.

The following definitions apply in this rule:

- (1) "Background concentration" means the level of a contaminant in soil, groundwater or other media up gradient from a facility, practice or activity that has not been affected by the facility, practice or activity; or other facility, practice or activity.
- (2) "Decontamination specialist" means an individual who has met the standards for certification as a decontamination specialist and has a currently valid certificate issued by the Waste Management and Radiation Control, as defined under Utah Code Subsection 19-6-906(2).
- (3) "Chain-of-custody protocol" means a procedure used to document each person that has had custody or control of an environmental sample from its source to the analytical laboratory, and the time of possession of each person.
- (4) "Characterize" means to determine the quality or properties of a material by sampling and testing to determine the concentration of contaminants, or specific properties of the material such as flammability or corrosiveness.
- (5) "Combustible" means vapor concentration from a liquid that has a flash point greater than 100 degrees F.
- (6) "Composite sample" means the combination of up to 3 individual wipe (grab) samples into one submission for analysis by a laboratory. The composite sample result will be the average or standardized result in units of micrograms of methamphetamine per 100 square centimeters.
- (7) "Confirmation sampling" means collecting samples by a certified decontamination specialist during a preliminary assessment or upon completion of decontamination activities. Only confirmation sampling can be used to confirm that contamination is below the decontamination standards outlined in this rule.
- (8) "Contaminant" means a hazardous material.
- (9) "Contamination" or "contaminated" means a) polluted by hazardous materials that cause property to be unfit for human habitation or use due to immediate or long-term health hazards; or b) that a property is polluted by hazardous materials as a result of the use, production, or presence of methamphetamine in excess of decontamination standards adopted by the Department of Health under Section 26-51-201, as defined under Utah Code Subsection 19-6-902 (3).
- (10) "Corrosive" means a material such as acetic acid, acetic anhydride, acetyl chloride, ammonia (anhydrous), ammonium hydroxide, benzyl chloride, dimethylsulfate, formaldehyde, formic acid, hydrogen chloride/hydrochloric acid, hydrobromic acid, hydriodic acid, hydroxylamine, methylamine, methylene chloride (dichloromethane, methylene dichloride), methyl methacrylate, nitroethane, oxalylchloride, perchloric acid, phenylmagnesium bromide, phosphine, phosphorus oxychloride, phosphorus pentoxide, sodium amide (sodamide), sodium metal, sodium hydroxide, sulfur trioxide, sulfuric acid, tetrahydrofuran, thionyl chloride or any other substance that increases or decreases the pH of a material and may cause degradation of the material.
- (11) "Decontamination" means treatment or removal of contamination by a decontamination specialist or owner of record to reduce concentrations of contaminants below the

decontamination standards.

(12) "Decontamination standards" means the levels or concentrations of contaminants that must be met to demonstrate that contamination is not present or that decontamination has successfully removed the contamination.

(13) "Delineate" means to determine the nature and extent of contamination by sampling, testing, or investigating.

(14) "Easily cleanable" means an object and its surface that can be cleaned by detergent solution applied to its surface in a way that would reasonably be expected to remove dirt from the object when rinsed and to be able to do so without damaging the object or its surface finish.

(15) "Ecstasy" means 3,4-methylenedioxy-methamphetamine (MDMA).

(16) "EPA" means the United States Environmental Protection Agency.

(17) "EPA Method 8015B" means the EPA approved method for determining the concentration of various non-halogenated volatile organic compounds and semi-volatile organic compounds by gas chromatography/flame ionization detector.

(18) "EPA Method 6010B" means the EPA approved method for determining the concentration of various heavy metals by inductively coupled plasma.

(19) "EPA Method 8260B" means the EPA approved method for determining the concentration of various volatile organic compounds by gas chromatograph/mass spectrometer.

(20) "FID" means flame ionization detector.

(21) "Flammable" means vapor concentration from a liquid that has a flash point less than 100 degree F.

(22) "Grab Sample" means one sample collected from a single, defined area or media at a given time and location.

(23) "Hazardous materials" has the same meaning as "hazardous or dangerous materials" as defined in Section 58-37d-3; and includes any illegally manufactured controlled substances.

(24) "Hazardous waste" means toxic materials to be discarded as directed in 40 CFR 261.3.

(25) "HEPA" means high-efficiency particulate air and indicates the efficiency of an air filter or air filtration system.

(26) "Impacted groundwater" means water present beneath ground surface that contains concentrations of a contaminant above the UGWQS.

(27) "Impacted soil" means soil that contains concentrations of a contaminant above background or EPA residential Risk Based Screening Concentrations as contained in the document listed in R392-600-8.

(28) "LEL/O2" means lower explosive limit/oxygen.

(29) "Negative pressure enclosure" means an air-tight enclosure using a local exhaust and HEPA filtration system to maintain a lower air pressure in the work area than in any adjacent area and to generate a constant flow of air from the adjacent areas into the work area.

(30) "Non-porous" means resistant to penetration of liquids, gases, powders and includes non-permeable substance or materials, that are sealed such as, concrete floors, wood floors, ceramic tile floors, vinyl tile floors, sheet vinyl floors, painted drywall or sheet rock walls or ceilings, doors, appliances, bathtubs, toilets, mirrors, windows, counter-tops, sinks, sealed wood, metal, glass, plastic, and pipes.

(31) "Non-confirmation sampling" means collecting samples by any party other than a certified decontamination specialist.

(32) "Owner of record" means (a) The owner of property as shown on the records of the county recorder in the county where the property is located; and (b) may include an individual,

financial institution, company, corporation, or other entity.

(33) "Personal protective equipment" means various types of clothing such as suits, gloves, hats, and boots, or apparatus such as facemasks or respirators designed to prevent inhalation, skin contact, or ingestion of hazardous chemicals.

(34) "PID" means photo ionization detector.

(35) "Porous" means material easily penetrated or permeated by gases, liquids, or powders such as carpets, draperies, bedding, mattresses, fabric covered furniture, pillows, drop ceiling or other fiber-board ceiling panels, cork paneling, blankets, towels, clothing, and cardboard or any other material that is worn or not properly sealed.

(36) "Preliminary assessment" means an evaluation of a property to define all areas that are contaminated and delineate the extent of contamination. The preliminary assessment consists of an on-site evaluation conducted by the decontamination specialist or owner of record to gather information to demonstrate that contamination is not present above the decontamination standards or to enable development of a workplan outlining the most appropriate method to decontaminate the property.

(37) "Properly disposed" means to discard at a licensed facility in accordance with all applicable laws and not reused or sold.

(38) "Property" means: (a) any property, site, structure, part of a structure, or the grounds, surrounding a structure; and (b) includes single-family residences, outbuildings, garages, units of multiplexes, condominiums, apartment buildings, warehouses, hotels, motels, boats, motor vehicles, trailers, manufactured housing, shops, or booths.

(39) "Return air housing" means the main portion of an air ventilation system where air from the livable space returns to the air handling unit for heating or cooling.

(40) "Sample location" means the actual place where an environmental sample was obtained, including designation of the room, the surface (wall, ceiling, appliance, etc), and the direction and distance from a specified fixed point (corner, door, light switch, etc).

(41) "Services" means the activities performed by decontamination specialist in the course of decontaminating residual contamination from the manufacturing of illegal drugs or from the storage of chemicals used in manufacturing illegal drugs and includes not only the removal of any contaminants but inspections and sampling.

(42) "Toxic" means hazardous materials in sufficient concentrations that they can cause local or systemic detrimental effects to people.

(43) "UGWQS" means the Utah Ground Water Quality Standards established in R317-6-2.

(44) "VOA" means volatile organic analyte.

(45) "VOCs" means volatile organic compounds or organic chemicals that can evaporate at ambient temperatures used in the manufacture illegal drugs such as acetone, acetonitrile, aniline, benzene, benzaldehyde, benzyl chloride, carbon tetrachloride, chloroform, cyclohexanone, dioxane, ethanol, ethyl acetate, ethyl ether, Freon 11, hexane, isopropanol, methanol, methyl alcohol, methylene chloride, naphtha, nitroethane, petroleum ether, petroleum distillates, pyridine, toluene, o-toluidine, and any other volatile organic chemical that may be used to manufacture illegal drugs.

(46) "Waste" means refuse, garbage, or other discarded material, either solid or liquid.

R392-600-3. Preliminary Assessment Procedures.

(1) The local health department shall notify owner of record of tests results reported to the local health department indicating that a property is potentially contaminated.

(a) If the test results were from non-confirmation sampling, the owner of record may obtain

confirmation sampling, performed by a certified decontamination specialist, within 10 days of receipt of the notice and provide the local health department with the confirmation sampling test results.

(b) If the test results were from confirmation sampling, the local health department shall direct the owner of record to decontaminate the property as outlined in the following sections.

(2) The decontamination specialist or owner of record shall determine the nature and extent of damage and contamination of the property from illegal drug operations by performing a preliminary assessment prior to decontamination activities. Contamination may be removed prior to approval of the work plan as necessary to abate an imminent threat to human health or the environment. If there was a fire or an explosion in the contaminated portion of the property that appears to have compromised its structural integrity, the decontamination specialist or owner of record shall obtain a structural assessment of the contaminated portion of the property prior to initiating the preliminary assessment.

(3) To conduct the preliminary assessment, the decontamination specialist or owner of record shall:

(a) request and review copies of any law enforcement, state agency or other report regarding illegal drug activity or suspected illegal drug activity at the property;

(b) evaluate all information obtained regarding the nature and extent of damage and contamination;

(c) determine the method of illegal drug manufacturing used;

(d) determine the chemicals involved in the illegal drug operation;

(e) determine specific locations where processing and illegal drug activity took place or was suspected and where hazardous materials were stored and disposed;

(f) use all available information to delineate areas of contamination;

(g) develop procedures to safely enter the property in order to conduct a preliminary assessment;

(h) wear appropriate personal protective equipment for the conditions assessed;

(i) visually inspect all portions of the property, including areas outside of any impacted structure to document where stained materials or surfaces are visible, drug production took place, hazardous materials were stored, and burn pits or illegal drug operation trash piles may have been or are currently present;

(j) determine whether the property contains a septic system on-site and if there has been a release to the system as a result of the illegal drug operations;

(k) determine the locations of the ventilation system components in the areas of contamination;

(l) conduct and document appropriate testing for corrosive, flammable, combustible, and toxic atmospheres during the initial entry in the contaminated portion of the property using instruments such as a LEL/O₂ meter, pH paper, PID, FID, or equivalent equipment; and

(m) if decontamination is not anticipated due to the lack of supporting evidence of decontamination, obtain confirmation samples to demonstrate compliance with the decontamination standards using the methodology specified in this rule.

(4) If the preliminary assessment does not reveal the presence of contamination above the decontamination standards specified in this rule, the decontamination specialist or owner of record may request that the property be removed from the list of contaminated properties as specified in 19-6-903 provided that:

(a) a final report documenting the preliminary assessment is submitted to the local health department by the owner of record and decontamination specialist if one was involved in conducting

the preliminary assessment; and

(b) the local health department concurs with the recommendations contained in the report specified in (a).

(5) If the preliminary assessment reveals the presence of contamination, the decontamination specialist or owner of record shall proceed according to R392-600-4 through R392-600-7. The contaminated portions of the property shall be kept secure against un-authorized access until the work plan has been submitted, any required permit is issued, and the property has been decontaminated to the standards established in this rule.

R392-600-4. Work Plan.

(1) Prior to performing decontamination of the property, the decontamination specialist or owner of record shall prepare a written work plan that contains:

(a) complete identifying information of the property, such as street address, mailing address, owner of record, legal description, county tax or parcel identification number, or vehicle identification number if a mobile home, trailer or boat;

(b) if applicable, the certification number of the decontamination specialist who will be performing decontamination services on the contaminated portion of the property;

(c) copies of the decontamination specialist's current certification;

(d) photographs of the property;

(e) a description of the areas of contamination, and areas that are considered not contaminated, including any information that may be available regarding locations where illegal drug processing was performed, hazardous materials were stored and stained materials and surfaces were observed;

(f) a description of contaminants that may be present on the property;

(g) results of any testing conducted for corrosive, flammable, combustible, and toxic atmospheres during the initial entry in the contaminated portion of the property, such as by a LEL/O2 meter, pH paper, PID, FID, or equivalent equipment;

(h) a description of the personal protective equipment to be used while in or on the contaminated portion of the property;

(i) the health and safety procedures that will be followed in performing the decontamination of the contaminated portion of the property;

(j) a detailed summary of the decontamination to be performed based on the findings and conclusions of the Preliminary Assessment, which summary shall include:

(i) all surfaces, materials or articles to be removed;

(ii) all surfaces, materials and articles to be cleaned on-site;

(iii) all procedures to be employed to remove or clean the contamination, including areas of contamination as well as those areas that are not contaminated;

(iv) all locations where decontamination will commence;

(v) all containment and negative pressure enclosure plans; and

(vi) personnel decontamination procedures to be employed to prevent the spread of contamination;

(k) the shoring plan, if an assessment of the structural integrity was conducted and it was determined that shoring was necessary, including a written description or drawing that shows the structural supports required to safely occupy the building during decontamination;

(l) a complete description of the proposed post-decontamination confirmation sampling locations, parameters, techniques and quality assurance requirements;

(m) the names of all individuals who gathered samples, the analytical laboratory performing the testing, and a copy of the standard operating procedures for the analytical method used by the analytical laboratory;

(n) a description of disposal procedures and the anticipated disposal facility;

(o) a schedule outlining time frames to complete the decontamination process; and

(p) all available information relating to the contamination and the property based on the findings and conclusions of the preliminary assessment.

(2) Prior to implementing the work plan, it must first be:

(a) approved in writing by the owner of record and, if one is involved, the decontamination specialist who will execute the work plan; and

(b) submitted to the local health department with jurisdiction over the county in which the property is located.

(3) The owner of record, and any decontamination specialist involved in executing the work plan shall retain the work plan for a minimum of three years after completion of the work plan and the removal of the property from the contaminated-properties list.

(4) All information required to be included in the work plan shall be keyed to or contain a reference to the appropriate subsection of this rule.

R392-600-5. Decontamination Procedures.

(1) The decontamination specialists, and owner of record shall comply with all applicable federal, state, municipal, and local laws, rules, ordinances, and regulations in decontaminating the property.

(2) The decontamination specialist or owner of record shall be present on the property during all decontamination activities.

(3) The decontamination specialist or owner of record shall conduct the removal of the contamination from the property, except for porous materials from areas not contaminated that may be cleaned as outlined in sub-section R392-600-5(11).

(4) The decontamination specialist or owner of record shall see that doors or other openings from areas requiring decontamination shall be partitioned from all other areas with at least 4-mil plastic sheeting or equivalent before beginning decontamination to prevent contamination of portions of the property that have not been impacted by illegal drug operations.

(5) Ventilation Cleaning Procedures.

(a) Air registers shall be removed and cleaned as outlined in subsection R392-600-5(11).

(b) All air register openings shall be covered by temporary filter media.

(c) A fan-powered HEPA filter collection machine shall be connected to the ductwork to develop negative air pressure in the ductwork.

(d) Air lances, mechanical agitators, or rotary brushes shall be inserted into the ducts through the air register openings to loosen all dirt, dust and other materials.

(e) The air handler units, including the return air housing, coils, fans, systems, and drip pan shall be cleaned as required in subsection R392-600-5(11).

(f) All porous linings or filters in the ventilation system shall be removed and properly disposed.

(g) The ventilation system shall be sealed off at all openings with at least 4-mil plastic sheeting, or other barrier of equivalent strength and effectiveness, to prevent recontamination until the contaminated portion of the property meets the decontamination standards in R392-600-6(2) and(3).

(6) Procedures for Contaminated Areas.

(a) All stained materials from the illegal drug operations shall be removed and properly disposed, unless the decontamination specialist or owner of record determines that cleaning and testing can be performed and can demonstrate based on results of confirmation sampling and testing that the materials meet the decontamination standards contained in subsections R392-600-6(2) and (3).

(b) All non-porous surfaces such as floors, walls, ceilings, mirrors, window, doors, appliances, and non-fabric furniture may be cleaned to the point of stain removal and left in place or removed and properly disposed. After on-site cleaning, the decontamination specialist shall test all surfaces to verify compliance with the decontamination standards contained in R392-600-6(2) and (3).

(c) All exposed concrete surfaces shall be thoroughly cleaned as outlined in R392-600-5(11) and tested to meet the decontamination standards contained in R392-600-6(2) and (3) or may be removed and properly disposed.

