# Clandestine Drug Lab General Cleanup Guidance


**DIVISION OF ENVIRONMENTAL HEALTH**

Minnesota Pollution Control Agency

**Minnesota Department of Health (MDH)**
**Division of Environmental Health**

**Minnesota Pollution Control Agency (MPCA)**

# Clandestine Drug Lab General Cleanup Guidance

**September 2010 VERSION,**
**Clarification to Table 1 March 2013**

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## ACKNOWLEDGEMENTS

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Research from the California Department of Toxic Substance Control (DTSC), the National Jewish Medical and Research Center, and the National Alliance of Model State Drug Laws (NAMSDL) National Working Group on Cleanup and Remediation of Methamphetamine Laboratories were used in the development of this guidance.

The guidance is informed by the Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Health (MDH) Public Health Laboratory studies of contaminated materials from former methamphetamine laboratory structures in Minnesota. Financial support for the former meth lab distribution and cleaning effectiveness studies was provided by the federal Environmental Protection Agency (EPA) Brownfield Grant Program.

Minnesota local public health personnel, state agency staff and private abatement contractors have provided comment, criticism and immeasurable assistance throughout the guidance development process.

MDH thanks all of the above for their continued efforts in addressing the public health impacts of clandestine methamphetamine laboratories.

# I. INTRODUCTION

This document ("Cleanup Guidance") is designed to assist property owners, remediation contractors, and local authorities with their efforts to reduce exposure to contamination from former methamphetamine laboratories (meth labs). The guidance provided is recommended as a model guideline for the clean up process. These recommendations are based on current information from a national working group on meth lab contamination remediation, experience from remediation contractors and government officials, and the results of research.

*NOTE: Neither this nor any other guidance provides science-based advice for removal of* **all potential risk** *to human health. Rather, this document provides best current practice for reducing exposures to toxic chemicals used in methamphetamine (meth) manufacture. The guidance will be revised as research and practice further enhance our understanding of meth chemicals, testing, and remediation.*

The main focus of this guidance is management and sampling of meth and other chemical residues *within structures*. This guidance uses meth as a surrogate for the presence of all other chemicals and is based on the premise that removal of meth will provide adequate management of other contaminants.

Similarly, guidance regarding *outdoor contamination* focused on solid wastes and volatile solvents is based on the premise that management of volatile solvents will provide adequate management of other outdoor contaminants.

The Minnesota Department of Health (MDH) recommends documentation of interior and exterior assessment and remediation activities. The Clandestine Lab Contractors' Procedural Report ("Contractors' Report") is the suggested model for recording remediation decisions and actions. The local authority that oversees remediation can require use of the Contractors' Report or allow an alternative format prepared by the contractor.

Web Resources:

- Both the Cleanup Guidance and the Contractors' Report can be found on the Minnesota Department of Health (MDH) website at: http://www.health.state.mn.us/divs/eh/meth/
- Exterior Evaluation and Remediation Guidance can be found on the Minnesota Pollution Control Agency website at: http://www.pca.state.mn.us/cleanup/meth.html

This revised Cleanup Guidance is available as of September 2010. All meth lab remediation started after September 2010 must conform to these general cleanup guidelines.

## II. AUTHORITY

Minnesota Statutes section 152.0275, subdivision 2 (c)[1] states:

A county or local health department or sheriff shall order that any property or portion of a property that has been found to be a clandestine lab site and contaminated by substances, chemicals, or items of any kind used in the manufacture of methamphetamine or any part of the manufacturing process, or the by-products or degradates of manufacturing methamphetamine be prohibited from being occupied or used until it has been assessed and remediated as provided in the Department of Health's clandestine drug labs general cleanup guidelines. The remediation shall be accomplished by a contractor who will make the verification required under paragraph (e).

## III. OVERVIEW

A property declared, by a governmental agency, as a meth lab must be remediated before it can be occupied. Local officials must oversee the remediation and establish the specific schedule for completion. A qualified contractor must perform the remediation. This guidance specifies the recommended cleanup standards and processes for remediation.

## IV. CHANGES TO THE GUIDANCE FROM PREVIOUS VERSIONS

### A. Units of Measurement for Meth

With this version of the guidance, the units for surface contamination are µg/100 cm². Most states and the federal government use units of µg/100 cm².

Previous versions of this guidance used µg/ft². For example, the previous value of <1 µg/ft² is shown in this version of the guidance as <0.1 µg/100 cm².

### B. California Health-based Standard for Meth Residue

The California health-based methamphetamine cleanup standard[2] ('California standard') of 1.5 µg/100 cm² is incorporated into this version of the guidance.

[1] https://www.revisor.mn.gov/statutes/?id=152.0275

[2] "ASSESSMENT OF CHILDREN'S EXPOSURE TO SURFACE METHAMPHETAMINE RESIDUES IN FORMER CLANDESTINE METHAMPHETAMINE LABS, AND IDENTIFICATION OF A RISK-BASED CLEANUP STANDARD FOR SURFACE METHAMPHETAMINE CONTAMINATION", Integrated Risk Assessment Branch Office of Environmental Health Hazard Assessment California Environmental Protection Agency, February 2009 http://www.oehha.ca.gov/public_info/public/kids/meth022609.html

This standard is used in three scenarios:

- For post-remediation sampling conducted in a declared meth lab (surface contamination of cleaned, painted, or sealed surfaces should not exceed this standard).
- In determining the health risk when there is no declared meth lab, but one or more of the following situations exist: meth is detected, meth use is known to have occurred, or meth use is suspected.
- When considering salvaging items with a high cost, high intrinsic value, or high emotional value from a meth lab.

In declared meth labs, the more restrictive value of <0.1 µg/100 cm² is still used to exclude a structure or portion of a structure from remediation. In this situation, meth is used as a surrogate for a variety of meth lab chemicals.

### C. Post-Remediation Sampling

Post-remediation sampling for meth is now necessary and results are evaluated with the California standard. Post-remediation sampling is conducted after cleaning, painting and sealing appropriate surfaces.

Post-remediation sampling for other chemicals associated with a meth lab is generally not required. The remediation process will reduce potential risks from the associated chemicals involved in meth production.

### D. Analytic Laboratory Requirements

Remediation contractors should use a certified analytic laboratory to assure local authorities that the sampling data are reliable. Analytic laboratories include those certified by the Minnesota Department of Health Public Health Laboratory, an equivalent state certification program from another state, or the US Environmental Protection Agency.

## V. CONCEPTS

### A. Clandestine Drug Labs

This guidance specifically addresses the remediation of former meth labs, although other illicit drugs may be manufactured in clandestine drug labs as well. This cleanup guidance can be applied to all meth labs.

Meth labs vary greatly:

- Meth labs can range from crude makeshift operations to highly sophisticated and technologically advanced facilities.
- Meth labs can be set up almost anywhere and are often found in private residences, motel and hotel rooms, apartments, trailers, automobiles, campgrounds, and commercial establishments. Labs can also be found in rural outbuildings, barns, and other structures that may appear uninhabitable.
- There are many different ways to make meth. The precursor chemicals, by-products, and hazards associated with each production method differ. See Appendix A for a more detailed description.