(d) All appliances shall be removed and properly disposed, unless the decontamination specialist or owner of record determines that cleaning and testing can be performed and can demonstrate based on results of confirmation sampling and testing that the materials meet the decontamination standards contained in subsections R392-600-6(2) and (3). Only smooth and easily cleanable surfaces may be decontaminated on site and only in accordance subsection R392-600-5(11). After on-site cleaning, the decontamination specialist shall test all surfaces to verify compliance with the decontamination standards contained in R392-600-6(2) and (3). For appliances such as ovens that have insulation, a 100 square centimeter portion of the insulation shall also be tested. If the insulation does not meet the decontamination standards contained in R392-600-6(2) and R392-600-6(3), the insulated appliances shall be removed and properly disposed.

(e) Porous materials with no evidence of staining or contamination may be cleaned by HEPA vacuuming and one of the following methods:

(i) Steam cleaning: Hot water and detergent shall be injected into the porous materials under pressure to agitate and loosen any contamination. The water and detergent solution shall then be extracted from the porous material by a wet vacuum.

(ii) Detergent and water solution: porous materials shall be washed in a washing machine with detergent and water for at least 15 minutes. The porous materials shall be rinsed with water. This procedure shall be repeated at least two additional times using new detergent solution and rinse water.

(f) Doors or other openings to areas with no visible contamination shall be partitioned from all other areas with at least 4-mil plastic sheeting or equivalent after being cleaned to avoid re-contamination.

(g) Spray-on acoustical ceilings shall be left undisturbed, and shall be sampled and tested for asbestos and for contamination to determine whether ceilings meet the decontamination standards contained in R392-600-6(2) and (3), and if in need of removal, whether asbestos remediation protocols are applicable. If the materials exceed the standards, the decontamination specialist or owner of record shall properly remove and dispose of them.

(7) Structural Integrity and Security Procedures.

If, as a result of the decontamination, the structural integrity or security of the property is compromised, the decontamination specialist or owner of record shall take measures to remedy the structural integrity and security of the property.

(8) Procedures for Plumbing, Septic, Sewer, and Soil.

(a) All plumbing inlets to the septic or sewer system, including sinks, floor drains, bathtubs, showers, and toilets, shall be visually assessed for any staining or other observable residual contamination. All plumbing traps shall be assessed for VOC concentrations with a PID or FID in accordance with Section R392-600-6(6). All plumbing traps shall be assessed for mercury vapors in accordance with Section R392-600-6(9) by using a mercury vapor analyzer unless the results of the preliminary assessment indicate that contamination was unlikely to have occurred. If VOC concentrations or mercury vapor concentrations exceed the decontamination standards contained in R392-600-6(2) and (3), the accessible plumbing and traps where the excess levels are found shall be removed and properly disposed, or shall be cleaned and tested to meet the decontamination standards contained in R392-600-6(2) and (3).

(b) The decontamination specialist or owner of record shall obtain documentation from the local health department or the local waste water company describing the sewer disposal system for the dwelling and include it in the final report. If the dwelling is connected to an on-site septic system, a sample of the septic tank liquids shall be obtained and tested for VOC concentrations unless the results of the preliminary assessment indicate that contamination was unlikely to have occurred.

(c) If VOCs are not found in the septic tank sample or are found at concentrations less than UGWQS and less than 700 micrograms per liter for acetone, no additional work is required in the septic system area, unless requested by the owner of the property.

(d) If VOCs are found in the septic tank at concentrations exceeding the UGWQS or exceeding 700 micrograms per liter for acetone the following applies:

(i) The decontamination specialist or owner of record shall investigate the septic system discharge area for VOCs, lead, and mercury unless there is clear evidence that mercury or lead was not used in the manufacturing of illegal drugs at the illegal drug operation;

(ii) The horizontal and vertical extent of any VOCs, mercury, and lead detected in the soil samples shall be delineated relative to background or EPA residential risk based screening concentrations contained in the document listed in R392-600-8.

(iii) If any of the VOCs, mercury, and lead used in the illegal drug operations migrated down to groundwater level, the decontamination specialist or owner of record shall delineate the vertical and horizontal extent of the groundwater contamination.

(iv) After complete characterization of the release, the decontamination specialist or owner of record shall remediate the impacted soils to concentrations below background or EPA residential risk based screening concentrations as contained in the document listed in R392-600-8 and any impacted groundwater to concentrations below the UGWQS and below 700 micrograms per liter for acetone.

(v) The contents of the septic tank shall be removed and properly disposed.

(e) The decontamination specialist or owner of record shall also notify the Utah Department of Environmental Quality, Division of Water Quality, if a release has occurred as a result of illegal drug operations to a single family septic system or a multiple family system serving less than 20 people.

(f) All sampling and testing pursuant to this section shall be performed in accordance with EPA sampling and testing protocol.

(9) Procedures for burn areas, trash piles and bulk wastes.

(a) The decontamination specialist or owner of record shall characterize, remove, and properly dispose of all bulk wastes remaining from the activities of the illegal drug operations or other wastes impacted by compounds used by the illegal drug operations.

(b) The decontamination specialist or owner of record shall examine the property for

evidence of burn areas, burn or trash pits, debris piles, and stained areas suggestive of contamination. The decontamination specialist or owner of record shall test any burn areas, burn or trash pits, debris piles or stained areas with appropriate soil sampling and testing equipment, such as a LEL/O₂ meter, pH paper, PID, FID, mercury vapor analyzer, or equivalent equipment to determine if the area is contaminated.

(c) If the burn areas, burn or trash pits, debris piles, or stained areas are not in a part of the property that has otherwise been determined to be contaminated, the decontamination specialist shall recommend to the owner of the property that these areas be investigated.

(d) If the burn areas, burn or trash pits, debris piles or stained areas are part of the contaminated portion of the property, the decontamination specialist or owner of record shall investigate and remediate these areas.

(e) The decontamination specialist or owner of record shall investigate burn areas, burn or trash pits, debris piles, or stained areas for the VOCs used by the illegal drug operations and lead and mercury, unless there is clear evidence that mercury or lead was not used in the manufacturing of illegal drugs at the illegal drug operations.

(f) The decontamination specialist or owner of record shall delineate the horizontal and vertical extent of any VOCs, lead, or mercury detected in the soil samples relative to background concentrations or EPA residential risk based screening concentrations as contained in the document listed in R392-600-8.

(g) If any of the compounds used by the illegal drug operation migrated into groundwater, the decontamination specialist or owner of record shall delineate the vertical and horizontal extent of the groundwater contamination relative to the UGWQS and relative to the maximum contaminant level of 700 micrograms per liter for acetone.

(h) After complete characterization of the release, the decontamination specialist or owner of record shall remediate contaminated soils to background or EPA residential risk based screening concentrations as contained in the document listed in R392-600-8, and contaminated groundwater to concentrations at or below the UGWQS and at or below 700 micrograms per liter for acetone.

(i) All sampling and testing conducted under this section shall be performed in accordance with current EPA sampling and testing protocol.

(10) Decontamination procedures for motor vehicles.

If an illegal drug operation is encountered in a motor vehicle, the decontamination specialist or owner of record shall conduct a Preliminary Assessment in the manner described in this rule to determine if the vehicle is contaminated. If it is determined that the motor vehicle is contaminated and the vehicle cannot be cleaned in a manner consistent with this rule, the motor vehicle may no longer be occupied. The vehicle shall also be properly disposed.

(11) Cleaning Procedure.

For all items, surfaces or materials that are identified as easily cleanable and for which the work plan indicates they will be decontaminated on site, the decontamination specialist or owner of record shall wash them with a detergent and water solution and then thoroughly rinse them. This procedure shall be repeated at least two additional times using new detergent solution and rinse water. The decontamination specialist or owner of record shall test all surfaces where decontamination on site has been attempted to verify compliance with the decontamination standards in R392-600-6(2) and R392-600-6(3).

(12) Waste Characterization and Disposal Procedures.

The Hazardous Waste Rules of R315-1 through R315-101, the Solid Waste Rules of R315-301 through R315-320 and the Illegal Drug Operations Decontamination Standards regulate

the management and disposal of hazardous waste and contaminated debris generated during decontamination of an illegal drug operations. The decontamination specialist and owner of record shall comply with these rules and meet the following criteria.

(a) No waste, impacted materials or contaminated debris from the decontamination of illegal drug operations may be removed from the site or waste stream for recycling or reuse without the written approval of the local Health Department.

(b) All items removed from the illegal drug operations and waste generated during decontamination work shall be properly disposed.

(c) All liquid waste, powders, pressurized cylinders and equipment used during the production of illegal drugs shall be properly characterized by sampling or testing prior to making a determination regarding disposal or the waste shall simply be considered hazardous waste and properly disposed, except the waste shall not be deemed to be household hazardous waste.

(d) All impacted materials and contaminated debris that are not determined by the decontamination specialist or owner of record to be a hazardous waste may be considered a solid waste and properly disposed.

(e) All Infectious Waste shall be managed in accordance with Federal, State and local requirements.

(f) The disturbance, removal and disposal of asbestos must be done in compliance with all Federal, State, and local requirements including the requirements for Asbestos Certification, Asbestos Work Practices and Implementation of Toxic Substances Control Act, Utah Administrative Code R307-801.

(g) The removal and disposal of lead based paint must be done in compliance with all Federal, State, and local requirements including the requirements for Lead-Based Paint Accreditation, Certification and Work Practice Standards, Utah Administrative Code R307-840.

(h) The decontamination specialist and owner of record shall comply with all Federal, State, Municipal, County or City codes, ordinances and regulations pertaining to waste storage, manifesting, record keeping, waste transportation and disposal.

R392-600-6. Confirmation Sampling and Decontamination Standards.

(1) The decontamination specialist shall conduct confirmation sampling after decontamination to verify that concentrations are below the decontamination standards prior to the submittal of a final report. Samples are not required if a contaminated surface has been removed and replaced, unless there is evidence that the area has been re-contaminated. All decontaminated areas and materials, areas not contaminated, and surfaces that have not been removed shall be sampled for compliance with the standards in Table 1.

(2) If the decontamination standards are not achieved, the decontamination specialist or owner of record shall perform additional decontamination and the decontamination specialist shall re-sample to confirm the surface or area meets the decontamination standards specified in Table 1.

TABLE 1

COMPOUND	DECONTAMINATION STANDARD
Red Phosphorus	Removal of stained material or cleaned as specified in this rule such that there is no remaining visible residue.
Iodine Crystals	Removal of stained material or cleaned as specified in this rule such that there is no remaining visible residue.
Methamphetamine	Less than or equal to 1.0 microgram Methamphetamine per 100 square centimeters
VOCs in Air	Less than or equal to 1 ppm
Corrosives	Surface pH between 6 and 8
Ecstasy	Less than or equal to 0.1 microgram Ecstasy per 100 square centimeters

(3) The decontamination specialist or owner of record shall also conduct sampling and testing for all of the metals listed in Table 2 unless there is clear evidence that these metals were not used in the illegal drug operations. If Table 2 contaminants are present, the decontamination specialist or owner of record shall decontaminate the affected areas and the decontamination specialist shall sample until they meet the decontamination standards in Table 2.

TABLE 2

COMPOUND	DECONTAMINATION STANDARD
Lead	Less than or equal to 4.3 micrograms Lead per 100 square centimeters
Mercury	Less than or equal to 3.0 micrograms Mercury per cubic meter of air

- (4) Confirmation sampling procedures.
 - (a) All sample locations shall be photographed.
 - (b) All samples shall be obtained from areas representative of the materials or surfaces being

tested. Samples shall be collected from materials or surfaces using wipe samples and shall be biased toward areas where contamination is suspected or confirmed or was known to be present prior to decontamination.

(c) All samples shall be obtained, preserved, and handled and maintained under chain-of-custody protocol in accordance with industry standards for the types of samples and analytical testing to be conducted.

(d) The individual conducting the sampling shall wear a new pair of gloves to obtain each sample.

(e) All reusable sampling equipment shall be decontaminated prior to sampling.

(f) All testing equipment shall be properly equipped and calibrated for the types of compounds to be analyzed.

(g) Cotton gauze, 3" x 3" 12-ply or 4" x 4" 8-ply, in sterile packages, shall be used for all wipe sampling. The cotton gauze shall be wetted with analytical grade methanol for the wipe sampling. The cotton gauze shall be blotted or wiped at least five times in two perpendicular directions within each sampling area.

(h) After sampling, each wipe sample shall be placed in a new clean sample container and capped tightly. Recommended containers are 50-mL polypropylene disposable centrifuge tubes or 40-mL VOA glass vials. Plastic bags shall not be used. The sample container shall be properly labeled with at least the site or project identification number, date, time, and actual sample location. The sample container shall be refrigerated until delivered to an analytical laboratory.

(i) Each sample shall be analyzed for methamphetamine, ephedrine, pseudoephedrine, and ecstasy depending upon the type of illegal drug operations using NIOSH Manual of Analytical Method (NMAM) 9106, 9109 or 9111 or equivalent method approved by the Utah Department of Health.

(5) Confirmation sampling from areas of contamination.

(a) Grab samples or composite samples are allowed for confirmation sampling of contaminated areas.

(b) Three 10 cm. x 10 cm. areas (100 square centimeters) shall be wipe sampled from each room of the property where illegal drug operations occurred, hazardous materials were stored and where staining or contamination are or were present. The three samples shall be obtained from a nonporous section of the floor, one wall, and the ceiling in each room or any other location where contamination is suspected.

(c) Three 10 cm. x 10 cm. areas (100 square centimeters) shall be wipe sampled from different areas of the ventilation system, unless the system serves more than one unit or structure. If the system serves more than one unit or structure, samples shall be collected from a representative distribution of the system as well as the corresponding areas that it serves until the contamination is delineated, decontaminated, and determined to be below the decontamination standards established in this rule.

(d) If there is a kitchen, three 10 cm. x 10 cm. areas (100 square centimeters) shall be wipe sampled from the surfaces most likely to be contaminated including the counter top, sink, or stove top, and from the floor in front of the stove top or any other location where contamination is suspected.

(e) If there is a bathroom, three 10 cm. x 10 cm. areas (100 square centimeters) shall be wipe sampled from the surfaces most likely to be contaminated including the counter top, sink, toilet, or the shower/bath tub and any other location where contamination is suspected.

(f) If there are any appliances, one 10 cm. x 10 cm. area (100 square centimeters) shall be

wipe sampled from the exposed portion of each appliance. If multiple appliances are present, each wipe sample may be a composite of up to three 100 square centimeter areas on three separate appliances, provided that the surfaces most likely to be contaminated are tested.

(g) If there is any other enclosed space where illegal drug operations occurred, hazardous materials were stored, or where staining or contamination is present, three 10 cm. x 10 cm. areas (100 square centimeters) shall be wipe sampled from the surfaces most likely to be contaminated.

(h) Each wipe sample shall be placed in a new clean sample container and capped tightly. Recommended containers are 50-mL polypropylene disposable centrifuge tubes or 40-mL VOA glass vials. Plastic bags shall not be used.

(6) VOC sampling and testing procedures.

(a) A properly calibrated PID or FID capable of detecting VOCs shall be used for testing. The background concentration of VOCs shall be obtained by testing three exterior areas outside the areas of contamination and in areas with no known or suspected sources of VOCs. All VOC readings shall be recorded for each sample location.

(b) At least three locations in areas of contamination shall be tested for VOC readings. The testing equipment probe shall be held in the sample location for at least 30 seconds to obtain a reading.

(c) All accessible plumbing traps shall be tested for VOCs by holding the testing equipment probe in the plumbing pipe above the trap for at least 60 seconds.

(7) Testing procedures for corrosives.

(a) Surface pH measurements shall be made using deionized water and pH test strips with a visual indication for a pH between 6 and 8. The pH reading shall be recorded for each sample location.

(b) For horizontal surfaces, deionized water shall be applied to the surface and allowed to stand for at least three minutes. The pH test strip shall then be placed in the water for a minimum of 30 seconds and read.

(c) For vertical surfaces, a cotton gauze, 3" x 3" 12-ply or 4" x 4" 8-ply, in sterile packages, shall be wetted with deionized water and wiped over a 10 cm. x 10 cm. area at least five times in two perpendicular directions. The cotton gauze shall then be placed into a clean sample container and covered with clean deionized water. The cotton gauze and water shall stand in the container for at least three minutes prior to testing. The pH test strip shall then be placed in the water for a minimum of 30 seconds and read.

(d) pH testing shall be conducted on at least three locations in each room within the areas of contamination.

(8) Lead Sampling and Testing Procedures.

(a) Unless there is clear evidence that lead was not used in the manufacturing of methamphetamine, or ecstasy at the illegal drug operations, lead sampling shall be conducted as follows:

(i) Cotton gauze, 3" x 3" 12-ply or 4" x 4" 8-ply, in sterile packages shall be used for wipe sampling. The cotton gauze shall be wetted with analytical grade 3 per cent nanograde nitric acid for the wipe sampling. The cotton gauze shall be blotted or wiped at least five times in two perpendicular directions within each sampling area.

(ii) Three 10 cm. x 10 cm. areas (100 square centimeters) shall be sampled in each room within the areas of contamination; and

(b) After sampling, each wipe sample shall be placed in a new clean sample container and capped tightly. The sample container shall be properly labeled with at least the site or project

identification number, date, time, and actual sample location. The sample container shall be delivered to an analytical laboratory that uses EPA Method 6010B or an equivalent method approved by the Utah Department of Health.

(c) The sample shall be analyzed for lead using EPA Method 6010B or equivalent.

(9) Mercury Sampling and Testing Procedures.

(a) A properly calibrated mercury vapor analyzer shall be used for evaluating the decontaminated areas for the presence of mercury. All mercury readings shall be recorded for each sample location.

(b) At least three locations in each room within the areas of contamination shall be tested for mercury vapor readings. The testing equipment probe shall be held in the sample location for at least 30 seconds to obtain a reading.

(c) All accessible plumbing traps shall be tested for mercury by holding the testing equipment probe in the plumbing pipe above the trap for at least 60 seconds.

(10) Septic tank sampling and testing procedures.

(a) All sampling and testing shall be performed in accordance with current EPA sampling and testing protocol.

(b) The liquid in the septic tank shall be sampled with a new clean bailer or similar equipment.

(c) The liquid shall be decanted or poured with minimal turbulence into three new VOA vials properly prepared by the analytical laboratory.

(d) The VOA vials shall be filled so that there are no air bubbles in the sealed container. If air bubbles are present, the vial must be emptied and refilled.

(i) The sample vials shall be properly labeled with at least the date, time, and sample location.

(ii) The sample vials shall be refrigerated until delivered to the analytical laboratory.

(iii) The sample shall be analyzed using EPA Method 8260 or equivalent.

(11) Confirmation sampling by Local Health Departments.

The local health department may also conduct confirmation sampling after decontamination is completed and after the final report is submitted to verify that the property has been decontaminated to the standards outlined in this rule.

R392-600-7. Final Report.

(1) A final report shall be:

(a) prepared by the decontamination specialist or owner of record upon completion of the decontamination activities;

(b) submitted to the owner of the decontaminated property and the local health department of the county in which the property is located; and

(c) retained by the decontamination specialist and owner of record for a minimum of three years.

(2) The final report shall include the following information and documentation:

(a) complete identifying information of the property, such as street address, mailing address, owner of record, legal description, county tax or parcel identification number, or vehicle identification number if a mobile home or motorized vehicle;

(b) the name and certification number of the decontamination specialist who performed the decontamination services on the property;

(c) a detailed description of the decontamination activities conducted at the property,

including any cleaning performed in areas not contaminated;

(d) a description of all deviations from the approved work plan;

(e) photographs documenting the decontamination services and showing each of the sample locations,

(f) a drawing or sketch of the areas of contamination that depicts the sample locations and areas that were decontaminated;

(g) a description of the sampling procedure used for each sample;

(h) a copy of the testing results from testing all samples, including testing for VOCs, corrosives, and if applicable, lead and mercury, and testing performed by an analytical laboratory;

(i) a written discussion interpreting the test results for all analytical testing on all samples;

(j) a copy of any asbestos sampling and testing results;

(k) a copy of the analytical laboratory test quality assurance data on all samples and a copy of the chain-of-custody protocol documents;

(l) a summary of the waste characterization work, any waste sampling and testing results, and transportation and disposal documents, including bills of lading, weight tickets, and manifests for all materials removed from the property;

(m) a summary of the decontamination specialist or owner of record's observation and testing of the property for evidence of burn areas, burn or trash pits, debris piles, or stained areas;

(n) a written discussion and tables summarizing the confirmation sample results with a comparison to the decontamination standards outlined in this rule; and

(o) an affidavit from the decontamination specialist and owner of record that the property has been decontaminated to the standards outlined in this rule.

(3) All information required to be included in the final report shall be keyed to or contain a reference to the appropriate subsection of this rule.

R392-600-8. Reference.

The document: U.S. Environmental Protection Agency. Region 9: Superfund Preliminary Remediation Goals (PRG) Table, October 2004, is incorporated by reference.

Date of Enactment or Last Substantive Amendment: June 21, 2017

Authorizing, and Implemented or Interpreted Law: 19-6-906

APPENDIX D

R311-500 Decontamination Specialist Certification Program Rules

R311. Environmental Quality, Environmental Response and Remediation.

R311-500. Illegal Drug Operations Site Reporting and Decontamination Act, Decontamination Specialist Certification Program.

R311-500-1. Objective, Scope and Authority.

(a) Objective. The Decontamination Specialist Certification Program is designed to assist in helping ensure that personnel in charge of decontamination are trained to perform cleanups and knowledgeable of established decontamination standards; to develop methods whereby an applicant can demonstrate competency and obtain certification to become a Certified Decontamination Specialist; to protect the public health and the environment; and to provide for the health and safety of personnel involved in decontamination activities.

(b) Scope. These certification rules apply to individuals who perform decontamination of property that is on the contamination list specified in Section 19-6-903(3)(b) of the Illegal Drug Operations Site Reporting and Decontamination Act.

(c) Authority. Section 19-6-906 directs the Department of Environmental Quality Solid and Hazardous Waste Control Board, in consultation with the Department of Health and local Health Departments, to make rules to establish within the Division of Environmental Response and Remediation:

(1) certification standards for any private person, firm, or entity involved in the decontamination of contaminated property; and

(2) a process for revoking the certification of a Decontamination Specialist who fails to maintain the certification standards.

R311-500-2. Definitions.

(a) Refer to Section 19-6-902 for definitions not found in this rule.

(b) For the purposes of the Decontamination Specialist Certification Program rules:

(1) "Applicant" means any individual who applies to become a Certified Decontamination Specialist or applies to renew the existing certificate.

(2) "Board" means the Solid and Hazardous Waste Control Board.

(3) "Certificate" means a document that evidences certification.

(4) "Certification" means approval by the Director or the Board to perform decontamination of contaminated property under Title 19 Chapter 6, Illegal Drug Operations Site Reporting and Decontamination Act.

(5) "Certification Program" means the Division's process for issuing and revoking the Certification.

(6) "Confirmation Sampling" means collecting samples during a preliminary assessment or upon completion of decontamination activities to confirm that contamination is below the decontamination standards outlined in R392-600, Illegal Drug Operations Decontamination Standards.

(7) "Decontamination" means treatment or removal of contamination by a decontamination specialist or as otherwise allowed in the Illegal Drug Operations Site Reporting and Decontamination Act to reduce concentrations below the decontamination standards defined in R392-600 and to remove property from the contamination list specified in Subsection 19-6-903(3)(b).

(8) "Department" means the Utah Department of Environmental Quality.

(9) "Director" means the Director of the Division of Environmental Response and Remediation or the Director's designated representative.

(10) "Division" means the Division of Environmental Response and Remediation.

- (11) "Lapse" in reference to the Certification, means to terminate automatically.
- (12) "UAPA" means the Utah Administrative Procedures Act, Title 63 Chapter 46b.

R311-500-3. Delegation of Powers and Duties to the Director.

(a) The Director is delegated authority by the Board to administer the Decontamination Specialist Certification Program established within the Division.

(b) The Director may take any action necessary or incidental to develop certification standards and issue or revoke a certificate. These actions include but are not limited to:

- (1) Establishing certification standards;
- (2) Establishing and reviewing applications, certifications, or other data;
- (3) Establishing and conducting testing and training;
- (4) Denying applications;
- (5) Issuing certifications;
- (6) Evaluating compliance with the performance standards established in Section R311-500-8 through observations in the field, review of sampling methodologies and records or other means;
- (7) Renewing certifications;
- (8) Revoking certifications;
- (9) Issuing notices and initial orders;
- (10) Enforcing notices, orders and rules on behalf of the Board; and
- (11) Requiring a Certified Decontamination Specialist or applicant to furnish information or records relating to his or her fitness to be a Certified Decontamination Specialist.

R311-500-4. Application for Certification.

(a) Any individual may apply for certification by paying the applicable fees and by submitting an application to the Director to demonstrate that the applicant:

- (1) meets the eligibility requirements specified in R311-500-5; and
- (2) will comply with the performance standards specified in R311-500-8 after receiving a certificate.

(b) Applications submitted under R311-500-4 shall be on a form approved by the Director and shall be reviewed by the Director to determine if the applicant is eligible for certification.

R311-500-5. Eligibility for Certification.

(a) For initial and renewal certification, an applicant must:

(1) Meet Occupational Safety and Health Agency safety training requirements in accordance with 29 CFR 1910.120 and any other applicable safety training, including refresher training, as required by federal and state law; and

(2) Successfully pass a certification examination developed and administered under the direction of the Director.

(A) The contents of the initial certification examination and the renewal certification examination as well as the percentage of correct answers required to pass the examinations shall be determined by the Director before the tests are administered. The Director may offer a less comprehensive renewal certification examination to those individuals that have completed a Division sponsored renewal-training course.

(B) The Director shall determine the frequency and dates of the certification examinations.

(C) For applicants that fail the initial certification examination or the renewal certification

examination, the Director may offer one additional examination within one month of the original test date without requiring submittal of a new application. The applicant shall pay a fee determined by the Director to cover the cost of the additional testing. Applicants that fail the re-examination shall wait six months prior to submitting a new application in accordance with R311-500-4.

R311-500-6. Certification.

(a) Initial certification for all certificate holders shall be effective for a period of two years from the date of issuance, unless revoked before the expiration date pursuant to R311-500-9. Certificates shall be subject to periodic renewal pursuant to R311-500-7.

R311-500-7. Renewal.

(a) A certificate holder may apply for certificate renewal by successfully completing the following prior to the expiration date of the current certificate:

(1) Submitting a completed renewal application on a form approved by the Director within the dates specified by the Director;

(2) Paying any applicable fees; and

(3) Passing a certification renewal examination.

(A) If the Director determines that the applicant meets the eligibility requirements of R311-500-5 and will comply with the performance standards of R311-500-8, the Director shall reissue the certificate to the applicant.

(B) If the Director determines that the applicant does not meet the eligibility requirements described in R311-500-5 or will not comply or has not complied with the performance standards of R311-500-8, the Director may issue a notice to deny certification in a manner consistent with R311-500-9.

(b) Renewal certificates shall be valid for two years and shall be subject to revocation under R311-500-9.

(c) Any individual who is not a Certified Decontamination Specialist on the date the renewal certification examination is given because the applicant's certification was revoked or expired prior to completing a renewal application must successfully meet the application and eligibility criteria for initial certification as specified in R311-500-4 and R311-500-5 prior to issuance of a certificate.

R311-500-8. Performance Standards.

(a) A Certified Decontamination Specialist performing decontamination activities at contaminated property:

(1) shall be certified prior to engaging in any decontamination activities for the purpose of removing the contaminated property from the list referenced in Section 19-6-903(3)(b) and display the certificate upon request;

(2) shall report to the local Health Department the location of any property that is the subject of decontamination work by the Decontamination Specialist;

(3) shall file a workplan with the local Health Department;

(4) shall perform work in accordance with the workplan;

(5) shall perform work meeting applicable local, state and federal laws, including certification and licensing requirements for performing construction work;

(6) shall oversee and supervise all decontamination activities and ensure any person(s) assisting with decontamination work at contaminated property meets Occupational Safety and Health Agency safety training requirements in accordance with 29 CFR 1910.120;

(7) shall disclose to any person(s) assisting with decontamination at contaminated property that work is being performed in a clandestine drug laboratory, inform the person(s) of the potential risks associated with this type of environment and ensure that the person(s) wears the necessary personal protective equipment as established by the Decontamination Specialist;

(8) shall make all decisions regarding decontamination and be the only individual conducting confirmation sampling;

(9) shall follow scientifically sound and accepted sampling procedures;

(10) shall submit a Final Report to the local Health Department, which includes an affidavit stating that the property has been decontaminated to the standards outlined in R392-600;

(11) shall maintain a current address and phone number on file with the Division;

(12) shall not participate in fraudulent, unethical, deceitful or dishonest activity with respect to performance of work for which certification is granted; and

(13) shall not participate in any other activities regulated under R311-500 without meeting all requirements of that certification program.

R311-500-9. Denial of Application and Revocation of Certification.

(a) Grounds for denial of an application or revocation of a certification may include any of the following:

(1) Failure to meet any of the application and eligibility criteria established in R311-500-4 and R311-500-5;

(2) Failure to submit a completed application;

(3) Evidence of past or current criminal activity;

(4) Demonstrated disregard for the public health, safety or the environment;

(5) Misrepresentation or falsification of figures, reports and/or data submitted to the local Health Department or the State;

(6) Cheating on a certification examination;

(7) Falsely obtaining or altering a certificate;

(8) Negligence, incompetence or misconduct in the performance of duties as a Certified Decontamination Specialist;

(9) Failure to furnish information or records required by the Director to demonstrate fitness to be a Certified Decontamination Specialist; or

(10) Violation of any certification or performance standard specified in this rule.

(b) Administrative proceedings regarding the denial of an application or the revocation of certification are governed by Rule R305-6.

R311-500-10. No Preemption.

(a) Certification to work as a Certified Decontamination Specialist does not relieve an individual from any requirement to obtain additional licenses or certificates in different specialties to the extent required by other agencies whose jurisdiction and authority may overlap the decontamination work. The Certified Decontamination Specialist shall obtain the additional licenses or certificates prior to performing the work for which the additional license or certificate is required. The Illegal Drug Operations Site Reporting and Decontamination Act Decontamination Specialist Certification Program rules do not preempt or supercede rules or standards promulgated by other regulatory programs in the State of Utah.

R311-500-11. Certified Decontamination Specialist List.

(a) The Director shall maintain a current list of Certified Decontamination Specialists that shall be made available to the public upon request.

KEY: meth lab contractor certification, adjudicative proceedings, administrative proceedings, revocation procedures

Date of Enactment or Last Substantive Amendment: August 29, 2011

Notice of Continuation: February 18, 2015

Authorizing, and Implemented or Interpreted Law: 19-1-301; 19-6-901 et seq.; 63G-4-201 through 205; 63G-4-503

APPENDIX E

29 CFR 1910.120 – Hazardous Waste Operations and Emergency Response



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Regulations (Standards - 29 CFR)

Hazardous waste operations and emergency response. - 1910.120

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• Part Number:	1910
• Part Title:	Occupational Safety and Health Standards
• Subpart:	H
• Subpart Title:	Hazardous Materials
• Standard Number:	<u>1910.120</u>
• Title:	Hazardous waste operations and emergency response.
• Appendix:	<u>A</u> , <u>B</u> , <u>C</u> , <u>D</u> , <u>E</u>

1910.120(a)

Scope, application, and definitions. --

1910.120(a)(1)

Scope. This section covers the following operations, unless the employer can demonstrate that the operation does not involve employee exposure or the reasonable possibility for employee exposure to safety or health hazards:

1910.120(a)(1)(i)

Clean-up operations required by a governmental body, whether Federal, state local or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for the EPA NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained);

1910.120(a)(1)(ii)

Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 ***et seq***);

..1910.120(a)(1)(iii)

1910.120(a)(1)(iii)

Voluntary clean-up operations at sites recognized by Federal, state, local or other governmental bodies as uncontrolled hazardous waste sites;

1910.120(a)(1)(iv)

Operations involving hazardous waste that are conducted at treatment, storage, disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with U.S.E. P.A. to implement RCRA regulations; and

1910.120(a)(1)(v)

Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.

1910.120(a)(2)

Application.

1910.120(a)(2)(i)

All requirements of Part 1910 and Part 1926 of Title 29 of the Code of Federal Regulations apply pursuant to their terms to hazardous waste and emergency response operations whether covered by this section or not. If there is a conflict or overlap, the provision more protective of employee safety and health shall apply without regard to 29 CFR 1910.5(c)(1).

1910.120(a)(2)(ii)

Hazardous substance clean-up operations within the scope of paragraphs (a)(1)(i) through (a)(1)(iii) of this section must comply with all paragraphs of this section except paragraphs (p) and (q).

1910.120(a)(2)(iii)

Operations within the scope of paragraph (a)(1)(iv) of this section must comply only with the requirements of paragraph (p) of this section.