Contractors working on remediation of non-meth illicit drug labs may contact the Minnesota Department of Health (MDH) Meth Program for advice on remediation of those labs. The Minnesota Pollution Control Agency (MPCA) is another resource for help in remediating non-meth labs.

### B. Partial Labs

This guidance is applicable to partial labs.

"Partial labs" are labs in which only a part of a step in the meth manufacturing process was performed. The manufacture of meth is a multi-stage process. In some cases, the various steps are performed in more than one lab or structure. For example, unrefined drug precursors may be chemically altered in one location and used in the final steps of the meth manufacture process at a different location. While each lab should be evaluated on a case-by-case basis, it is generally recommended that "partial labs" be cleaned with the assumption that the entire manufacturing process and its associated processes may have taken place in all areas of the structure.

### C. Meth Use

This guidance is useful for cleaning up a meth use structure when the habitability of the structure is in question.

Studies have shown that the use of meth by smoking can produce levels of airborne meth that may result in general contamination of the indoor environment. A structure in which meth was used but not manufactured is not likely to be as contaminated as a meth lab structure.

- Contamination levels will depend upon how much meth is smoked and the smoker’s technique.

- A meth use structure does not have the added health risks associated with the chemical reagents, intermediate chemicals, and byproducts found in a meth lab.

One of the times that the habitability of a structure is questioned is when meth is detected during a real estate transaction. Requiring testing for meth as a condition before agreeing to purchase a property can be part of real estate practice. In the case where meth testing reveals the presence of meth and a meth lab was not declared, this guidance can be used to ensure the structure is habitable.

This guidance does not require remediation of a meth use structure if the surface methamphetamine contamination is below the California standard of 1.5 µg/100 $cm^2$.

Methamphetamine sampling cannot be used to determine whether the meth contamination came from manufacturing meth ("cooking") or smoking meth.

### D. Sampling a Meth Lab for Hazardous Substances

Sampling for meth is the best practice for determining whether a location that appears to have been used for manufacturing ("cooking") meth is contaminated with other hazardous substances.

Meth is used as a surrogate for all of the chemicals associated with meth cooking for the following reasons:

- Other meth lab chemicals are not persistent in the indoor environment and sampling for the purpose of characterizing the extent of contamination would not be productive. For example, volatile organic compounds (VOCs), which are used in most meth labs, dissipate rapidly after the cooking step and under normal ventilation[3].
- Relatively few samples for meth are needed to provide a reasonable estimate of the overall contamination of a structure because meth becomes airborne and disperses throughout the structure in a widespread and contiguous pattern. Some meth lab chemicals, such as reagents (acids, bases, and solvents) used to drive the chemical reactions are not evenly dispersed in a building but are found in small, discrete 'puddles' in several areas of the property and may be easy to miss in cursory sampling.

When contamination is confirmed through meth sampling, additional types of chemical sampling may be warranted (see Section VII, below).

[3] Martyny, JW et al., " A 24-Hour Study to Investigate Chemical Exposures Associated with Clandestine Methamphetamine Laboratories", National Jewish Medical and Research Center, August 11, 2005.

## E. Exclusion of Structures or Portions of Structures

Minnesota law requires any property or portion of a property that has been declared a clandestine lab site and contaminated, be remediated before it can be occupied (see Chapter II, Authority.) A structure or portion of a structure can be excluded from remediation if a contractor proves the area in question is not contaminated.

Best practice to prove an area is not contaminated includes the following:

- The area must not have any chemicals stains and odors.
- No materials associated with meth production are present or were found in the area.
- There must be a logical reason to believe that meth production did not occur in the area.
- The area must have less than 0.1 µg/100 $cm^2$ methamphetamine surface contamination.

## F. Removal and Remediation

Making a former meth lab site safer for inhabitance requires two basic efforts:

- Removal of the gross contamination (i.e., containers of chemicals and equipment and apparatus that could be used to make illegal drugs) by law enforcement.
- Remediation of interior structures and, if applicable, the surrounding land, surface waters, and ground water by a contractor.

This document focuses on cleanup guidance related to remediation.

Remediation involves utilizing recognized procedures and technology-based standards to restore former meth labs to a state in which the property can be inhabited again.

Remediation occurs when gross chemical removal (if any) is complete, the site is secured[4], and the site has been released by law enforcement as part of any criminal investigation.

[4] Securing a site may include removal of weapons, locking doors, boarding up access points, removal of guard dogs, defusing bombs and other steps to make the property safe and prevent further damage.

# VI. PRE-REMEDIATION CONSIDERATIONS

## A. Roles and Responsibilities

An effective meth lab remediation involves a cooperative effort among law enforcement, local public health (local authority), the property owner, and the contractor. Roles and responsibilities for each participant in the remediation are described in law effective in 2006[5], Laws of Minnesota 2005, chapter 136, Article 7, effective January 1, 2006.

- *Law enforcement* agencies in Minnesota will post meth lab properties with signs warning of possible chemical contamination. Occupation of residential structures on properties where meth labs have been discovered is usually prohibited until after assessment and/or remediation. There may be some circumstances when the local health authority would allow the occupants of a second home on the property to remain in place, e.g., when law enforcement feels certain that the second structure was not involved in any way.
- The *local authority* will declare a public health nuisance, approve the contractor and work plan, and prohibit re-occupancy of meth lab properties until remediation is complete. The local authority must file certain affidavits upon issuing a no-occupancy order or vacating such an order. The County Recorder or Registrar of Titles will record and maintain these affidavits.
- The *property owner* is responsible for the cost of remediation. The property owner should understand the work plan and monitor progress on the site. MDH has a contractor list available at http://www.health.state.mn.us/divs/eh/meth/index.html.

  Cost Recovery: The meth legislation effective in January 1, 2006 states that the lab operator (meth cook) can be required to pay restitution to public entities and property owners for costs associated with lab response and remediation.
- *Contractors* work for property owners and with local authorities to assess, sample, clean, and dispose of wastes and materials removed from the property. Contractors should understand and complete remediation according to the guidance and under oversight of the local authority. The Contractors' Report is recommended for use to document their work to the extent required by the local authority.

[5] https://www.revisor.mn.gov/statutes/?id=152.0275

*NOTE: The legal and public health determination of a meth lab may not always be the same. For the purposes of safe public health practice, assessment is required whenever lab waste, equipment, or chemicals are found on a property, whether or not an arrest or conviction has occurred. It is not sufficiently protective to require remediation only when a working lab has been discovered. When there is no sign of cooking and all meth chemicals on site are unopened, MDH recommends that the decision to sample or clean should be made on a case by case basis with input from local law enforcement and public health officials.*

*Since the meth cleanup legislation became effective in 2006, there has been confusion about the meaning, intent, and letter of the law. According to the law, a clandestine lab site means, "…any structure or conveyance or outdoor location occupied or affected by conditions or chemicals typically associated with the manufacturing of meth."*

*The law also states that, "A county or local health department or sheriff shall order that any property or portion of a property that has been found to be a clandestine lab site and contaminated by substances, chemicals, or items of any kind used in the manufacture of meth or any part of the manufacturing process, or the by-products or degradates of manufacturing meth be prohibited from being occupied or used until it has been assessed and remediated as provided in the Department of Health's … general cleanup guidelines."*

*The law is somewhat ambiguous about how a property may be "found to be a clandestine lab" and how one determines whether a property has been "affected by conditions or chemicals…" and therefore must be remediated.*

Other agencies and resources:

- The *local Community Health Services Administrator* will maintain a list of current and former contaminated properties which includes the name of the owner, location of the property, extent of the contamination, and status of the remediation. That list will be available to the public upon request.
- The *Minnesota Department of Employment and Economic Development* has financial assistance available for cities and towns in order to expedite remediation of former lab sites. Cities and towns can apply to the Small Cities Development Program through their web page at: http://www.deed.state.mn.us/SCDP/
- *Minnesota Department of Health (MDH) Methamphetamine Program staff* advises local public health officials, law enforcement personnel, property owners, and others. MDH will oversee sampling and remediation of facilities that operate under MDH permit or license (e.g., hotels, motels, restaurants). MDH will assist local officials in assessing the health implications of indoor contaminant levels. MDH is responsible for maintaining this guidance. While MDH does not certify or license contractors, MDH will maintain a list on the MDH website of contractors that claim to meet the qualifications of this guidance.

  MDH Methamphetamine Program contacts and information are available at: http://www.health.state.mn.us/divs/eh/meth

- The *Minnesota Pollution Control Agency (MPCA)* is responsible for writing and maintaining the sections of this guidance that pertain to waste management, well sampling and groundwater pollution, soil and disposal pit sampling and excavation, and septic tank and drain field sampling and remediation. MPCA will provide verbal guidance on outdoor issues to the local authority having jurisdiction. If requested by the local authority, MPCA may assume oversight of outdoor sampling and remediation in cases of long-term or large production labs, new production methods, neighboring wells close to labs, or confirmed groundwater contamination. Information is available at: http://www.pca.state.mn.us
- The *Minnesota Occupational Safety and Health Administration (OSHA)* provides guidance and enforcement of worker safety training, equipment, and practices. Information is available at: http://www.dli.mn.gov/MnOsha.asp

## B. Meth Production Methods

Most meth used in Minnesota is imported from Mexico or the southwestern United States. In 2006, Minnesota labs supplied perhaps 15 to 20 percent of the meth used in the state. Minnesota labs are typically "user labs", small in comparison to the "super labs" of the southwest.

There are three methods for making meth in common practice in the U.S. today. See Appendix A, Meth Manufacturing Processes and Common Manufacturing Chemicals for detailed information.

- Most people who make meth in Minnesota use variations of the anhydrous ammonia method (also called the Birch Reduction method or "Nazi" method).
- Few lab operations using the red phosphorous method have been discovered in Minnesota but they do occur.
- In 2009 a new method, using ammonium nitrate (called the "Shake and Bake" or "One Pot" method) has become common through several parts of the nation. Few "Shake and Bake" labs have been found in Minnesota.

All persons involved in the remediation of a former meth lab must be aware of potential hazards created by each of the current meth cooking methods as the assessment of labs cannot necessarily be based on the method being used at the time of seizure. The meth cooks arrested may not know or be truthful about "cooks" done in the past and the physical evidence at a lab may indicate only the most recent method used.

Seizure of a large capacity lab ("super lab") or discovery of new cooking methods or chemicals should be brought to the attention of MDH and MPCA so agency staff can discuss whether this guidance is appropriate and sufficient for the situation.

## C. Meth Lab Chemical Contamination

Cooking meth by any method will result in the release of:

- Ingredient chemicals.
- Precursor drugs (pseudoephedrine or ephedrine).
- Meth in vapor and particle form.
- Other largely unknown byproducts. (See Appendix A.)

Chemicals may enter the body by being breathed, eaten, injected (by a contaminated needle or accidental skin prick), or absorbed by the skin.

Both acute (short term) and chronic (long term) health hazards may result from the manufacturing of meth. Acute exposure hazards come from direct contact with product or waste and inhalation of product or waste. Burns, tissue irritation, and rashes can result from chemical spills and skin contact. Headaches, dizziness, nausea, and other health effects can result from inhalation of vapors.

Most of the known hazards decrease after the meth cooking process has stopped.

- Proper removal of the production wastes and bulk chemicals eliminates many of the risks associated with meth labs.
- Spilled volatile chemicals and solvents such as ammonia, methanol, ether, or acetone will move into air and will be readily removed from the structure by ventilation.

More persistent are the semi-volatile or non-volatile production chemicals such as acids, bases, precursor chemicals, and products used or created in the manufacturing processes.

Smoking meth indoors will also distribute meth throughout the structure and the structure’s contents. Handling meth, loading meth pipes or syringes, or packaging the drug for distribution may result in spills onto floors and other surfaces.

The risk of injury from chemical exposure depends on:

- The chemical itself.
- The concentration.
- The quantity.
- The length and route of exposure.

Assessment of a lab site should include special attention to:

- Accessibility of residues and frequency of direct contact –

  The likely use of a contaminated area is an important factor in estimating frequency of contact. For example, residues in a kitchen or bathroom of a house will likely be contacted more frequently than residues in a non-residential outbuilding.

- Characteristics of the inhabitants or users of the structure –

  For example, toddlers who crawl on carpet or floors will have high frequency of skin contact with toxic residues over a considerable area of skin. These residues may directly irritate the skin and may be absorbed into the body through the skin. If hand to mouth behavior occurs when hands have been in contact with toxic chemicals, these will be ingested into the body. Hand to eye behavior will introduce toxic materials to the eyes. Toddlers most frequently demonstrate hand to mouth and hand to eye behaviors, but all people exhibit them.

The toxicity of meth lab residues will depend upon:

- The amount of the residue - the amount of residue will depend upon the size of the meth lab, the length of time it operated, methods of chemical storage and disposal, occurrence of chemical spills, as well as on the physical characteristics of the structure in which the meth lab occurred.
- The chemicals in the residue - the chemicals in the residue will vary with the method of methamphetamine manufacture.

Minnesota Statutes section 152.0275, Subdivision 2, (c) requires that any property or portion of a property that is a meth lab and contaminated by the meth lab must be assessed and remediated. All structures on the property, or portion of the property that is a meth lab, must be assessed and remediated. If during the assessment, a structure or portion of a structure can be shown not to be contaminated, that structure or portion of the structure can be excluded from remediation. (See Section V, F: Exclusion of Structures or Portions of Structures.)

### D. Situations Where There Is Not a Declared Meth Lab

If the residence *is a declared meth lab*, follow the remediation guidance recommended by MDH in this document. The remediation must be conducted by a contractor.

If a *meth lab is suspected* but the residence was not declared a meth lab, the property owner may decide to have the property remediated. It is strongly recommended that the property owner hire a contractor to do the remediation and any pre- or post remediation sampling.

If the property owner or renter decides to perform the remediation themselves, the owner or renter should perform the remediation following the steps in this guidance to the best of their ability.

If the *only concern is meth use*, the health concern about harmful exposures is limited to the methamphetamine itself, and does not include concerns about the other chemicals that can contaminate a residence from a meth lab.