Notes and Exceptions:

1910.120(a)(2)(iii)(A)

All provisions of paragraph (p) of this section cover any treatment, storage or disposal (TSD) operation regulated by 40 CFR parts 264 and 265 or by state law authorized under RCRA, and required to have a permit or interim status from EPA pursuant to 40 CFR 270.1 or from a state agency pursuant to RCRA.

1910.120(a)(2)(iii)(B)

Employers who are not required to have a permit or interim status because they are conditionally exempt small quantity generators under 40 CFR 261.5 or are generators who qualify under 40 CFR 262.34 for exemptions from regulation under 40 CFR parts 264, 265 and 270 ("excepted employers") are not covered by paragraphs (p)(1) through (p)(7) of this section. Excepted employers who are required by the EPA or state agency to have their employees engage in emergency response or who direct their employees to engage in emergency response are covered by paragraph (p)(8) of this section, and cannot be exempted by (p)(8)(i) of this section.

..1910.120(a)(2)(iii)(C)

1910.120(a)(2)(iii)(C)

If an area is used primarily for treatment, storage or disposal, any emergency response operations in that area shall comply with paragraph (p) (8) of this section. In other areas not used primarily for treatment, storage, or disposal, any emergency response operations shall comply with paragraph (q) of this section. Compliance with the requirements of paragraph (q) of this section shall be deemed to be in compliance with the requirements of paragraph (p)(8) of this section.

1910.120(a)(2)(iv)

Emergency response operations for releases of, or substantial threats of releases of, hazardous substances which are not covered by paragraphs (a)(1)(i) through (a)(1)(iv) of this section must only comply with the requirements of paragraph (q) of this section.

1910.120(a)(3)

Definitions --

Buddy system means a system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

Clean-up operation means an operation where hazardous substances are removed, contained, incinerated, neutralized, stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.

Decontamination means the removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

Emergency response or **responding to emergencies** means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area, or by maintenance personnel are not considered to be emergency responses within the scope of this standard. Responses to releases of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.

Facility means (A) any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft, or (B) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.

Hazardous materials response (HAZMAT) team means an organized group of employees, designated by the employer, who are expected to perform work to handle and control actual or potential leaks or spills of hazardous substances requiring possible close approach to the substance. The team members perform responses to releases or potential releases of hazardous substances for the purpose of control or stabilization of the incident. A HAZMAT team is not a fire brigade nor is a typical fire brigade a HAZMAT team. A HAZMAT team, however, may be a separate component of a fire brigade or fire department.

Hazardous substance means any substance designated or listed under (A) through (D) of this definition, exposure to which results or may result in adverse effects on the health or safety of employees:

[A] Any substance defined under section 101(14) of CERCLA;

[B] Any biologic agent and other disease causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring.

[C] Any substance listed by the U.S. Department of Transportation as hazardous materials under 49 CFR 172.101 and appendices; and

[D] Hazardous waste as herein defined.

Hazardous waste means --

[A] A waste or combination of wastes as defined in 40 CFR 261.3, or

[B] Those substances defined as hazardous wastes in 49 CFR 171.8.

Hazardous waste operation means any operation conducted within the scope of this standard.

Hazardous waste site or **Site** means any facility or location within the scope of this standard at which hazardous waste operations take place.

Health hazard means a chemical, mixture of chemicals or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes. Further definition of the terms used above can be found in Appendix A to 29 CFR 1910.1200.

IDLH or **Immediately dangerous to life or health** means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would interfere with an individual's ability to escape from a dangerous atmosphere.

Oxygen deficiency means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

Permissible exposure limit means the exposure, inhalation or dermal permissible exposure limit specified in 29 CFR Part 1910, Subparts G and Z.

Published exposure level means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986, which is incorporated by reference as specified in § 1910.6, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1987-88" dated 1987, which is incorporated by reference as specified in § 1910.6.

Post emergency response means that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun. If post emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of the initial response and not post emergency response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to paragraph (q)(11) of this section.

Qualified person means a person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control.

Site safety and health supervisor (or official) means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

Small quantity generator means a generator of hazardous wastes who in any calendar month generates no more than 1,000 kilograms (2,205) pounds of hazardous waste in that month.

Uncontrolled hazardous waste site means an area identified as an uncontrolled hazardous waste site by a governmental body, whether Federal, state, local or other where an accumulation of hazardous substances creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands such as those created by former municipal, county or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous substance wastes. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at TSD sites are not covered by this definition.

1910.120(b)

Safety and health program.

NOTE TO (b): Safety and health programs developed and implemented to meet other federal, state, or local regulations are considered acceptable in meeting this requirement if they cover or are modified to cover the topics required in this paragraph. An additional or separate safety and health program is not required by this paragraph.

1910.120(b)(1)

General.

1910.120(b)(1)(i)

Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations.

1910.120(b)(1)(ii)

The written safety and health program shall incorporate the following:

1910.120(b)(1)(ii)(A)

An organizational structure;

1910.120(b)(1)(ii)(B)

A comprehensive workplan;

..1910.120(b)(1)(ii)(C)

1910.120(b)(1)(ii)(C)

A site-specific safety and health plan which need not repeat the employer's standard operating procedures required in paragraph (b)(1)(ii)(F) of this section;

1910.120(b)(1)(ii)(D)

The safety and health training program;

1910.120(b)(1)(ii)(E)

The medical surveillance program;

1910.120(b)(1)(ii)(F)

The employer's standard operating procedures for safety and health; and

1910.120(b)(1)(ii)(G)

Any necessary interface between general program and site specific activities.

1910.120(b)(1)(iii)

Site excavation. Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with Subpart P of 29 CFR Part 1926.

1910.120(b)(1)(iv)

Contractors and sub-contractors. An employer who retains contractor or sub-contractor services for work in hazardous waste operations shall inform those contractors, sub-contractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety or other hazards of the hazardous waste operation that have been identified by the employer's information program.

1910.120(b)(1)(v)

Program availability. The written safety and health program shall be made available to any contractor or subcontractor or their representative who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to OSHA personnel, and to personnel of other Federal, state, or local agencies with regulatory authority over the site.

1910.120(b)(2)

Organizational structure part of the site program. --

1910.120(b)(2)(i)

The organizational structure part of the program shall establish the specific chain of command and specify the overall responsibilities of supervisors and employees. It shall include, at a minimum, the following elements:

1910.120(b)(2)(i)(A)

A general supervisor who has the responsibility and authority to direct all hazardous waste operations.

1910.120(b)(2)(i)(B)

A site safety and health supervisor who has the responsibility and authority to develop and implement the site safety and health plan and verify compliance.

1910.120(b)(2)(i)(C)

All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities.

1910.120(b)(2)(i)(D)

The lines of authority, responsibility, and communication.

1910.120(b)(2)(ii)

The organizational structure shall be reviewed and updated as necessary to reflect the current status of waste site operations.

..1910.120(b)(3)

1910.120(b)(3)

Comprehensive workplan part of the site program. The comprehensive workplan part of the program shall address the tasks and objectives of the site operations and the logistics and resources required to reach those tasks and objectives.

1910.120(b)(3)(i)

The comprehensive workplan shall address anticipated clean-up activities as well as normal operating procedures which need not repeat the employer's procedures available elsewhere.

1910.120(b)(3)(ii)

The comprehensive workplan shall define work tasks and objectives and identify the methods for accomplishing those tasks and objectives.

1910.120(b)(3)(iii)

The comprehensive workplan shall establish personnel requirements for implementing the plan.

1910.120(b)(3)(iv)

The comprehensive workplan shall provide for the implementation of the training required in paragraph (e) of this section.

1910.120(b)(3)(v)

The comprehensive workplan shall provide for the implementation of the required informational programs required in paragraph (i) of this section.

1910.120(b)(3)(vi)

The comprehensive workplan shall provide for the implementation of the medical surveillance program described in paragraph (f) if this section.

1910.120(b)(4)

Site-specific safety and health plan part of the program. --

1910.120(b)(4)(i)

General. The site safety and health plan, which must be kept on site, shall address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection.

1910.120(b)(4)(ii)

Elements. The site safety and health plan, as a minimum, shall address the following:

1910.120(b)(4)(ii)(A)

A safety and health risk or hazard analysis for each site task and operation found in the workplan.

1910.120(b)(4)(ii)(B)

Employee training assignments to assure compliance with paragraph (e) of this section.

1910.120(b)(4)(ii)(C)

Personal protective equipment to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in paragraph (g)(5) of this section.

1910.120(b)(4)(ii)(D)

Medical surveillance requirements in accordance with the program in paragraph (f) of this section.

1910.120(b)(4)(ii)(E)

Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.

..1910.120(b)(4)(ii)(F)

1910.120(b)(4)(ii)(F)

Site control measures in accordance with the site control program required in paragraph (d) of this section.

1910.120(b)(4)(ii)(G)

Decontamination procedures in accordance with paragraph (k) of this section.

1910.120(b)(4)(ii)(H)

An emergency response plan meeting the requirements of paragraph (l) of this section for safe and effective responses to emergencies, including the necessary PPE and other equipment.

1910.120(b)(4)(ii)(I)

Confined space entry procedures.

1910.120(b)(4)(ii)(J)

A spill containment program meeting the requirements of paragraph (j) of this section.

1910.120(b)(4)(iii)

Pre-entry briefing. The site specific safety and health plan shall provide for pre-entry briefings to be held prior to initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. The information and data obtained from site characterization and analysis work required in paragraph (c) of this section shall be used to prepare and update the site safety and health plan.

1910.120(b)(4)(iv)

Effectiveness of site safety and health plan. Inspections shall be conducted by the site safety and health supervisor or, in the absence of that individual, another individual who is knowledgeable in occupational safety and health, acting on behalf of the employer as necessary to determine the effectiveness of the site safety and health plan. Any deficiencies in the effectiveness of the site safety and health plan shall be corrected by the employer.

1910.120(c)

Site characterization and analysis --

1910.120(c)(1)

General. Hazardous waste sites shall be evaluated in accordance with this paragraph to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards.

1910.120(c)(2)

Preliminary evaluation. A preliminary evaluation of a site's characteristics shall be performed prior to site entry by a qualified person in order to aid in the selection of appropriate employee protection methods prior to site entry. Immediately after initial site entry, a more detailed evaluation of the site's specific characteristics shall be performed by a qualified person in order to further identify existing site hazards and to further aid in the selection of the appropriate engineering controls and personal protective equipment for the tasks to be performed.

1910.120(c)(3)

Hazard identification. All suspected conditions that may pose inhalation or skin absorption hazards that are immediately dangerous to life or health (IDLH) or other conditions that may cause death or serious harm shall be identified during the preliminary survey and evaluated during the detailed survey. Examples of such hazards include, but are not limited to, confined space entry, potentially explosive or flammable situations, visible vapor clouds, or areas where biological indicators such as dead animals or vegetation are located.

1910.120(c)(4)

Required information. The following information to the extent available shall be obtained by the employer prior to allowing employees to enter a site:

1910.120(c)(4)(i)

Location and approximate size of the site.

1910.120(c)(4)(ii)

Description of the response activity and/or the job task to be performed.

1910.120(c)(4)(iii)

Duration of the planned employee activity.

1910.120(c)(4)(iv)

Site topography and accessibility by air and roads.

1910.120(c)(4)(v)

Safety and health hazards expected at the site.

1910.120(c)(4)(vi)

Pathways for hazardous substance dispersion.

1910.120(c)(4)(vii)

Present status and capabilities of emergency response teams that would provide assistance to on-site employees at the time of an emergency.

1910.120(c)(4)(viii)

Hazardous substances and health hazards involved or expected at the site and their chemical and physical properties.

..1910.120(c)(5)

1910.120(c)(5)

Personal protective equipment. Personal protective equipment (PPE) shall be provided and used during initial site entry in accordance with the following requirements:

1910.120(c)(5)(i)

Based upon the results of the preliminary site evaluation, an ensemble of PPE shall be selected and used during initial site entry which will provide protection to a level of exposure below permissible exposure limits and published exposure levels for known or suspected hazardous substances and health hazards and which will provide protection against other known and suspected hazards identified during the preliminary site evaluation. If there is no permissible exposure limit or published exposure level, the employer may use other published studies and information as a guide to appropriate personal protective equipment.

1910.120(c)(5)(ii)

If positive-pressure self-contained breathing apparatus is not used as part of the entry ensemble, and if respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation, an escape self-contained breathing apparatus of at least five minute's duration shall be carried by employees during initial site entry.

1910.120(c)(5)(iii)

If the preliminary site evaluation does not produce sufficient information to identify the hazards or suspected hazards of the site an ensemble providing equivalent to Level B PPE shall be provided as minimum protection, and direct reading instruments shall be used as appropriate for identifying IDLH conditions. (See Appendix B for guidelines on Level B protective equipment.)

1910.120(c)(5)(iv)

Once the hazards of the site have been identified, the appropriate PPE shall be selected and used in accordance with paragraph (g) of this section.

1910.120(c)(6)

Monitoring. The following monitoring shall be conducted during initial site entry when the site evaluation produces information which shows the potential for ionizing radiation or IDLH conditions, or when the site information is not sufficient reasonably to eliminate these possible conditions:

1910.120(c)(6)(i)

Monitoring with direct reading instruments for hazardous levels of ionizing radiation.

1910.120(c)(6)(ii)

Monitoring the air with appropriate direct reading test equipment for (i.e., combustible gas meters, detector tubes) for IDLH and other conditions that may cause death or serious harm (combustible or explosive atmospheres, oxygen deficiency, toxic substances.)

1910.120(c)(6)(iii)

Visually observing for signs of actual or potential IDLH or other dangerous conditions.

1910.120(c)(6)(iv)

An ongoing air monitoring program in accordance with paragraph (h) of this section shall be implemented after site characterization has determined the site is safe for the start-up of operations.

1910.120(c)(7)

Risk identification. Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances shall be identified. Employees who will be working on the site shall be informed of any risks that have been identified. In situations covered by the Hazard Communication Standard, 29 CFR 1910.1200, training required by that standard need not be duplicated.

NOTE TO PARAGRAPH (c)(7). - Risks to consider include, but are not limited to:

- [a] Exposures exceeding the permissible exposure limits and published exposure levels.
- [b] IDLH Concentrations.
- [c] Potential Skin Absorption and Irritation Sources.
- [d] Potential Eye Irritation Sources.
- [e] Explosion Sensitivity and Flammability Ranges.
- [f] Oxygen deficiency.

1910.120(c)(8)

Employee notification. Any information concerning the chemical, physical, and toxicologic properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to the affected employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard for this purpose.

1910.120(d)

Site control. --

1910.120(d)(1)

General. Appropriate site control procedures shall be implemented to control employee exposure to hazardous substances before clean-up work begins.

..1910.120(d)(2)

1910.120(d)(2)

Site control program. A site control program for protecting employees which is part of the employer's site safety and health program required in paragraph (b) of this section shall be developed during the planning stages of a hazardous waste clean-up operation and modified as necessary as new information becomes available.

1910.120(d)(3)

Elements of the site control program. The site control program shall, as a minimum, include: A site map; site work zones; the use of a "buddy system"; site communications including alerting means for emergencies; the standard operating procedures or safe work practices; and, identification of the nearest medical assistance. Where these requirements are covered elsewhere they need not be repeated.

1910.120(e)

Training. --

1910.120(e)(1)

General.

1910.120(e)(1)(i)

All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph

before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph.

1910.120(e)(1)(ii)

Employees shall not be permitted to participate in or supervise field activities until they have been trained to a level required by their job function and responsibility.

1910.120(e)(2)

Elements to be covered. The training shall thoroughly cover the following:

1910.120(e)(2)(i)

Names of personnel and alternates responsible for site safety and health;

1910.120(e)(2)(ii)

Safety, health and other hazards present on the site;

1910.120(e)(2)(iii)

Use of personal protective equipment;

1910.120(e)(2)(iv)

Work practices by which the employee can minimize risks from hazards;

1910.120(e)(2)(v)

Safe use of engineering controls and equipment on the site;

1910.120(e)(2)(vi)

Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards; and

1910.120(e)(2)(vii)

The contents of paragraphs (G) through (J) of the site safety and health plan set forth in paragraph (b) (4)(ii) of this section.

..1910.120(e)(3)

1910.120(e)(3)

Initial training.

1910.120(e)(3)(i)

General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor.

1910.120(e)(3)(ii)

Workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision

of a trained, experienced supervisor.