- The homeowner or renter may sample for meth to find out how much meth is present.
- There is no significant health risk to any family member living in a residence when methamphetamine contamination measures at or below 1.5 µg/100 $cm^2$.
- When methamphetamine contamination measures above 1.5 µg/100 $cm^2$ the homeowner or renter may follow the remediation steps in this guidance as closely as possible to reduce the risk from exposure to methamphetamine residue. For example, washing surfaces with detergent and water will reduce the residual methamphetamine. Washing clothing in a washing machine will reduce residual methamphetamine exposure from the clothing.

## E. Overview of the Sequence of Remediation Activities

Below is an overview of the sequence in which remediation activities should occur. Each of the processes below is described in greater detail in the sections following the overview, in the appendices of this document, and in the Clandestine Lab Contractors' Procedural Report[6] (Contractors' Report).

The processes in this list begin after gross removal has occurred. Gross removal includes the removal and disposal of bulk chemicals, equipment, and apparatus (hazardous wastes) that could be used to manufacture meth and typically occurs immediately following the seizure of a clandestine lab by law enforcement.

1) Secure the property to prevent unauthorized entry.
2) Hire a contractor.
3) Ventilate or "air out" the structure (e.g. open doors and windows; use fans, blowers, and/or a negative air unit with a high-efficiency particulate air (HEPA) filtration system and continue ventilating the structure during the remediation process.)
4) Perform a preliminary assessment using relevant documentation found in the Contractors' Report.
   a) Conduct an off-site evaluation.
   b) Conduct an on-site evaluation.
   c) Assess the need for pre-remediation samples.

[6] Clandestine Lab Contractors' Procedural Report is available at www.health.state.mn.us/divs/eh/meth/index.html

5) Develop a work plan using information from the preliminary assessment including a waste disposal plan.
6) Any materials or objects that will be disposed of should be discarded before cleaning begins. Notify the lead criminal investigator concerning meth related items discovered during this step.
7) Complete a precursory or "once-over" washing of the walls and floors to reduce heavy concentrations of contamination.
8) Clean and seal the heating, ventilation, and air conditioning (HVAC) system. Do not run this system again until all other cleanup is complete.
9) Flush plumbing traps, unless wastewater from the detergent-water washing process will be flushed through the plumbing system. In this case, wait to flush plumbing until all wastewater has been flushed.
10) Vacuum using a vacuum with a HEPA filter (a high efficiency particulate absorbing filter).
11) Use a detergent-water solution to wash ceilings, walls, floors, furniture, and other items that will be kept.
12) Paint or seal washed ceilings, walls, and floors.
13) Conduct post-remediation sampling.
14) Ventilate the structure once more after the remediation process and before it is re-inhabited.
15) Perform outdoor remediation activities.
16) Secure the property to prevent unauthorized entry.

## VII. CHEMICAL SAMPLING GUIDANCE

A. Methamphetamine Sampling

- Meth wipe samples are typically collected by wiping a wall or other surface with a solvent dampened wipe. Rayon/polyester or cotton general-purpose medical sponges and Whatman filter paper, wetted with methanol, are often used for surface wipes. For many building materials, the amount of meth removed by wipe collection from the surface is a small fraction of the total amount of meth present in the building material due to the material's surface texture and porosity.

Wipe sampling for meth should be representative of the extent of aerial dispersion on all levels of a structure. Wipe sampling should be done on non-porous (e.g., metal heat registers, ceiling fans) and horizontal surfaces that have not been cleaned. Due to the variability in analytical results from wipe sampling of building materials, this guidance recommends the best materials to sample as:

- Ceiling fan blades; top surface if unclean, bottom surface if fan blades appear clean.
- Enameled or painted metal, such as heat register vents and appliances.
- Metal or enameled metal high in the room.

- HVAC plenum - the cold air-return just before the furnace.

Wipe samples from vertical surfaces in the same area will have varied results. Minnesota research has shown that levels of meth contamination on vertical surfaces increase from floor to ceiling. When wipe sampling vertical or horizontal surfaces, wipe sampling is recommended to be done on surfaces located as high within the room as possible. For example, a sample from next to the ceiling would be preferable to a sample from head level.

In general, unclean horizontal surfaces such as counters, tables, and floors will have higher levels of meth and precursor chemicals due to spills during cooking, packaging, and use. In addition, horizontal surfaces are subject to fallout of meth that attaches to dust when meth is cooked.

It is recommended that post-remediation sampling be performed after sealing/painting of any surfaces has been completed. See the Interior Remediation section for detailed information on cleanup of surfaces.

- "Micro-vacuuming" is a non-destructive method for sampling porous building materials such as raw wood, brick, and unpainted cement block. Micro-vacuuming can also be used on carpeting but is less reliable for use on other fabrics.

Micro-vacuuming is believed to collect meth-contaminated dust and particles on building material and trapped by surface texture of porous materials. Although micro-vacuuming cannot be used to calculate the concentration of meth within the material, this sampling method detects the presence of meth on some materials more reliably than wipe sampling,

B. Other Chemical Sampling

- Corrosives: Commonly used corrosives include but are not limited to hydrochloric acid, sulfuric acid, sodium hydroxide, anhydrous ammonia, phosphoric acid, and muriatic acid. Surface pH testing during the assessment process is recommended and should provide reasonable assurance that common acids and bases are not present at levels posing a health hazard.
- Volatile Organic Chemicals (VOCs): Commonly used VOCs (solvents) include, but are not limited to, acetone, benzene, ether, freon, hexane, isopropanol, methanol, toluene, and xylene. VOC testing should be conducted in all rooms of the structure, to ensure the safety of workers as well as for assessment purposes and to verify remediation. VOC testing can also be used to detect sources of residual contamination, such as in heating vents, plumbing, and sewers.

- Phosphorus and Iodine: Removal of stained materials is the best means of remediating contamination involving red phosphorus, iodine crystals, and tincture of iodine. When removal of stained material is not a reasonable option (such as on a concrete floor), the surface can be power-washed, allowed to dry, and then sealed.
- Mercury and Lead: Lead and mercury have been present at past lab operations; however, the presence of lead and mercury is not common. Screening levels are included here in the event they may be needed and to raise awareness of their potential use. Typically, the processes (methods using phenyl-2-propanine (P2P) precursor) that used lead and mercuric compounds have been abandoned in favor of simpler methods using lithium or sodium metal, or red phosphorus and iodine. Lead and mercury testing should be limited to illicit drug laboratories where there is clear evidence or high suspicion of use of these metals.
- Sampling Protocols can be found in Appendices C1-4.

C. Analysis Results

Once samples have been analyzed, use Table 1 to determine the necessary action.