1910.120(e)(3)(iii)

Workers regularly on site who work in areas which have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing, shall receive a minimum of 24 hours of instruction off the site, and the minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

1910.120(e)(3)(iv)

Workers with 24 hours of training who are covered by paragraphs (e)(3)(ii) and (e)(3)(iii) of this section, and who become general site workers or who are required to wear respirators, shall have the additional 16 hours and two days of training necessary to total the training specified in paragraph (e)(3)(i).

1910.120(e)(4)

Management and supervisor training. On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive 40 hours initial training, and three days of supervised field experience (the training may be reduced to 24 hours and one day if the only area of their responsibility is employees covered by paragraphs (e)(3)(ii) and (e)(3)(iii)) and at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

1910.120(e)(5)

Qualifications for trainers. Trainers shall be qualified to instruct employees about the subject matter that is being presented in training. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instructional experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

1910.120(e)(6)

Training certification. Employees and supervisors that have received and successfully completed the training and field experience specified in paragraphs (e)(1) through (e)(4) of this section shall be certified by their instructor or the head instructor and trained supervisor as having completed the necessary training. A written certificate shall be given to each person so certified. Any person who has not been so certified or who does not meet the requirements of paragraph (e)(9) of this section shall be prohibited from engaging in hazardous waste operations.

1910.120(e)(7)

Emergency response. Employees who are engaged in responding to hazardous emergency situations at hazardous waste clean-up sites that may expose them to hazardous substances shall be trained in how to respond to such expected emergencies.

1910.120(e)(8)

Refresher training. Employees specified in paragraph (e)(1) of this section, and managers and supervisors specified in paragraph (e)(4) of this section, shall receive eight hours of refresher training annually on the items specified in paragraph (e)(2) and/or (e)(4) of this section, any critique of incidents that have occurred in the past year that can serve as training examples of related work, and other relevant topics.

1910.120(e)(9)

Equivalent training. Employers who can show by documentation or certification that an employee's work experience and/or training has resulted in training equivalent to that training required in paragraphs (e)(1) through (e)(4) of this section shall not be required to provide the initial training

requirements of those paragraphs to such employees and shall provide a copy of the certification or documentation to the employee upon request. However, certified employees or employees with equivalent training new to a site shall receive appropriate, site specific training before site entry and have appropriate supervised field experience at the new site. Equivalent training includes any academic training or the training that existing employees might have already received from actual hazardous waste site experience.

1910.120(f)

Medical surveillance --

1910.120(f)(1)

General. Employees engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section and not covered by (a)(2)(iii) exceptions and employers of employees specified in paragraph (q) (9) shall institute a medical surveillance program in accordance with this paragraph.

1910.120(f)(2)

Employees covered. The medical surveillance program shall be instituted by the employer for the following employees:

1910.120(f)(2)(i)

All employees who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;

1910.120(f)(2)(ii)

All employees who wear a respirator for 30 days or more a year or as required by 1910.134;

1910.120(f)(2)(iii)

All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and

1910.120(f)(2)(iv)

Members of HAZMAT teams.

1910.120(f)(3)

Frequency of medical examinations and consultations. Medical examinations and consultations shall be made available by the employer to each employee covered under paragraph (f)(2) of this section on the following schedules:

1910.120(f)(3)(i)

For employees covered under paragraphs (f)(2)(i), (f)(2)(ii), and (f)(2)(iv);

1910.120(f)(3)(i)(A)

Prior to assignment;

1910.120(f)(3)(i)(B)

At least once every twelve months for each employee covered unless the attending physician believes a longer interval (not greater than biennially) is appropriate;

..1910.120(f)(3)(i)(C)

1910.120(f)(3)(i)(C)

At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last six months.

1910.120(f)(3)(i)(D)

As soon as possible upon notification by an employee that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the permissible exposure limits or published exposure levels in an emergency situation;

1910.120(f)(3)(i)(E)

At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary.

1910.120(f)(3)(ii)

For employees covered under paragraph (f)(2)(iii) and for all employees including of employers covered by paragraph (a)(1)(iv) who may have been injured, received a health impairment, developed signs or symptoms which may have resulted from exposure to hazardous substances resulting from an emergency incident, or exposed during an emergency incident to hazardous substances at concentrations above the permissible exposure limits or the published exposure levels without the necessary personal protective equipment being used:

1910.120(f)(3)(ii)(A)

As soon as possible following the emergency incident or development of signs or symptoms;

1910.120(f)(3)(ii)(B)

At additional times, if the examining physician determines that follow-up examinations or consultations are medically necessary.

1910.120(f)(4)

Content of medical examinations and consultations.

1910.120(f)(4)(i)

Medical examinations required by paragraph (f)(3) of this section shall include a medical and work history (or updated history if one is in the employee's file) with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site.

1910.120(f)(4)(ii)

The content of medical examinations or consultations made available to employees pursuant to paragraph (f) shall be determined by the attending physician. The guidelines in the ***Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*** (See Appendix D, reference # 10) should be consulted.

1910.120(f)(5)

Examination by a physician and costs. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, preferably one knowledgeable in occupational medicine, and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place.

1910.120(f)(6)

Information provided to the physician. The employer shall provide one copy of this standard and its appendices to the attending physician and in addition the following for each employee:

1910.120(f)(6)(i)

A description of the employee's duties as they relate to the employee's exposures,

1910.120(f)(6)(ii)

The employee's exposure levels or anticipated exposure levels.

1910.120(f)(6)(iii)

A description of any personal protective equipment used or to be used.

1910.120(f)(6)(iv)

Information from previous medical examinations of the employee which is not readily available to the examining physician.

1910.120(f)(6)(v)

Information required by §1910.134.

1910.120(f)(7)

Physician's written opinion.

1910.120(f)(7)(i)

The employer shall obtain and furnish the employee with a copy of a written opinion from the examining physician containing the following:

1910.120(f)(7)(i)(A)

The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or emergency response, or from respirator use.

..1910.120(f)(7)(i)(B)

1910.120(f)(7)(i)(B)

The physician's recommended limitations upon the employees assigned work.

1910.120(f)(7)(i)(C)

The results of the medical examination and tests if requested by the employee.

1910.120(f)(7)(i)(D)

A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

1910.120(f)(7)(ii)

The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposure.

1910.120(f)(8)

Recordkeeping.

1910.120(f)(8)(i)

An accurate record of the medical surveillance required by paragraph (f) of this section shall be retained. This record shall be retained for the period specified and meet the criteria of 29 CFR 1910.20.

1910.120(f)(8)(ii)

The record required in paragraph (f)(8)(i) of this section shall include at least the following information:

1910.120(f)(8)(ii)(A)

The name and social security number of the employee;

1910.120(f)(8)(ii)(B)

Physicians' written opinions, recommended limitations and results of examinations and tests;

1910.120(f)(8)(ii)(C)

Any employee medical complaints related to exposure to hazardous substances;

1910.120(f)(8)(ii)(D)

A copy of the information provided to the examining physician by the employer, with the exception of the standard and its appendices.

1910.120(g)

Engineering controls, work practices, and personal protective equipment for employee protection. Engineering controls, work practices and PPE for substances regulated in Subpart Z. (i) Engineering controls, work practices, personal protective equipment, or a combination of these shall be implemented in accordance with this paragraph to protect employees from exposure to hazardous substances and safety and health hazards.

1910.120(g)(1)

Engineering controls, work practices and PPE for substances regulated in Subparts G and Z.

1910.120(g)(1)(i)

Engineering controls and work practices shall be instituted to reduce and maintain employee exposure to or below the permissible exposure limits for substances regulated by 29 CFR Part 1910, to the extent required by Subpart Z, except to the extent that such controls and practices are not feasible.

NOTE TO PARAGRAPH (g)(1)(i): Engineering controls which may be feasible include the use of pressurized cabs or control booths on equipment, and/or the use of remotely operated material handling equipment. Work practices which may be feasible are removing all non-essential employees from potential exposure during opening of drums, wetting down dusty operations and locating employees upwind of possible hazards.

1910.120(g)(1)(ii)

Whenever engineering controls and work practices are not feasible, or not required, any reasonable combination of engineering controls, work practices and PPE shall be used to reduce and maintain to or below the permissible exposure limits or dose limits for substances regulated by 29 CFR Part 1910, Subpart Z.

1910.120(g)(1)(iii)

The employer shall not implement a schedule of employee rotation as a means of compliance with permissible exposure limits or dose limits except when there is no other feasible way of complying with the airborne or dermal dose limits for ionizing radiation.

1910.120(g)(1)(iv)

The provisions of 29 CFR, subpart G, shall be followed.

1910.120(g)(2)

Engineering controls, work practices, and PPE for substances not regulated in Subparts G and Z.

An appropriate combination of engineering controls, work practices, and personal protective equipment shall be used to reduce and maintain employee exposure to or below published exposure levels for hazardous substances and health hazards not regulated by 29 CFR Part 1910, Subparts G and Z. The employer may use the published literature and MSDS as a guide in making the employer's determination as to what level of protection the employer believes is appropriate for hazardous substances and health hazards for which there is no permissible exposure limit or published exposure limit.

1910.120(g)(3)

Personal protective equipment selection.

1910.120(g)(3)(i)

Personal protective equipment (PPE) shall be selected and used which will protect employees from the hazards and potential hazards they are likely to encounter as identified during the site characterization and analysis.

..1910.120(g)(3)(ii)

1910.120(g)(3)(ii)

Personal protective equipment selection shall be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the site, the task-specific conditions and duration, and the hazards and potential hazards identified at the site.

1910.120(g)(3)(iii)

Positive pressure self-contained breathing apparatus, or positive pressure air-line respirators equipped with an escape air supply shall be used when chemical exposure levels present will create a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

1910.120(g)(3)(iv)

Totally-encapsulating chemical protective suits (protection equivalent to Level A protection as recommended in Appendix B) shall be used in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate death, immediate serious illness or injury, or impair the ability to escape.

1910.120(g)(3)(v)

The level of protection provided by PPE selection shall be increased when additional information or site conditions show that increased protection is necessary to reduce employee exposures below permissible exposure limits and published exposure levels for hazardous substances and health hazards. (See Appendix B for guidance on selecting PPE ensembles.)

NOTE TO PARAGRAPH (g)(3): The level of employee protection provided may be decreased when additional information or site conditions show that decreased protection will not result in hazardous exposures to employees.

1910.120(g)(3)(vi)

Personal protective equipment shall be selected and used to meet the requirements of 29 CFR Part 1910, Subpart I, and additional requirements specified in this section.

1910.120(g)(4)

Totally-encapsulating chemical protective suits.

1910.120(g)(4)(i)

Totally-encapsulating suits shall protect employees from the particular hazards which are identified during site characterization and analysis.

1910.120(g)(4)(ii)

Totally-encapsulating suits shall be capable of maintaining positive air pressure. (See Appendix A for a test method which may be used to evaluate this requirement.)

1910.120(g)(4)(iii)

Totally-encapsulating suits shall be capable of preventing inward test gas leakage of more than 0.5 percent. (See Appendix A for a test method which may be used to evaluate this requirement.)

1910.120(g)(5)

Personal protective equipment (PPE) program. A personal protective equipment program, which is part of the employer's safety and health program required in paragraph (b) of this section or required in paragraph (p)(1) of this section and which is also a part of the site-specific safety and health plan shall be established. The PPE program shall address the elements listed below. When elements, such as donning and doffing procedures, are provided by the manufacturer of a piece of equipment and are attached to the plan, they need not be rewritten into the plan as long as they adequately address the procedure or element.

1910.120(g)(5)(i)

PPE selection based upon site hazards,

1910.120(g)(5)(ii)

PPE use and limitations of the equipment,

..1910.120(g)(5)(iii)

1910.120(g)(5)(iii)

Work mission duration,

1910.120(g)(5)(iv)

PPE maintenance and storage,

1910.120(g)(5)(v)

PPE decontamination and disposal,

1910.120(g)(5)(vi)

PPE training and proper fitting,

1910.120(g)(5)(vii)

PPE donning and doffing procedures,

1910.120(g)(5)(viii)

PPE inspection procedures prior to, during, and after use,

1910.120(g)(5)(ix)

Evaluation of the effectiveness of the PPE program, and

1910.120(g)(5)(x)

Limitations during temperature extremes, heat stress, and other appropriate medical considerations.

1910.120(h)

Monitoring. --

1910.120(h)(1)

General.

1910.120(h)(1)(i)

Monitoring shall be performed in accordance with this paragraph where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

1910.120(h)(1)(ii)

Air monitoring shall be used to identify and quantify airborne levels of hazardous substances and safety and health hazards in order to determine the appropriate level of employee protection needed on site.

1910.120(h)(2)

Initial entry. Upon initial entry, representative air monitoring shall be conducted to identify any IDLH condition, exposure over permissible exposure limits or published exposure levels, exposure over a radioactive material's dose limits or other dangerous condition such as the presence of flammable atmospheres, oxygen-deficient environments.

1910.120(h)(3)

Periodic monitoring. Periodic monitoring shall be conducted when the possibility of an IDLH condition or flammable atmosphere has developed or when there is indication that exposures may have risen over permissible exposure limits or published exposure levels since prior monitoring. Situations where it shall be considered whether the possibility that exposures have risen are as follows:

1910.120(h)(3)(i)

When work begins on a different portion of the site.

1910.120(h)(3)(ii)

When contaminants other than those previously identified are being handled.

..1910.120(h)(3)(iii)

1910.120(h)(3)(iii)

When a different type of operation is initiated (e.g., drum opening as opposed to exploratory well drilling.)

1910.120(h)(3)(iv)

When employees are handling leaking drums or containers or working in areas with obvious liquid contamination (e.g., a spill or lagoon.)

1910.120(h)(4)

Monitoring of high-risk employees. After the actual clean-up phase of any hazardous waste operation commences; for example, when soil, surface water or containers are moved or disturbed; the employer shall monitor those employees likely to have the highest exposures to those hazardous substances and health hazards likely to be present above permissible exposure limits or published exposure levels by using personal sampling frequently enough to characterize employee exposures. The

employer may utilize a representative sampling approach by documenting that the employees and chemicals chosen for monitoring are based on the criteria stated in the first sentence of this paragraph. If the employees likely to have the highest exposure are over permissible exposure limits or published exposure limits, then monitoring shall continue to determine all employees likely to be above those limits. The employer may utilize a representative sampling approach by documenting that the employees and chemicals chosen for monitoring are based on the criteria stated above.

NOTE TO PARAGRAPH (h): It is not required to monitor employees engaged in site characterization operations covered by paragraph (c) of this section.

1910.120(i)

Informational programs. Employers shall develop and implement a program which is part of the employer's safety and health program required in paragraph (b) of this section to inform employees, contractors, and subcontractors (or their representative) actually engaged in hazardous waste operations of the nature, level and degree of exposure likely as a result of participation in such hazardous waste operations. Employees, contractors and subcontractors working outside of the operations part of a site are not covered by this standard.

1910.120(j)

Handling drums and containers --

1910.120(j)(1)

General.

1910.120(j)(1)(i)

Hazardous substances and contaminated, liquids and other residues shall be handled, transported, labeled, and disposed of in accordance with this paragraph.

1910.120(j)(1)(ii)

Drums and containers used during the clean-up shall meet the appropriate DOT, OSHA, and EPA regulations for the wastes that they contain.

1910.120(j)(1)(iii)

When practical, drums and containers shall be inspected and their integrity shall be assured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions (i.e., buried beneath the earth, stacked behind other drums, stacked several tiers high in a pile, etc.) shall be moved to an accessible location and inspected prior to further handling.

1910.120(j)(1)(iv)

Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled.

1910.120(j)(1)(v)

Site operations shall be organized to minimize the amount of drum or container movement.

1910.120(j)(1)(vi)

Prior to movement of drums or containers, all employees exposed to the transfer operation shall be warned of the potential hazards associated with the contents of the drums or containers.

1910.120(j)(1)(vii)

U.S. Department of Transportation specified salvage drums or containers and suitable quantities of proper absorbent shall be kept available and used in areas where spills, leaks, or ruptures may occur.

1910.120(j)(1)(viii)

Where major spills may occur, a spill containment program, which is part of the employer's safety and health program required in paragraph (b) of this section, shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred.

1910.120(j)(1)(ix)

Drums and containers that cannot be moved without rupture, leakage, or spillage shall be emptied into a sound container using a device classified for the material being transferred.

1910.120(j)(1)(x)

A ground-penetrating system or other type of detection system or device shall be used to estimate the location and depth of buried drums or containers.

1910.120(j)(1)(xi)

Soil or covering material shall be removed with caution to prevent drum or container rupture.