Table 1: Sampling Levels and Their Meaning in This Guidance

| **Chemical** | **Interpretation and/or Action Taken** |
|---|---|
| Methamphetamine | a) < 0.1µg/100cm$^2$: No remediation necessary. (see Section V, F) Note: this only applies if you meet the exclusion criteria of Section V, E.<br>b) ≥ 0.1 µg/100cm$^2$: Meth Lab – Full remediation of structures according to Guidance. (see Section V, F)<br>c) < 1.5 µg/100cm$^2$: Meth Use – No remediation necessary. (see Section VI, D)<br>d) ≥ 1.5 µg/100cm$^2$: Meth Lab, Post Remediation – Further remediation necessary. (see Section IX, R)<br>e) ≥ 1.5 µg/100cm$^2$: Meth Use – Remediation recommended. (see Section VI, D) |
| Corrosives | Clean to: pH 6-8 |
| Volatile Organic Compounds (solvents) | Clean to: <1 ppm total VOCs in air (Common error for Photoionization Detectors (PIDS) can be as much as +/- 5ppm) |
| Phosphorus / Iodine | Discard stained/affected material. |

| | |
|---|---|
| Mercury / Lead | Notify MDH or MPCA before proceeding with remediation or assessment:<br>a) Mercury: Clean to < 0.3 µg/$m^3$ (0.036 ppb) in air. [IRIS Reference Concentration for Chronic Inhalation Exposure RfC]<br>b) Lead: Clean to < 40 µg/$ft^2$ wipe sample. [EPA TSCA Section 403] |

D. Analytical Laboratory Requirements

Remediation contractors should use a certified analytic laboratory to assure local authorities that the sampling data are reliable. Analytic laboratories include those certified by the Minnesota Department of Health Public Health Laboratory, an equivalent state certification program from another state, or the US Environmental Protection Agency.

The sampling methods used by the contractor and the analysis methods used by the analytical laboratory must be accurate at 0.1 µg/100 $cm^2$.

## VIII. CONTRACTOR REQUIREMENTS

A. Contractor Training and Site Responsibilities

Minnesota law requires that a remediation contractor conduct meth lab assessment, sampling, and remediation. This guidance and the procedures outlined in the guidance are recommended by MDH for use by the contractor during the remediation process.

NOTE: Minnesota Department of Health (MDH) does not license, regulate, permit, or otherwise certify companies to conduct the cleanup of clandestine drug labs. MDH will maintain a list of contractors that claim to meet the requirements stated in this guidance, on our website at http://www.health.state.mn.us/divs/eh/meth/index.html, but cannot recommend or guarantee the work of any of these companies.

The Project Manager, the Site Supervisor, and workers will do a variety of tasks which require different levels of training, expertise, and personal protective equipment.

The contractor's Project Manager should be specifically named for each site and a qualified Project Manager will meet the training requirements listed in Appendix B, Contractor Qualifications and Information.

The Contractors' Report is recommended for documentation of the Project Manager's site activities. This document is available on the MDH website. The Contractors' Report is designed as a standardized form to record the assessment, remediation, and decisions made at a site. The local authority may or may not require use of this format.

The Project Manager should begin communication with the local authority early in the process of developing the work plan, so reporting and other requirements will be clear to all parties.

Duties that should be performed by the Project Manager are:

- Conduct preliminary site assessment activities.
- Prepare a pre-cleaning sampling plan, if requested by owner or local authority.
- Prepare a work plan.
- Prepare a health and safety plan.
- Make amendments to plans as required by the local health authority.
- Obtain any required permits.
- Deliver "Meth Lab Right-to-Know[7]" training to all workers on the site or ensure that all workers have had Meth Lab Right-to-Know training within the past 12 months.
- Complete and sign the Contractors' Report (if used).
- Submit a final report to the local authority.
- Retain the final report in the contractor's records for six years.[8]

Minnesota law requires that the contractor shall verify to the property owner and the local authority that the work was completed according to MDH guidance. That verification must be provided within five days from the completion of the work.

A Site Supervisor may work under the supervision of the Project Manager and a qualified Supervisor will meet the training requirements listed in Appendix B.

The Project Manager or a Site Supervisor should be present on the site when the following activities take place:

- Removal of remaining chemicals.
- Removal of plaster or drywall surfaces.
- Removal of wallpaper.
- Removal of carpet, furniture and other dust-raising activities.
- Scraping of textured or "popcorn" ceilings, removing tile or other ceilings.

[7] Meth Lab Right-to-Know training is intended to educate individuals working at a meth lab contaminated site to recognize and safely work with hazardous materials specific to a meth lab. The training should include but is not limited to: a) recognition, potential for harm, and handling of common meth chemicals, biological and physical hazards; b) sharps and pathogen briefing; and c) worksite hygiene.
[8] MN Statutes section 152.0275 Subdivision. 2, (f) holds the contractor liable for six years..

The Project Manager and Site Supervisor do not need to remain on site during cleaning or painting but one of them must inspect the site upon completion of either activity. Either the Project Manager, Site Supervisor, or a third party must perform all sampling.

The Project Manager or a Site Supervisor must inspect the dumpster, truck, roll-off box, or other container of structure contents and waste prior to the waste leaving the site. This inspection is to ensure that no hazardous chemicals, containers of anhydrous ammonia, or biohazards (sharps, etc.) are disposed of improperly. Either employee must also ensure that all furniture, clothes, carpeting, and other items disposed have been destroyed to prevent scavenging of these items.

A local authority may reject or require replacement of a Project Manager or Site Supervisor if the local authority makes a finding of:

- Criminal activity.
- Disregard for public health or the environment.
- Failure to comply with the requirements of this guidance or local ordinances.
- Disregard for and/or noncompliance with health, safety, or pollution rules or standards.
- Misrepresentation or falsification of sampling, figures, reports or data.
- Negligence, incompetence, or misconduct in the performance of duties.

The remediation process steps for a former meth lab site, the associated personnel requirements required for that activity, and recommendations for personal protective equipment (PPE) can be found in Appendix B.

### B. Owner-Assisted Reconstruction and Restoration

The property owner may only assist with approval by the contractor and the local authority. In such a case, the contractor’s work plan must specify work that can be completed by the property owner or his agent. The contractor and local authority must be in agreement about inspection of such work.

The property owner must receive basic meth lab right-to-know information before performing any on-site activities. This information should also be provided to any service provider who works on a site that has not yet been remediated. Basic meth right-to-know information for property owners and other workers who will be onsite for brief periods can be found in Appendix B.

The Property Owner may assist with painting or other reconstruction tasks after the professional contractor and crew have removed carpeting or other disposables, and washed structural surfaces (after Step 11 in Section VI, Subsection E).

C. Contractor's Work Plan

The Project Manager should prepare a work plan based on the findings of a pre-remediation assessment, as documented in the Contractors' Report or similar format. The contractor must submit the work plan to the local authority for review and possible modification and approval. The work plan should include:

- General site health and safety plan.
- Site entry plan, as needed.
- Location of property.
- Photographs and/or drawing of property including floor plans that indicate areas of contamination, damage, chemical storage areas, etc.
- Data from pre-cleaning samples, if presumption of contamination has been challenged.
- Property contents, proposed disposal, and cleaning plan of specific contents.
- Description of proposed decontamination procedures of structure and specific contents.
- Post-decontamination sampling locations and sampling methods to be used.
- Identification of analytical laboratory.
- Identification of waste disposal site(s).
- Timetable for remediation process.
- Identification of Project Manager and Site Supervisor, verification of their training, and notice of who will perform sampling.

# IX. INTERIOR REMEDIATION

A. Remediation Steps

The Contractors' Report or a similar format should be used to document remediation and assessment decisions and actions. The basic steps to clean a former meth lab structure are listed below and described further in the following text.