1910.120(j)(1)(xii)

Fire extinguishing equipment meeting the requirements of 29 CFR Part 1910, Subpart L, shall be on hand and ready for use to control incipient fires.

1910.120(j)(2)

Opening drums and containers. The following procedures shall be followed in areas where drums or containers are being opened:

1910.120(j)(2)(i)

Where an airline respirator system is used, connections to the source of air supply shall be protected from contamination and the entire system shall be protected from physical damage.

1910.120(j)(2)(ii)

Employees not actually involved in opening drums or containers shall be kept a safe distance from the drums or containers being opened.

1910.120(j)(2)(iii)

If employees must work near or adjacent to drums or containers being opened, a suitable shield that does not interfere with the work operation shall be placed between the employee and the drums or containers being opened to protect the employee in case of accidental explosion.

1910.120(j)(2)(iv)

Controls for drum or container opening equipment, monitoring equipment, and fire suppression equipment shall be located behind the explosion-resistant barrier.

..1910.120(j)(2)(v)

1910.120(j)(2)(v)

When there is a reasonable possibility of flammable atmospheres being present, material handling equipment and hand tools shall be of the type to prevent sources of ignition.

1910.120(j)(2)(vi)

Drums and containers shall be opened in such a manner that excess interior pressure will be safely relieved. If pressure cannot be relieved from a remote location, appropriate shielding shall be placed between the employee and the drums or containers to reduce the risk of employee injury.

1910.120(j)(2)(vii)

Employees shall not stand upon or work from drums or containers.

1910.120(j)(3)

Material handling equipment. Material handling equipment used to transfer drums and containers shall be selected, positioned and operated to minimize sources of ignition related to the equipment from igniting vapors released from ruptured drums or containers.

1910.120(j)(4)

Radioactive wastes. Drums and containers containing radioactive wastes shall not be handled until such time as their hazard to employees is properly assessed.

1910.120(j)(5)

Shock sensitive wastes. As a minimum, the following special precautions shall be taken when drums and containers containing or suspected of containing shock-sensitive wastes are handled:

1910.120(j)(5)(i)

All non-essential employees shall be evacuated from the area of transfer.

1910.120(j)(5)(ii)

Material handling equipment shall be provided with explosive containment devices or protective shields to protect equipment operators from exploding containers.

1910.120(j)(5)(iii)

An employee alarm system capable of being perceived above surrounding light and noise conditions shall be used to signal the commencement and completion of explosive waste handling activities.

1910.120(j)(5)(iv)

Continuous communications (i.e., portable radios, hand signals, telephones, as appropriate) shall be maintained between the employee-in-charge of the immediate handling area and both the site safety and health supervisor and the command post until such time as the handling operation is completed. Communication equipment or methods that could cause shock sensitive materials to explode shall not be used.

1910.120(j)(5)(v)

Drums and containers under pressure, as evidenced by bulging or swelling, shall not be moved until such time as the cause for excess pressure is determined and appropriate containment procedures have been implemented to protect employees from explosive relief of the drum.

1910.120(j)(5)(vi)

Drums and containers containing packaged laboratory wastes shall be considered to contain shock-sensitive or explosive materials until they have been characterized.

Caution: Shipping of shock sensitive wastes may be prohibited under U.S. Department of Transportation regulations. Employers and their shippers should refer to 49 CFR 173.21 and 173.50.

1910.120(j)(6)

Laboratory waste packs. In addition to the requirements of paragraph (j)(5) of this section, the following precautions shall be taken, as a minimum, in handling laboratory waste packs (lab packs):

1910.120(j)(6)(i)

Lab packs shall be opened only when necessary and then only by an individual knowledgeable in the inspection, classification, and segregation of the containers within the pack according to the hazards of

the wastes.

1910.120(j)(6)(ii)

If crystalline material is noted on any container, the contents shall be handled as a shock-sensitive waste until the contents are identified.

1910.120(j)(7)

Sampling of drum and container contents. Sampling of containers and drums shall be done in accordance with a sampling procedure which is part of the site safety and health plan developed for and available to employees and others at the specific worksite.

1910.120(j)(8)

Shipping and transport.

1910.120(j)(8)(i)

Drums and containers shall be identified and classified prior to packaging for shipment.

1910.120(j)(8)(ii)

Drum or container staging areas shall be kept to the minimum number necessary to safely identify and classify materials and prepare them for transport.

1910.120(j)(8)(iii)

Staging areas shall be provided with adequate access and egress routes.

1910.120(j)(8)(iv)

Bulking of hazardous wastes shall be permitted only after a thorough characterization of the materials has been completed.

1910.120(j)(9)

Tank and vault procedures.

1910.120(j)(9)(i)

Tanks and vaults containing hazardous substances shall be handled in a manner similar to that for drums and containers, taking into consideration the size of the tank or vault.

1910.120(j)(9)(ii)

Appropriate tank or vault entry procedures as described in the employer's safety and health plan shall be followed whenever employees must enter a tank or vault.

1910.120(k)

Decontamination --

1910.120(k)(1)

General. Procedures for all phases of decontamination shall be developed and implemented in accordance with this paragraph.

..1910.120(k)(2)

1910.120(k)(2)

Decontamination procedures.

1910.120(k)(2)(i)

A decontamination procedure shall be developed, communicated to employees and implemented before any employees or equipment may enter areas on site where potential for exposure to hazardous substances exists.

1910.120(k)(2)(ii)

Standard operating procedures shall be developed to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances.

1910.120(k)(2)(iii)

All employees leaving a contaminated area shall be appropriately decontaminated; all contaminated clothing and equipment leaving a contaminated area shall be appropriately disposed of or decontaminated.

1910.120(k)(2)(iv)

Decontamination procedures shall be monitored by the site safety and health supervisor to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies.

1910.120(k)(3)

Location. Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.

1910.120(k)(4)

Equipment and solvents. All equipment and solvents used for decontamination shall be decontaminated or disposed of properly.

1910.120(k)(5)

Personal protective clothing and equipment.

1910.120(k)(5)(i)

Protective clothing and equipment shall be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness.

1910.120(k)(5)(ii)

Employees whose non-impermeable clothing becomes wetted with hazardous substances shall immediately remove that clothing and proceed to shower. The clothing shall be disposed of or decontaminated before it is removed from the work zone.

1910.120(k)(6)

Unauthorized employees. Unauthorized employees shall not remove protective clothing or equipment from change rooms.

1910.120(k)(7)

Commercial laundries or cleaning establishments. Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposures to hazardous substances.

1910.120(k)(8)

Showers and change rooms. Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, they shall be provided and meet the

requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing shall be provided and used.

1910.120(I)

Emergency response by employees at uncontrolled hazardous waste sites --

1910.120(I)(1)

Emergency response plan.

1910.120(I)(1)(i)

An emergency response plan shall be developed and implemented by all employers within the scope of paragraphs (a)(1)(i) through (ii) of this section to handle anticipated emergencies prior to the commencement of hazardous waste operations. The plan shall be in writing and available for inspection and copying by employees, their representatives, OSHA personnel and other governmental agencies with relevant responsibilities.

1910.120(I)(1)(ii)

Employers who will evacuate their employees from the danger area when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan complying with 29 CFR 1910.38.

1910.120(I)(2)

Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following:

1910.120(I)(2)(i)

Pre-emergency planning.

1910.120(I)(2)(ii)

Personnel roles, lines of authority, training, and communication.

1910.120(I)(2)(iii)

Emergency recognition and prevention.

1910.120(I)(2)(iv)

Safe distances and places of refuge.

1910.120(I)(2)(v)

Site security and control.

1910.120(I)(2)(vi)

Evacuation routes and procedures.

..1910.120(I)(2)(vii)

1910.120(I)(2)(vii)

Decontamination procedures which are not covered by the site safety and health plan.

1910.120(I)(2)(viii)

Emergency medical treatment and first aid.

1910.120(l)(2)(ix)

Emergency alerting and response procedures.

1910.120(l)(2)(x)

Critique of response and follow-up.

1910.120(l)(2)(xi)

PPE and emergency equipment.

1910.120(l)(3)

Procedures for handling emergency incidents.

1910.120(l)(3)(i)

In addition to the elements for the emergency response plan required in paragraph (l)(2) of this section, the following elements shall be included for emergency response plans:

1910.120(l)(3)(i)(A)

Site topography, layout, and prevailing weather conditions.

1910.120(l)(3)(i)(B)

Procedures for reporting incidents to local, state, and federal governmental agencies.

1910.120(l)(3)(ii)

The emergency response plan shall be a separate section of the Site Safety and Health Plan.

1910.120(l)(3)(iii)

The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.

1910.120(l)(3)(iv)

The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

1910.120(l)(3)(v)

The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

1910.120(l)(3)(vi)

An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation, to stop work activities if necessary, to lower background noise in order to speed communication, and to begin emergency procedures.

1910.120(l)(3)(vii)

Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

1910.120(m)

Illumination. Areas accessible to employees shall be lighted to not less than the minimum illumination intensities listed in the following Table H-120.1 while any work is in progress:

TABLE H-120.1. -- MINIMUM ILLUMINATION INTENSITIES IN FOOT-CANDLES

Foot-candles	Area or operations
5	General site areas.
3	Excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas; (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Mine Safety and Health Administration approved cap lights shall be acceptable for use in the tunnel heading.
10	General shops (e.g., mechanical and electrical equipment rooms, active storerooms, barracks or living quarters, locker or dressing rooms, dining areas, and indoor toilets and workrooms.
30	First aid stations, infirmaries, and offices.

1910.120(n)***Sanitation at temporary workplaces --*****1910.120(n)(1)*****Potable water.*****1910.120(n)(1)(i)**

An adequate supply of potable water shall be provided on the site.

1910.120(n)(1)(ii)

Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from containers.

1910.120(n)(1)(iii)

Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.

1910.120(n)(1)(iv)

Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

1910.120(n)(2)***Nonpotable water.*****1910.120(n)(2)(i)**

Outlets for nonpotable water, such as water for firefighting purposes shall be identified to indicate clearly that the water is unsafe and is not to be used for drinking, washing, or cooking purposes.

1910.120(n)(2)(ii)

There shall be no cross-connection, open or potential, between a system furnishing potable water and a system furnishing nonpotable water.

..1910.120(n)(3)**1910.120(n)(3)*****Toilet facilities.*****1910.120(n)(3)(i)**

Toilets shall be provided for employees according to Table H-120.2.

TABLE H-120.2. -- TOILET FACILITIES

Number of employees	Minimum number of facilities
20 or fewer	One.
More than 20, fewer than 200	One toilet seat and 1 urinal per 40 employees.
More than 200	One toilet seat and 1 urinal per 50 employees.

1910.120(n)(3)(ii)

Under temporary field conditions, provisions shall be made to assure not less than one toilet facility is available.

1910.120(n)(3)(iii)

Hazardous waste sites, not provided with a sanitary sewer, shall be provided with the following toilet facilities unless prohibited by local codes:

1910.120(n)(3)(iii)(A)

Chemical toilets;

1910.120(n)(3)(iii)(B)

Recirculating toilets;

1910.120(n)(3)(iii)(C)

Combustion toilets; or

1910.120(n)(3)(iii)(D)

Flush toilets.

1910.120(n)(3)(iv)

The requirements of this paragraph for sanitation facilities shall not apply to mobile crews having transportation readily available to nearby toilet facilities.

1910.120(n)(3)(v)

Doors entering toilet facilities shall be provided with entrance locks controlled from inside the facility.

..1910.120(n)(4)**1910.120(n)(4)**

Food handling. All food service facilities and operations for employees shall meet the applicable laws, ordinances, and regulations of the jurisdictions in which they are located.

1910.120(n)(5)

Temporary sleeping quarters. When temporary sleeping quarters are provided, they shall be heated, ventilated, and lighted.

1910.120(n)(6)

Washing facilities. The employer shall provide adequate washing facilities for employees engaged in operations where hazardous substances may be harmful to employees. Such facilities shall be in near proximity to the worksite; in areas where exposures are below permissible exposure limits and which are under the controls of the employer; and shall be so equipped as to enable employees to remove hazardous substances from themselves.

1910.120(n)(7)

Showers and change rooms. When hazardous waste clean-up or removal operations commence on a site and the duration of the work will require six months or greater time to complete, the employer shall provide showers and change rooms for all employees exposed to hazardous substances and health hazards involved in hazardous waste clean-up or removal operations.

1910.120(n)(7)(i)

Showers shall be provided and shall meet the requirements of 29 CFR 1910.141(d)(3).

1910.120(n)(7)(ii)

Change rooms shall be provided and shall meet the requirements of 29 CFR 1910.141(e). Change rooms shall consist of two separate change areas separated by the shower area required in paragraph (n)(7)(i) of this section. One change area, with an exit leading off the worksite, shall provide employees with an area where they can put on, remove and store work clothing and personal protective equipment.

1910.120(n)(7)(iii)

Showers and change rooms shall be located in areas where exposures are below the permissible exposure limits and published exposure levels. If this cannot be accomplished, then a ventilation system shall be provided that will supply air that is below the permissible exposure limits and published exposure levels.

1910.120(n)(7)(iv)

Employers shall assure that employees shower at the end of their work shift and when leaving the hazardous waste site.

1910.120(o)

New technology programs.

1910.120(o)(1)

The employer shall develop and implement procedures for the introduction of effective new technologies and equipment developed for the improved protection of employees working with hazardous waste clean-up operations, and the same shall be implemented as part of the site safety and health program to assure that employee protection is being maintained.

1910.120(o)(2)

New technologies, equipment or control measures available to the industry, such as the use of foams, absorbents, neutralizers, or other means to suppress the level of air contaminants while excavating the site or for spill control, shall be evaluated by employers or their representatives. Such an evaluation shall be done to determine the effectiveness of the new methods, materials, or equipment before implementing their use on a large scale for enhancing employee protection. Information and data from manufacturers or suppliers may be used as part of the employer's evaluation effort. Such evaluations shall be made available to OSHA upon request.

1910.120(p)

Certain Operations Conducted Under the Resource Conservation and Recovery Act of 1976 (RCRA).

Employers conducting operations at treatment, storage and disposal (TSD) facilities specified in paragraph (a)(1)(iv) of this section shall provide and implement the programs specified in this paragraph. See the "Notes and Exceptions" to paragraph (a)(2)(iii) of this section for employers not covered.

1910.120(p)(1)

Safety and health program. The employer shall develop and implement a written safety and health program for employees involved in hazardous waste operations that shall be available for inspection by employees, their representatives and OSHA personnel. The program shall be designed to identify, evaluate and control safety and health hazards in their facilities for the purpose of employee protection, to provide for emergency response meeting the requirements of paragraph (p)(8) of this section and to address as appropriate site analysis, engineering controls, maximum exposure limits, hazardous waste handling procedures and uses of new technologies.

1910.120(p)(2)

Hazard communication program. The employer shall implement a hazard communication program meeting the requirements of 29 CFR 1910.1200 as part of the employer's safety and program.

NOTE TO §1910.120 - The exemption for hazardous waste provided in 1910.1200 is applicable to this section.

..1910.120(p)(3)

1910.120(p)(3)

Medical surveillance program. The employer shall develop and implement a medical surveillance program meeting the requirements of paragraph (f) of this section.

1910.120(p)(4)

Decontamination program. The employer shall develop and implement a decontamination procedure meeting the requirements of paragraph (k) of this section.

1910.120(p)(5)

New technology program. The employer shall develop and implement procedures meeting the requirements of paragraph (o) of this section for introducing new and innovative equipment into the workplace.

1910.120(p)(6)

Material handling program. Where employees will be handling drums or containers, the employer shall develop and implement procedures meeting the requirements of paragraphs (j)(1)(ii) through (viii) and (xi) of this section, as well as (j)(3) and (j)(8) of this section prior to starting such work.

1910.120(p)(7)

Training program --

1910.120(p)(7)(i)

New employees. The employer shall develop and implement a training program which is part of the employer's safety and health program, for employees exposed to health hazards or hazardous substances at TSD operations to enable the employees to perform their assigned duties and functions in a safe and healthful manner so as not to endanger themselves or other employees. The initial training shall be for 24 hours and refresher training shall be for eight hours annually. Employees who have received the initial training required by this paragraph shall be given a written certificate attesting that they have successfully completed the necessary training.

1910.120(p)(7)(ii)

Current employees. Employers who can show by an employee's previous work experience and/or training that the employee has had training equivalent to the initial training required by this paragraph, shall be considered as meeting the initial training requirements of this paragraph as to that employee. Equivalent training includes the training that existing employees might have already received from actual site work experience. Current employees shall receive eight hours of refresher training annually.

1910.120(p)(7)(iii)

Trainers. Trainers who teach initial training shall have satisfactorily completed a training course for teaching the subjects they are expected to teach or they shall have the academic credentials and instruction experience necessary to demonstrate a good command of the subject matter of the courses and competent instructional skills.

1910.120(p)(8)

Emergency response program --

1910.120(p)(8)(i)

Emergency response plan. An emergency response plan shall be developed and implemented by all employers. Such plans need not duplicate any of the subjects fully addressed in the employer's contingency planning required by permits, such as those issued by the U.S. Environmental Protection Agency, provided that the contingency plan is made part of the emergency response plan. The emergency response plan shall be a written portion of the employer's safety and health program required in paragraph (p)(1) of this section. Employers who will evacuate their employees from the worksite location when an emergency occurs and who do not permit any of their employees to assist in handling the emergency are exempt from the requirements of paragraph (p)(8) if they provide an emergency action plan complying with 29 CFR 1910.38.

1910.120(p)(8)(ii)

Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following areas to the extent that they are not addressed in any specific program required in this paragraph:

1910.120(p)(8)(ii)(A)

Pre-emergency planning and coordination with outside parties.

1910.120(p)(8)(ii)(B)

Personnel roles, lines of authority, training, and communication.

1910.120(p)(8)(ii)(C)

Emergency recognition and prevention.

1910.120(p)(8)(ii)(D)

Safe distances and places of refuge.

1910.120(p)(8)(ii)(E)

Site security and control.

1910.120(p)(8)(ii)(F)

Evacuation routes and procedures.

1910.120(p)(8)(ii)(G)

Decontamination procedures.

1910.120(p)(8)(ii)(H)

Emergency medical treatment and first aid.

1910.120(p)(8)(ii)(I)

Emergency alerting and response procedures.

..1910.120(p)(8)(ii)(J)

1910.120(p)(8)(ii)(J)

Critique of response and follow-up.

1910.120(p)(8)(ii)(K)

PPE and emergency equipment.

1910.120(p)(8)(iii)

Training.

1910.120(p)(8)(iii)(A)

Training for emergency response employees shall be completed before they are called upon to perform in real emergencies. Such training shall include the elements of the emergency response plan, standard operating procedures the employer has established for the job, the personal protective equipment to be worn and procedures for handling emergency incidents.

Exception #1: an employer need not train all employees to the degree specified if the employer divides the work force in a manner such that a sufficient number of employees who have responsibility to control emergencies have the training specified, and all other employees, who may first respond to an emergency incident, have sufficient awareness training to recognize that an emergency response situation exists and that they are instructed in that case to summon the fully trained employees and not attempt control activities for which they are not trained.

Exception #2: An employer need not train all employees to the degree specified if arrangements have been made in advance for an outside fully-trained emergency response team to respond in a reasonable period and all employees, who may come to the incident first, have sufficient awareness training to recognize that an emergency response situation exists and they have been instructed to call the designated outside fully-trained emergency response team for assistance.

1910.120(p)(8)(iii)(B)

Employee members of TSD facility emergency response organizations shall be trained to a level of competence in the recognition of health and safety hazards to protect themselves and other employees. This would include training in the methods used to minimize the risk from safety and health hazards; in the safe use of control equipment; in the selection and use of appropriate personal protective equipment; in the safe operating procedures to be used at the incident scene; in the techniques of coordination with other employees to minimize risks; in the appropriate response to over exposure from health hazards or injury to themselves and other employees; and in the recognition of subsequent symptoms which may result from over exposures.

1910.120(p)(8)(iii)(C)

The employer shall certify that each covered employee has attended and successfully completed the training required in paragraph (p)(8)(iii) of this section, or shall certify the employee's competency for certification of training shall be recorded and maintained by the employer.

1910.120(p)(8)(iv)

Procedures for handling emergency incidents.

1910.120(p)(8)(iv)(A)

In addition to the elements for the emergency response plan required in paragraph (p)(8)(ii) of this section, the following elements shall be included for emergency response plans to the extent that they do not repeat any information already contained in the emergency response plan:

1910.120(p)(8)(iv)(A)(1)

Site topography, layout, and prevailing weather conditions.

1910.120(p)(8)(iv)(A)(2)

Procedures for reporting incidents to local, state, and federal governmental agencies.

1910.120(p)(8)(iv)(B)

The emergency response plan shall be compatible and integrated with the disaster, fire and/or emergency response plans of local, state, and federal agencies.

1910.120(p)(8)(iv)(C)

The emergency response plan shall be rehearsed regularly as part of the overall training program for site operations.

1910.120(p)(8)(iv)(D)

The site emergency response plan shall be reviewed periodically and, as necessary, be amended to keep it current with new or changing site conditions or information.

..1910.120(p)(8)(iv)(E)

1910.120(p)(8)(iv)(E)

An employee alarm system shall be installed in accordance with 29 CFR 1910.165 to notify employees of an emergency situation, to stop work activities if necessary, to lower background noise in order to speed communication; and to begin emergency procedures.

1910.120(p)(8)(iv)(F)

Based upon the information available at time of the emergency, the employer shall evaluate the incident and the site response capabilities and proceed with the appropriate steps to implement the site emergency response plan.

1910.120(q)

Emergency response program to hazardous substance releases. This paragraph covers employers whose employees are engaged in emergency response no matter where it occurs except that it does not cover employees engaged in operations specified in paragraphs (a)(1)(i) through (a)(1)(iv) of this section. Those emergency response organizations who have developed and implemented programs equivalent to this paragraph for handling releases of hazardous substances pursuant to section 303 of the Superfund Amendments and Reauthorization Act of 1986 (Emergency Planning and Community Right-to-Know Act of 1986, 42 U.S.C. 11003) shall be deemed to have met the requirements of this paragraph.

1910.120(q)(1)

Emergency response plan. An emergency response plan shall be developed and implemented to handle anticipated emergencies prior to the commencement of emergency response operations. The plan shall be in writing and available for inspection and copying by employees, their representatives and OSHA personnel. Employers who will evacuate their employees from the danger area when an emergency occurs, and who do not permit any of their employees to assist in handling the emergency, are exempt from the requirements of this paragraph if they provide an emergency action plan in accordance with 29 CFR 1910.38.

1910.120(q)(2)

Elements of an emergency response plan. The employer shall develop an emergency response plan for emergencies which shall address, as a minimum, the following areas to the extent that they are not addressed in any specific program required in this paragraph:

1910.120(q)(2)(i)

Pre-emergency planning and coordination with outside parties..

1910.120(q)(2)(ii)

Personnel roles, lines of authority, training, and communication.

1910.120(q)(2)(iii)

Emergency recognition and prevention.

1910.120(q)(2)(iv)

Safe distances and places of refuge.

1910.120(q)(2)(v)

Site security and control.

1910.120(q)(2)(vi)

Evacuation routes and procedures.

1910.120(q)(2)(vii)

Decontamination.

1910.120(q)(2)(viii)

Emergency medical treatment and first aid.

1910.120(q)(2)(ix)

Emergency alerting and response procedures.

..1910.120(q)(2)(x)

1910.120(q)(2)(x)

Critique of response and follow-up.

1910.120(q)(2)(xi)

PPE and emergency equipment.

1910.120(q)(2)(xii)

Emergency response organizations may use the local emergency response plan or the state emergency response plan or both, as part of their emergency response plan to avoid duplication. Those items of the emergency response plan that are being properly addressed by the SARA Title III plans may be substituted into their emergency plan or otherwise kept together for the employer and employee's use.

1910.120(q)(3)

Procedures for handling emergency response.

1910.120(q)(3)(i)

The senior emergency response official responding to an emergency shall become the individual in charge of a site-specific Incident Command System (ICS). All emergency responders and their communications shall be coordinated and controlled through the individual in charge of the ICS assisted by the senior official present for each employer.

NOTE TO PARAGRAPH (q)(3)(i). - The "senior official" at an emergency response is the most senior official on the site who has the responsibility for controlling the operations at the site. Initially it is the senior officer on the first-due piece of responding emergency apparatus to arrive on the incident scene. As more senior officers arrive (i.e. , battalion chief, fire chief, state law enforcement official, site coordinator, etc.) the position is passed up the line of authority which has been previously established.

1910.120(q)(3)(ii)

The individual in charge of the ICS shall identify, to the extent possible, all hazardous substances or conditions present and shall address as appropriate site analysis, use of engineering controls, maximum exposure limits, hazardous substance handling procedures, and use of any new technologies.

..1910.120(q)(3)(iii)

1910.120(q)(3)(iii)

Based on the hazardous substances and/or conditions present, the individual in charge of the ICS shall implement appropriate emergency operations, and assure that the personal protective equipment worn is appropriate for the hazards to be encountered. However, personal protective equipment shall meet, at a minimum, the criteria contained in 29 CFR 1910.156(e) when worn while performing fire fighting operations beyond the incipient stage for any incident.

1910.120(q)(3)(iv)

Employees engaged in emergency response and exposed to hazardous substances presenting an inhalation hazard or potential inhalation hazard shall wear positive pressure self-contained breathing apparatus while engaged in emergency response, until such time that the individual in charge of the ICS determines through the use of air monitoring that a decreased level of respiratory protection will not result in hazardous exposures to employees.

1910.120(q)(3)(v)

The individual in charge of the ICS shall limit the number of emergency response personnel at the emergency site, in those areas of potential or actual exposure to incident or site hazards, to those who are actively performing emergency operations. However, operations in hazardous areas shall be performed using the buddy system in groups of two or more.

1910.120(q)(3)(vi)

Back-up personnel shall be standing by with equipment ready to provide assistance or rescue. Qualified basic life support personnel, as a minimum, shall also be standing by with medical equipment and transportation capability.

1910.120(q)(3)(vii)

The individual in charge of the ICS shall designate a safety officer, who is knowledgeable in the operations being implemented at the emergency response site, with specific responsibility to identify and evaluate hazards and to provide direction with respect to the safety of operations for the emergency at hand.

1910.120(q)(3)(viii)

When activities are judged by the safety officer to be an IDLH and/or to involve an imminent danger condition, the safety officer shall have the authority to alter, suspend, or terminate those activities. The safety official shall immediately inform the individual in charge of the ICS of any actions needed to be taken to correct these hazards at the emergency scene.

1910.120(q)(3)(ix)

After emergency operations have terminated, the individual in charge of the ICS shall implement

appropriate decontamination procedures.

1910.120(q)(3)(x)

When deemed necessary for meeting the tasks at hand, approved self-contained compressed air breathing apparatus may be used with approved cylinders from other approved self-contained compressed air breathing apparatus provided that such cylinders are of the same capacity and pressure rating. All compressed air cylinders used with self-contained breathing apparatus shall meet U.S. Department of Transportation and National Institute for Occupational Safety and Health criteria.

1910.120(q)(4)

Skilled support personnel. Personnel, not necessarily an employer's own employees, who are skilled in the operation of certain equipment, such as mechanized earth moving or digging equipment or crane and hoisting equipment, and who are needed temporarily to perform immediate emergency support work that cannot reasonably be performed in a timely fashion by an employer's own employees, and who will be or may be exposed to the hazards at an emergency response scene, are not required to meet the training required in this paragraph for the employer's regular employees. However, these personnel shall be given an initial briefing at the site prior to their participation in any emergency response. The initial briefing shall include instruction in the wearing of appropriate personal protective equipment, what chemical hazards are involved, and what duties are to be performed. All other appropriate safety and health precautions provided to the employer's own employees shall be used to assure the safety and health of these personnel.

1910.120(q)(5)

Specialist employees. Employees who, in the course of their regular job duties, work with and are trained in the hazards of specific hazardous substances, and who will be called upon to provide technical advice or assistance at a hazardous substance release incident to the individual in charge, shall receive training or demonstrate competency in the area of their specialization annually.

1910.120(q)(6)

Training. Training shall be based on the duties and function to be performed by each responder of an emergency response organization. The skill and knowledge levels required for all new responders, those hired after the effective date of this standard, shall be conveyed to them through training before they are permitted to take part in actual emergency operations on an incident. Employees who participate, or are expected to participate, in emergency response, shall be given training in accordance with the following paragraphs:

1910.120(q)(6)(i)

First responder awareness level. First responders at the awareness level are individuals who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the proper authorities of the release. They would take no further action beyond notifying the authorities of the release. First responders at the awareness level shall have sufficient training or have had sufficient experience to objectively demonstrate competency in the following areas:

..1910.120(q)(6)(i)(A)

1910.120(q)(6)(i)(A)

An understanding of what hazardous substances are, and the risks associated with them in an incident.

1910.120(q)(6)(i)(B)

An understanding of the potential outcomes associated with an emergency created when hazardous substances are present.

1910.120(q)(6)(i)(C)

The ability to recognize the presence of hazardous substances in an emergency.

1910.120(q)(6)(i)(D)

The ability to identify the hazardous substances, if possible.

1910.120(q)(6)(i)(E)

An understanding of the role of the first responder awareness individual in the employer's emergency response plan including site security and control and the U.S. Department of Transportation's Emergency Response Guidebook.

1910.120(q)(6)(i)(F)

The ability to realize the need for additional resources, and to make appropriate notifications to the communication center.

1910.120(q)(6)(ii)

First responder operations level. First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response to the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. They are trained to respond in a defensive fashion without actually trying to stop the release. Their function is to contain the release from a safe distance, keep it from spreading, and prevent exposures. First responders at the operational level shall have received at least eight hours of training or have had sufficient experience to objectively demonstrate competency in the following areas in addition to those listed for the awareness level and the employer shall so certify:

1910.120(q)(6)(ii)(A)

Knowledge of the basic hazard and risk assessment techniques.

1910.120(q)(6)(ii)(B)

Know how to select and use proper personal protective equipment provided to the first responder operational level.

1910.120(q)(6)(ii)(C)

An understanding of basic hazardous materials terms.

1910.120(q)(6)(ii)(D)

Know how to perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit.

1910.120(q)(6)(ii)(E)

Know how to implement basic decontamination procedures.

1910.120(q)(6)(ii)(F)

An understanding of the relevant standard operating procedures and termination procedures.

..1910.120(q)(6)(iii)

1910.120(q)(6)(iii)

Hazardous materials technician. Hazardous materials technicians are individuals who respond to releases or potential releases for the purpose of stopping the release. They assume a more aggressive role than a first responder at the operations level in that they will approach the point of release in order to plug, patch or otherwise stop the release of a hazardous substance. Hazardous materials technicians shall have received at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

1910.120(q)(6)(iii)(A)

Know how to implement the employer's emergency response plan.

1910.120(q)(6)(iii)(B)

Know the classification, identification and verification of known and unknown materials by using field survey instruments and equipment.

1910.120(q)(6)(iii)(C)

Be able to function within an assigned role in the Incident Command System.

1910.120(q)(6)(iii)(D)

Know how to select and use proper specialized chemical personal protective equipment provided to the hazardous materials technician.

1910.120(q)(6)(iii)(E)

Understand hazard and risk assessment techniques.

1910.120(q)(6)(iii)(F)

Be able to perform advance control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available with the unit.

1910.120(q)(6)(iii)(G)

Understand and implement decontamination procedures.

1910.120(q)(6)(iii)(H)

Understand termination procedures.

1910.120(q)(6)(iii)(I)

Understand basic chemical and toxicological terminology and behavior.

1910.120(q)(6)(iv)

Hazardous materials specialist. Hazardous materials specialists are individuals who respond with and provide support to hazardous materials technicians. Their duties parallel those of the hazardous materials technician, however, those duties require a more directed or specific knowledge of the various substances they may be called upon to contain. The hazardous materials specialist would also act as the site liaison with Federal, state, local and other government authorities in regards to site activities. Hazardous materials specialists shall have received at least 24 hours of training equal to the technician level and in addition have competency in the following areas and the employer shall so certify:

1910.120(q)(6)(iv)(A)

Know how to implement the local emergency response plan.

1910.120(q)(6)(iv)(B)

Understand classification, identification and verification of known and unknown materials by using advanced survey instruments and equipment.

1910.120(q)(6)(iv)(C)

Know the state emergency response plan.

1910.120(q)(6)(iv)(D)

Be able to select and use proper specialized chemical personal protective equipment provided to the

hazardous materials specialist.

1910.120(q)(6)(iv)(E)

Understand in-depth hazard and risk techniques.

1910.120(q)(6)(iv)(F)

Be able to perform specialized control, containment, and/or confinement operations within the capabilities of the resources and personal protective equipment available.

1910.120(q)(6)(iv)(G)

Be able to determine and implement decontamination procedures.

1910.120(q)(6)(iv)(H)

Have the ability to develop a site safety and control plan.