- Establish a lab Site Entry.
- Ventilate structure.
- Conduct a Preliminary Assessment.
- Air Quality: Perform air sampling before and after remediation.

- Plumbing and Sewer: Inspect plumbing and sanitary sewer; discard etched or stained fixtures; flush plumbing.
- Chemical Spills: Evaluate and clean chemical spills and residues.
- Porous Items: Remove and discard upholstered furniture, curtains, mattresses, paper items, and other porous contents including clothing which cannot be cleaned.
- Children’s Belongings: Remove clothing, toys, bedding, baby bottles and cups, and other personal items used by infants and small children.
- Porous Materials: Remove and discard carpeting, wallboard, suspended and attached ceiling tiles which cannot be cleaned.
- Optional Remediation: If local authority agrees, pre-sample, HEPA vacuum, then clean selected high-value, hard-surface items.
- Disposal: Dispose of all contaminated contents in a sanitary landfill.
- Precursory washing or "Once-Over" of surfaces.
- Structural Cleaning: (a) HEPA vacuum porous building materials such as concrete block, brick, raw wood studs, wooden floors, and all floors under removed carpeting. (b) Double wash with detergent and hot water, followed by a thorough rinse with clean water. Alternatively, concrete and raw wood can be steam cleaned with extraction.
- Area Segregation: After each room is cleaned, cordon off doors and openings to other rooms using (at least) 4-mil plastic sheeting to avoid recontamination.
- HVAC Cleaning: Clean heating, ventilation and air conditioning system. Replace filters after at the end of the remediation process.
- Encapsulation: Encapsulate residual contaminants with two coats of sealant. Paint should be sprayed and not brushed or rolled. Paint should be allowed to cure for the recommended time between coats.
- Septic: Empty septic tank if VOCs are present over recommended limits.
- Outdoors: Perform outdoor investigation and remediation.
- Final Ventilation.

B. Site Entry

A site entry plan is recommended and should specify equipment needs and procedural planning when hazards are believed to exist. The contractor should carefully consider the hazard potential from exposure to chemical residues, confined spaces, or other physical hazards before entering the site.

## C. Ventilation

Ventilation of the structure is recommended before, during, and after the remediation process except when ventilation may interfere with air sampling.

- Open all windows and use exhaust fans, blowers, or negative air machines for two days before and after cleaning.
- Take care that vented contaminants are not exhausted to air intakes of adjacent structures.
- In some cases, law enforcement personnel will have already ventilated the structure prior to conducting criminal investigation activity or the gross removal of chemicals.
- If the lab was sealed after these activities, ventilate the lab again before remediation occurs.
- Avoid operating the HVAC system during cleaning of the structure, while contents and carpets are being removed, and while structural surfaces and features are being washed and sealed with paint or other solvent-based coatings.
- Take care to provide adequate ventilation during sampling and painting.

A half-face cartridge respirator may be necessary during remediation under the following circumstances:

- If adequate ventilation cannot be achieved (e.g., in very cold weather).
- During the use of solvent cleaners or sampling materials.
- While removing carpeting and other highly contaminated materials.

## D. Preliminary Assessment

After the local authority has approved the Project Manager, the Project Manager should conduct a preliminary assessment of the property and all structures on the property.

- Property description (i.e., physical address, legal description (if possible), physical layout of the property, structural features, etc.).
- Copies of any law enforcement or other reports detailing illegal drug activity, materials removed from the property and materials' locations.
- Photographic documentation of the site.

- Record of:
  - apparent hazardous chemical use or storage areas,
  - apparent waste disposal areas,
  - presumed cooking areas identified by visible contamination or by law enforcement reports mentioning location of labs or lab equipment,
  - chemical stains, fire damage, other observable contamination/damage,
  - contamination information about surfaces, furnishings, appliances, and other features.
- Inspection of ventilation system.
- Inspection of plumbing, septic system, and sewer system.
- Identification of adjacent areas/units in multiple dwellings that may require cleaning.
- Identification and documentation of areas of contamination.
- Outdoor inspection for evidence of burn or trash pits, discolored soil, or dead vegetation, indicating possible contamination of water and/or soil.
- Inspection of well or city water connection.
- Identification of neighboring structures, wells, surface water, and other potential disposal locations within 250 feet of site.

E. Site-Type Considerations

The site of the lab, its structural characteristics, and potential future use must be considered when designing a remediation plan. Lab sites may be loosely categorized as follows:

- Private occupancy structure, e.g., single family home, apartment, or multiple dwelling.
- Licensed facility (residential or non-residential), e.g., hotel, motel, manufactured home park, restaurant, grocery store, child or adult foster care facilities, etc.
- Non-occupancy structure, e.g., garage (attached or unattached), barn, pole barn, tool shed, etc.
- Mobile residence, e.g., motor home, camper, or manufactured home.
- Other vehicle, e.g., van, bus, automobile, truck, boat, etc.
- Other lab sites that do not fall into any of the previous categories, e.g., tent, deer stand.

The following special considerations apply to site type and use:

- Private (e.g., apartment building) or public (e.g., motel) multiple dwellings require careful assessment when determining how much of a structure must be evacuated or cleaned. Adjacent rooms and common areas of multiple dwellings are presumed contaminated and must be cleaned, or sampled to rule out need for cleaning.
- Contamination of licensed facilities should be reported to the state or local agency involved in licensure. MDH regulates food, beverage, and lodging establishments such as hotels, motels, resorts, restaurants and youth camps. The Minnesota Department of Agriculture regulates grocery and convenience stores.
- Contractors who have performed cleanups on mobile residences warn that these structures contain many porous and absorbent materials and may be difficult and costly to remediate. Demolition should be considered. See the MPCA web site, http://search.pca.state.mn.us/query.html?charset=iso-8859-1&style=joomsearch1&col=newsite&qt=Demolition+requirements, for information on demolition requirements and how to dispose of demolition debris while meeting the requirements for hazardous waste.
- This guidance does permit remediation, with pre- and post-remediation sampling, of vehicles, if approved by the local authority. It has been demonstrated that remediation (which must usually include disposal of all upholstery and carpeting) often exceeds the value of the contaminated vehicle. Some Minnesota counties mandate demolition of vehicles.

*Summary Note: Some Conditions That May Affect Work Plan Decisions*

*Site History: Indications of severity of contamination, e.g., length of occupancy; real (chemicals or equipment) or anecdotal evidence (odors twice-weekly) gathered by law enforcement or provided by property owner, neighbors or occupants.*

*Site Use and Occupancy: Potential human (particularly child) exposure, e.g., site is a single-family home, hotel/motel, chicken coop, attached garage.*

*Sampling Intentions/Evidence: Location and number of samples taken or to be taken will affect ability to plan a modified remediation.*

*Proximity to Cooking or Storage Areas: Degree of apparent contamination, as indicated by police evidence, chemical staining, signs of fire or explosion, etc.*

F. Sampling for Exclusion of Structures or Portions of Structures

As stated earlier:

- The Local Authority will declare a property or portion of a property to be a meth lab (lab site).
- All rooms and all structures on a lab site are considered potentially contaminated.
- It is mandatory that all structures on the lab site must be remediated or pre-sampled to demonstrate that remediation is unnecessary (see Section V.E.)
- If full remediation of contents and structure is conducted as described below, sampling for meth before cleaning interiors of structures is not required.
- If the property owner does not wish to presume contamination, the owner must hire a contractor to perform a pre-cleaning assessment to demonstrate low or non-detectable meth levels in the part of the property in question (see Section V, F).
- The local authority can direct, or modify a proposed sampling plan, and can accept or reject use of a sampling method, sampling location(s), number of samples, or analytical laboratory to be used.

A pre-remediation sampling plan must clearly demonstrate consideration of the use, materials, and size of each room or structure to be sampled.

- A sufficient number of wipe samples should be taken appropriate to the use of the structure. For example, to demonstrate the absence of meth contamination will require at least one meth wipe sample collected from a high and unclean surface in each room of an occupancy structure and each area of an outbuilding.
- The sampling plan should include sampling of places and materials most likely to be contaminated with meth.

Personal belongings found in a former meth lab structure are presumed contaminated. Discard any visibly stained, odor-emitting, or damaged materials. Decide whether to clean or discard other items on a case-by-case basis using information from the preliminary assessment and a cost-benefit analysis.

Although there is no single determinant that can be used to decide which items should be discarded and which items can be cleaned and kept, consider the following during the decision-making process:

- Potential for Contact: Consider whether inhabitants of the structure are likely to come into contact with the item regularly (such as bedding). Discard

contaminated items with a high potential for human contact more readily than items with a low potential for human contact. Discard all items that children are likely to come into contact with (such as toys, bottles, etc.) as children may be especially vulnerable to hazardous substances used in manufacturing meth.

- Value: Consider the intrinsic or emotional value of the item. In some circumstances, items of high intrinsic or emotional value, such as wedding albums, may be salvaged.
- Porosity: Consider the porosity of the item or material. In general, porous items and materials are easily penetrated or permeated by hazardous gases, liquids, or residues. Non-porous surfaces are more resistant to this type of contamination. As a result, contamination is often located in porous items and on the surface of non-porous items. Thus, it is generally more difficult to eliminate contamination from porous items and materials.

Considering the potential for human contact, the intrinsic and emotional value, and the porosity of an item or material may help guide decisions as to whether the item or material should be discarded. For example, carpet should always be discarded because it has a high potential for human contact (especially since young children crawl on the floor), has relatively low intrinsic and emotional value, and is extremely porous and therefore difficult to successfully decontaminate.

## G. Indoor Air Quality

Indoor ambient air should be sampled before and after the process (or during the process as deemed necessary by the contractor) using a Photoionization Detector (PID) or similar instrument (see Appendix C.4).

- Initially, a sweep through the entire building should be made with an accurate record kept of all readings in every room.
- Each septic system drain (floor, tubs, sinks) should be tested with the PID to determine if any chemicals have accumulated in the drain trap.

## H. Plumbing

Plumbing should be tested for VOCs (including acetone, benzene, ether, freon, hexane, isopropanol, methanol, toluene, and xylene) during pre-remediation sampling.

- Meth chemicals are often poured down the drain during active cooking.
- Concentrations of the meth chemicals may remain in the traps of sinks and other drains.
- As a result, plumbing in structures may be compromised and require attention during remediation.

- VOC’s are often corrosive or flammable.
- By noting this during the preliminary assessment and taking the necessary steps for resolution, any attempts to pump out substances or remove traps should not lead to chemical exposure or serious injury.

Visibly contaminated (etched or stained) sinks, bathtubs, and toilets should be removed and properly disposed of, as they are difficult to clean. Porcelain and stainless steel, unless pitted or damaged, may be cleaned in the same manner as other hard, non-porous surfaces.

When staining is noted around sinks, toilets, or tubs, or if a strong chemical odor is coming from household plumbing, the plumbing system should be flushed with generous amounts of water to reduce the concentration of residual chemicals.

- All plumbing traps should be flushed when wastewater from detergent-water washing is not disposed of in the plumbing system (e.g., down sinks, bathtubs, or toilets) at the beginning of the remediation of plumbing fixtures.
- If wastewater from detergent-water washing is disposed of down drains within the structure, the system should be flushed after remediation.

I. Sanitary Sewer/Septic

Meth lab waste chemicals discarded in sewer systems are generally flushed from the system within minutes or hours of disposal. However, chemicals may remain in the system longer if connections are on a line of very low flow. It should be noted if the flow line is low during the preliminary assessment.

Large volumes of meth lab wastes can pose a problem if they are flushed and end up in a septic system. If there is evidence that meth lab wastes may have been disposed of into the septic system, field screening of the septic tank should be performed.

Evidence of waste disposal may include, but is not limited to witness statements; stained or etched sinks, bathtubs, or toilets; chemical odors coming from plumbing or septic tank; visual observations of unusual conditions within the tank (dead tank); or stressed or dead vegetation in a drain field.

If the sanitary drains from a property do not connect to a sanitary sewer nor empty into a septic tank, call the local oversight authority for determination of the wastewater fate based on site location (e.g., near wetlands, waterways). Include assessment of the drain field in the exterior evaluation and remediation.

If wastewater from the remediation process will be disposed of in the sewer/septic system, the system should not be flushed until remediation is complete and wastewater has been disposed of.

Sewer/septic systems should never be pumped if they contain VOCs. The sample results for VOCs will determine the proper course of action. Disposal of contaminated material, if required, should comply with local, state, and federal disposal requirements. Wastewater sampling from septic tanks may be appropriate in order to characterize waste while using methods that minimize VOC losses.

J. Evaluation of Chemical Spills

All food preparation counter-tops, stained materials, powders, and liquids throughout the structure should be pH tested (see Appendix C.3) to determine their corrosivity. An accurate record of findings should be made.

- Acids should be neutralized with sodium bicarbonate (baking soda); and bases with weakly acidic wash solutions (e.g., vinegar, citric or acetic acid).
- Solids can be scooped up and packaged for proper waste disposal.
- Liquids can be absorbed with clay or another non-reactive material and packaged for proper waste disposal.
- Badly stained or contaminated materials should be removed and discarded.

Litmus (pH) paper should be used to check a surface after neutralization.

K. Structure Contents and Furnishings

Contents of a contaminated structure are presumed contaminated and should be disposed of. Decisions regarding alternatives to disposal should include the value of the item and potential for future human contact.

Table 2: Value and Contact Potential Evaluations

| | |
|---|---|
| **High Value – High Contact Items**<br>E.g., Mattresses, carpeting, large upholstered items should almost always be discarded.<br>(See exceptions in text.) | **High Value – Low Contact Items**<br>E.g., In some circumstances, photographs may be salvaged without cleaning, or large appliances may be cleaned and saved. |
| **Low Value – High Contact Items**<br>E.g., clothing, plastic toys and toothbrush should always be discarded.<br>(See exceptions in text.) | **Low Value – Low Contact Items**<br>E.g., A screw driver, garden rake or other metal or hard material item may be cleaned in some circumstances. |

Household contents and guidance for their disposition are listed below. This list is not exhaustive. Recommendations for household contents are divided into three categories:

- **Always Discard**
- **Disposal Strongly Recommended**
- **Disposal Recommended**

Recommendations by Item:

- Infants' and Small Children's Clothes, Toys and Personal Items:

  **Always Discard.**

  Exceptions: Metal or other hard medical devices such as glasses or orthopedic devices that can be cleaned may be exempted at the discretion of the local authority and in consultation with the contractor regarding remediation options.