1910.120(q)(6)(iv)(I)

Understand chemical, radiological and toxicological terminology and behavior.

1910.120(q)(6)(v)

On scene incident commander. Incident commanders, who will assume control of the incident scene beyond the first responder awareness level, shall receive at least 24 hours of training equal to the first responder operations level and in addition have competency in the following areas and the employer shall so certify:

1910.120(q)(6)(v)(A)

Know and be able to implement the employer's incident command system.

1910.120(q)(6)(v)(B)

Know how to implement the employer's emergency response plan.

1910.120(q)(6)(v)(C)

Know and understand the hazards and risks associated with employees working in chemical protective clothing.

1910.120(q)(6)(v)(D)

Know how to implement the local emergency response plan.

..1910.120(q)(6)(v)(E)

1910.120(q)(6)(v)(E)

Know of the state emergency response plan and of the Federal Regional Response Team.

1910.120(q)(6)(v)(F)

Know and understand the importance of decontamination procedures.

1910.120(q)(7)

Trainers. Trainers who teach any of the above training subjects shall have satisfactorily completed a training course for teaching the subjects they are expected to teach, such as the courses offered by the U.S. National Fire Academy, or they shall have the training and/or academic credentials and instructional experience necessary to demonstrate competent instructional skills and a good command

of the subject matter of the courses they are to teach.

1910.120(q)(8)

Refresher training.

1910.120(q)(8)(i)

Those employees who are trained in accordance with paragraph (q)(6) of this section shall receive annual refresher training of sufficient content and duration to maintain their competencies, or shall demonstrate competency in those areas at least yearly.

1910.120(q)(8)(ii)

A statement shall be made of the training or competency, and if a statement of competency is made, the employer shall keep a record of the methodology used to demonstrate competency.

1910.120(q)(9)

Medical surveillance and consultation.

1910.120(q)(9)(i)

Members of an organized and designated HAZMAT team and hazardous materials specialist shall receive a baseline physical examination and be provided with medical surveillance as required in paragraph (f) of this section.

1910.120(q)(9)(ii)

Any emergency response employees who exhibit signs or symptoms which may have resulted from exposure to hazardous substances during the course of an emergency incident either immediately or subsequently, shall be provided with medical consultation as required in paragraph (f)(3)(ii) of this section.

1910.120(q)(10)

Chemical protective clothing. Chemical protective clothing and equipment to be used by organized and designated HAZMAT team members, or to be used by hazardous materials specialists, shall meet the requirements of paragraphs (g)(3) through (5) of this section.

1910.120(q)(11)

Post-emergency response operations. Upon completion of the emergency response, if it is determined that it is necessary to remove hazardous substances, health hazards and materials contaminated with them (such as contaminated soil or other elements of the natural environment) from the site of the incident, the employer conducting the clean-up shall comply with one of the following:

1910.120(q)(11)(i)

Meet all the requirements of paragraphs (b) through (o) of this section; or

..1910.120(q)(11)(ii)

1910.120(q)(11)(ii)

Where the clean-up is done on plant property using plant or workplace employees, such employees shall have completed the training requirements of the following: 29 CFR 1910.38, 1910.134, 1910.1200, and other appropriate safety and health training made necessary by the tasks they are expected to perform such as personal protective equipment and decontamination procedures.

APPENDICES TO §1910.120 - HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

NOTE: The following appendices serve as non-mandatory guidelines to assist employees and employers in complying with the appropriate requirements of this section. However paragraph 1910.120(g) makes

mandatory in certain circumstances the use of Level A and Level B PPE protection.

[61 FR 9227, March 7, 1996; 67 FR 67964, Nov. 7, 2002]

 [Next Standard \(1910.120 App A\)](#)

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Occupational Safety & Health Administration
200 Constitution Avenue, NW
Washington, DC 20210

APPENDIX F

Workplan and Report Template

WORKPLAN TEMPLATE FOR THE DECONTAMINATION OF ILLEGAL DRUG MANUFACTURING SITES

DECONTAMINATION SPECIALIST INFORMATION

Company Name:
Decontamination Specialist:
Mailing Address:
Phone Number:
DEQ Certification Number:

I understand that before any decontamination or cleanup activities can begin, the decontamination specialist must report to the local health department the location of any property that is the subject of any decontamination by the decontamination specialist (19-6-904(1)).

I understand that the report must contain sufficient information to allow the local health department to investigate and verify the location of the property, including the address and description of the property and include a proposed workplan for decontamination.

I understand that a decontamination specialist must be certified prior to engaging in any decontamination activities for the purpose of removing the property from the contamination list referenced in Section 19-6-903(3)(b).

I understand that the decontamination specialist shall oversee and supervise all decontamination activities and be the only individual making decisions relative to decontamination.

I understand that the decontamination specialist shall not participate in fraudulent, unethical or deceitful activities with respect to work being performed.

I understand that the decontamination specialist must comply with all applicable local, state and federal laws/regulations.

I certify that the statements in this work plan are true and accurate to the best of my knowledge.

Decontamination Specialist Signature

Date

PROPERTY INFORMATION

Property Owner Name: _____

Property Owner Mailing Address: _____

Property Owner Telephone Number: _____

Decontaminated Property's Physical Address: _____

Legal Description of Decontaminated Property (If this is a mobile home, vehicle, trailer or boat, include make, model, license plate # & VIN/ID#): _____

Tax ID #/Parcel #: _____

Year Home/Structure was built: _____

Written detailed directions for locating the property from the nearest principal marked road:

Map: Directional map clearly showing how to get to the property.

Attachment: Legal Description of the Property

PRELIMINARY ASSESSMENT

Include a written evaluation of the real property to assist in determining the nature and extent of potential contamination. Please include the following information obtained from the Preliminary Assessment to help document areas highly suggestive of contamination.

Agency Reports: Include all information relative to the site and areas of concern obtained from the local health department and law enforcement agencies. The reports should be included as an attachment.

Site Description: Include a brief description of the property and structures (For example: The property consists of a single-family residence, two storage sheds, central heat and air, and is on

city septic and water. Based on the preliminary assessment, areas highly suggestive of contamination appear to be the kitchen, surrounding hallway and master bedroom, including the closet which was used to store the cooking apparatus. Stained wallboard was identified in the kitchen and the surrounding hallway leading to the master bedroom is carpeted).

Site Map: Include a scaled drawing that includes locations of all structures, septic systems, surface water locations, dump sites, burn piles, cooking locations, hazardous materials storage, vehicles, boats, distressed vegetation and areas highly suggestive of contamination, etc....

On Site Survey: Include a detailed description of real property, vehicles and/or structures which are impacted. Note all stains, spills, flooring materials, cooking areas, chemical storage locations, household furniture, childrens' items, chemicals, biohazards, odors, basements, attics, crawlspaces, HVAC systems, wells, septic systems, drain fields, distressed vegetation, porous and non-porous materials from areas highly suggestive of contamination, heating ducts and vents and utility rooms.

Contaminants of Interest: Discuss contaminants that may be present based on the suspected drug lab and cooking process.

Preliminary Testing: Discuss results of any preliminary testing performed on the property.

Site Photos: High quality, dated photos of areas deemed highly suggestive of contamination as wells as those areas deemed not highly suggestive of contamination.

DECONTAMINATION PROCEDURES

This section should include a detailed description of methods used to address contamination. Must be based on Preliminary Assessment findings.

Note any and all surfaces, materials and articles to be decontaminated on-site. List methods and materials used, including equipment, detergent, and number of washes and rinses.

Describe materials to be removed from the property. Include a map and a discussion detailing all areas of decontamination, including on-site cleaning.

Describe health and safety procedures to be employed during the cleanup.

Discuss all procedures to be employed to remove or clean contamination.

Describe how the following issues/areas will be addressed for the entire property.

- Areas highly suggestive of contamination (describe the areas and include a discussion as to the disposition of all porous and non-porous materials).
- Areas not highly suggestive of contamination (describe the areas and include a discussion as to the disposition of all porous and non-porous materials).
- Septic system and drain field
- Household furniture
- Flooring
- Appliances
- HVAC/ventilation system
- Ceilings, walls, floors
- Impacted debris
- Burn piles and dump sites
- Vehicles
- Other (list and address all other pertinent issues)

WASTE DISPOSAL PLAN

Include a detailed description of methods used to address handling and removal of wastes.

Procedures used to designate waste:

In your own words, discuss how you determine whether any waste is hazardous waste.

Identification of all of the Waste Disposal Facilities you will use on this project: Landfills may request notification that materials to be disposed of are from a drug lab.

Name

Address

Contact Person and Phone Number

Disposal of Solid Wastes: Identify the waste and the name of the disposal facility

For Examples:

- Household furnishings and items
- Appliances
- Debris from structures
- Septic Waste
- Materials from demolitions

- Debris from burn piles and yard
- Cleaning Rinse Water
- Other

Disposal of Hazardous Wastes: Identify the waste and the name of the disposal facility

For Examples:

- ✓ Anhydrous ammonia cylinders
- ✓ HCL generators
- ✓ Opened and unopened containers of chemicals (known or unknown)
- ✓ Chemicals not associated with drug manufacturing such as bleaches, toilet bowl cleaners, oven cleaners, motor oil, antifreeze, and oil based paints.
- ✓ Refrigerators/air conditioners with refrigerant
- ✓ Soil above MTCA standards
- ✓ Items that pH ≤ 2 or ≥ 12.5
- ✓ Fluorescent light tubes
- ✓ Computer monitors

Describe procedures used to secure waste when decontamination specialist is off-site:

POST-DECONTAMINATION CONFIRMATION SAMPLING PLAN

This section should include a description of sampling protocols.

Description of materials, equipment and techniques: Include a detailed description of how samples will be collected for methamphetamine, VOCs, and corrosives. Be thorough, describing the tools and equipment to be used and the procedures to be employed.

Analytical lab: Provide the name, address, phone number and contact person at the laboratory. Include the analytical method.

Post Decontamination Sampling Table: Describe where samples will be collected, what compounds are being sampled for, what area(s) will be sampled and what is the nature of samples (e.g., grab or composite). The example shown below is for sampling at the “Jones Property”. Notice that the sample ID number references this by using the first two letters in the last name and “C” for the confirmation samples. Areas of the property assessed with a PID or

pH paper should also be included.

Sample ID Number	Sample Location**	Analyte	Analytical Method	Area Sampled	Post Decontamination Results
JO1-C	Living room-east wall	Meth	NIOSH 9106	100 cm ²	
JO2-C	Bedroom closet-wallboard	Meth	NIOSH 9106	100 cm ²	

**Sample Location: Samples must be grab samples from an area highly suggestive of contamination. Samples may be composited from areas not highly suggestive of contamination.

Quality Assurance: Include a discussion of the number/type of field quality assurance samples and procedures employed by the laboratory and field sampling team to ensure data is precise, accurate and representative of conditions at the site.

Schedule: Discuss each task and time frame to complete the decontamination.

Figures, Tables and Attachments: Include the appropriate figures, tables and attachments to help convey the proposed decontamination activities.

REPORT TEMPLATE FOR THE DECONTAMINATION OF ILLEGAL DRUG MANUFACTURING SITES

DECONTAMINATION SPECIALIST INFORMATION

Company Name:
Decontamination Specialist:
Mailing Address:
Phone Number:
DEQ Certification Number:

PROPERTY INFORMATION

Property Owner Name: _____

Property Owner Mailing Address: _____

Property Owner Telephone Number: _____

Decontaminated Property's Physical Address: _____

Legal Description of Decontaminated Property (If this is a mobile home or vehicle, include make, model, license plate # & VIN/ID#): _____

Assessor's Property Account #/Parcel #: _____

Year Home/Structure was built: _____

Site Description: Brief description of property and structures (For example: Property consists of a single family residence, two storage sheds, city septic and water, pond). Discuss areas highly suggestive of contamination and areas not highly suggestive of contamination.

Contaminants of Interest: Discuss contaminants that may be present based on the suspected drug lab and cooking process.

DECONTAMINATION

Summary of Decontamination Procedures:

Note any and all surfaces, materials and articles decontaminated on-site. List methods and materials used, including equipment, detergent, and number of washes and rinses.

Describe materials removed from the property. Include a map and a discussion detailing all areas of decontamination, including on-site cleaning.

Describe health and safety procedures employed during the cleanup.

Discuss all procedures employed to remove or clean contamination.

Describe how the following issues/areas were addressed:

- Areas highly suggestive of contamination (describe the areas and include a discussion as to the disposition of all porous and non-porous materials).
- Areas not highly suggestive of contamination (describe the areas and include a discussion as to the disposition of all porous and non-porous materials).
- Septic system and drain field
- Household furniture
- Flooring
- Appliances
- HVAC/ventilation system
- Ceilings, walls, floors
- Impacted debris
- Burn piles and dump sites
- Vehicles
- Other (discuss all other pertinent issues)

Photos: Includes high quality photos documenting decontamination.

WASTE DISPOSAL

Waste Disposal Procedures. Please include a discussion of procedures used to designate waste as well as the disposition of solid waste and hazardous waste. All disposal manifests as well as bills of lading, if applicable, should be included as an attachment.

CONFIRMATION SAMPLING

Confirmation Sampling: Describe sample locations, analytical parameters, and areas sampled. Discuss sampling procedures employed to collect representative samples.

Post Decontamination Sampling Results Table: (Copy of report from analytical lab, Data should be compared to R392-600).

Sample ID Number	Sample Location	Analyte	Area Sampled (grab samples or composite samples)	Post Decontamination Results
SM1-P	Living room	Meth	100 cm ²	.08ug/100cm ²
SM2-P	Living room ceiling fan	Meth	100 cm ²	.09ug/100cm ²
SM3-P	Kitchen floor by stove	Meth	100 cm ²	.08ug/100 cm ²

Analytical Lab: Provide the name of the laboratory. Discuss the laboratory analytical method.

Quality Assurance: Describe the number/type of field quality control samples and procedures employed by the laboratory and field sampling team to ensure data is precise, accurate and representative of conditions at the site.

Post Decontamination Sampling Photos: Includes high quality photos detailing confirmation sample locations.

Deviations: Discuss deviations from the workplan.

STATEMENT OF COMPLETION

I hereby certify that the statements in this final report are true and accurate to the best of my knowledge. I further certify that I have complied with the Performance Standards established in R311-500-8 and followed all the procedures established in R392-600. The property has been decontaminated to the standards set forth in the rules.

By: _____
(signature of authorized representative)

Name: _____
(print or type)

Date: _____

Title: _____

Company: _____

STATE OF _____)
:ss.
COUNTY OF _____)

On this ____ day of _____, 20____, personally appeared before me, _____ who duly acknowledged that s/he signed the above Statement of Completion as the Decontamination Specialist who performed the decontamination and confirmation sampling activities on said property.

NOTARY PUBLIC

Residing At:

My Commission Expires: _____

APPENDIX G

Sample Test Questions

**CLANDESTINE DRUG LABORATORIES
DECONTAMINATION SPECIALIST CERTIFICATION PROGRAM
INITIAL EXAMINATION**

Select the most correct answer

1. A drug laboratory poses a risk to human health and the environment due to:
 - a. The release of methamphetamine and potentially other chemicals during the cooking process
 - b. The location of the sites in a residential neighborhood
 - c. Residual impact that may linger until the property is effectively decontaminated
 - d. All of the above

2. Samples collected from areas highly suggestive of contamination should be:
 - a. Grab samples
 - b. Composite samples
 - c. Vacuum samples
 - d. A combination of A and B

3. The wetting agent allowed by rule for confirmation sampling is:
 - a. Analytical grade ethanol
 - b. Methylene chloride
 - c. Isopropyl alcohol
 - d. Analytical grade methanol

4. As specified in R311-500, the Decontamination Specialist must be the only person making decisions relative to:
 - a. Decontamination activities
 - b. Preliminary Assessment
 - c. Sampling
 - d. All of the above

5. Many of the chemicals encountered at a clandestine drug laboratory may be divided into four general categories that include:
 - a. Solvents, corrosive/irritants, inorganics and precursors
 - b. Acids, bases, volatile organics, semi-volatile organics
 - c. Metals, pesticides, volatile organics, precursors
 - d. Acids, irritants, semi-volatile organics, precursors

6. A wastewater sample collected from an outdoor septic tank reveals toluene at 2000 ug/L and acetone at 800 ug/L. Based on the data:
 - a. No further action is required in accordance with R311-500
 - b. The U.S. Environmental Protection Agency must be notified
 - c. The nature and extent of impact must be delineated prior to remediation
 - d. A secondary confirmation sample should be collected within two weeks to verify the original results