- Clothing and Other Fabrics:

  **Disposal Strongly Recommended.**

  - Discard clothing or fabrics with visible staining or contamination. It is believed that machine-washable clothing may be safely cleaned in a washing machine. If a washing machine is used to wash potentially contaminated fabric, wash items twice, and run an empty load before using the washing machine again.
  - Discard non-machine-washable fabrics in a manner that prevents reuse. Exceptions may be made in some cases for items of intrinsic value, such as a wedding dress, if the owner understands and accepts the risk associated with keeping it. Do not dry-clean items, as it could contaminate other people's clothing.

- Mattresses, Infant and Children:

  **Always Discard.**

- Mattresses, Adult:

  **Disposal Strongly Recommended.**

  Exceptions: When pre-remediation samples show low levels of meth in the structure, a mattress that is far removed from the area of cooking can be sampled to avoid disposal. The local authority must approve this action.

- Carpeting:

  **Always Discard.**

  Remove all carpets and discard them in a manner that prevents reuse. Do not HEPA-vacuum, steam-clean, or shampoo carpets.

- Dishes, Flatware, and other Hard Non-Porous Household Goods:

  **Disposal Recommended**.

  Exceptions: With approval of the local authority and with reasonable assurance that the work will be done, hard (non-porous) household items such as glazed ceramics, metals, and glass may be twice-washed and rinsed using detergent and hot water. Any item that shows evidence of use for meth cooking (e.g. acid etching, chemical staining) must be discarded.

- Countertops:

  **Disposal Strongly Recommended.**

  Explanations and exceptions:

  - All countertops with visible signs of contamination such as staining, odor emission, or etching should be discarded.
  - Countertops made of porous materials such as wood should be discarded;
  - Countertops made of solid materials can be sanded down and washed with a detergent-water solution;
  - Countertops made of stone, stone tile, or ceramic material can be resurfaced. The grout, if any, on these countertops should be removed and the surface re-grouted. If these countertops are not resurfaced they should be discarded.
  - Countertops made of stainless steel can be washed with a detergent-water solution.

- Large Wooden and other Hard Furniture Items, Including Metal, Glass and Aluminum:

  **Disposal Recommended.**

  Exceptions: Attempts can be made to wash large, hard furniture items (e.g., non-plastic, wooden, chrome or aluminum). These items should be washed twice with detergent and hot water followed by thorough rinsing. After cleaning, wipe sample with methanol surfaces that will be touched, such as a dresser drawer face or chair seat. Exterior surface must be <1.5 µg/100 $cm^2$ methamphetamine after cleaning.

- Leather or Fabric Upholstered Furniture:

  **Disposal Strongly Recommended.**

  Exceptions: Irreplaceable or very high-value items may be stripped of padding and upholstery and cleaned as hard furniture. After cleaning, wipe sample with methanol surfaces that will be touched, such as a dresser drawer face or chair seat.

- Plastic Furniture and Large Plastic Goods:

  **Always Discard.**

- Paper Items/Books:

  **Always Discard.**

  Exceptions: Important legal papers, historical items, or personal photographs may be exempted at the discretion of the local authority and in consultation with the contractor.

- Appliances:

  **Disposal Recommended.**

  Exceptions: Discard all appliances, electronics, and tools that show visible signs of contamination in a manner to prevent reuse (i.e., salvaging). Also, dispose of large and small appliances that could have been used in the production of meth or storage of meth products (such as refrigerators, stoves, ovens, microwaves, hotplates, toaster ovens, coffee makers, etc.).

  At the discretion of the local authority, high-value, low-contact appliances, tools, and electronics can be washed twice with a hot detergent solution and clean rinse water, or cleaned by alcohol wiping (use adequate ventilation). Exterior surface must be <1.5 µg/100 $cm^2$ methamphetamine after cleaning.

- Electrical Fixtures:

  **Always Discard.**

  All electrical outlet covers, wall switch plate covers, and lighting fixtures should be disposed of and replaced. These items are low in cost, tend to be high collection points for meth, and have great potential for repeated human contact.

## L. Precursory Washing or "Once-Over"

After all materials and items that will not be cleaned have been disposed of and the structure has been HEPA-vacuumed, conduct a precursory washing or "once-over" of the walls and floors, to cut contamination, using a detergent-water solution.

Conducting a "once-over" will not only help to ensure the safety of those who enter the structure (e.g., contractors and subcontractors), but it will also lessen the possibility that floor contamination will re-contaminate other areas of the structure later in the remediation process.

## M. Structural Features and Surfaces

Acoustic ceiling tiles, suspended or attached, should be removed for disposal. "Popcorn" ceilings may contain asbestos. A licensed asbestos inspector must collect and submit samples of the ceiling "popcorn" for asbestos testing. If asbestos is present and the ceiling is intact, the best option is to leave the ceiling in place and seal with a sprayed-on asbestos-encapsulating product. Sealing will also satisfy meth remediation

requirements. More information on asbestos abatement can be found at: http://www.health.state.mn.us/divs/eh/asbestos/homeowner/index.html

Walls, floors, and ceilings without "popcorn" texture should be double washed with hot water and detergent and rinsed with clean water to remove surface meth and prepare for painting or sealing.

- Washing should include frequent changes to fresh cloth rags and detergent solutions, and rinsing of the surface with clean rags and fresh water.
- Capture of all cleaning and rinsing solutions from the surface being cleaned is critical to remove meth.
- Wash waters can be disposed of in a sanitary sewer or in a functioning septic tank/drainfield system.

Any surface with stains should be considered contaminated and removed. Staining occurs most frequently with the Red P method. However, both the anhydrous ammonia and Red P methods use corrosive agents that can cause staining or etching of surfaces.

Hard, non-porous, smooth structural furnishings such as bathtubs, mirrors, windows, and doorframes should also be washed twice with hot detergent solution and water rinsed.

Painted and unpainted cement and cement block may be power washed. Be sure to collect the wash water. The wet vacuum used for collection must be decontaminated after use. Alternatively, steam clean the material with extraction of the cleaning solution.

Brick and raw wood are difficult to wet clean as the materials absorb the cleaning solutions. Oxidizing cleaners (such as oxygen bleach) may be most effective on these porous materials.

## N. Waste Characterization and Disposal

Report all meth-making chemical equipment or waste, including precursor pharmaceuticals, drug cooking or use paraphernalia, non-empty containers of potential precursor chemicals, sludge containers, suspicious propane cylinders or fire extinguishers, and other potential evidence to the lead criminal investigator.

The contractor may prepare household hazardous waste for safe transport to the local household hazardous waste (HHW) program. The contractor should contact the local HHW program for information on safe transport and pre-approval of materials from a clandestine lab property. If approval is not granted, the materials must be managed as hazardous waste.

Contaminated structural materials, household furnishings, and personal property may be handled as municipal solid waste. Materials may be disposed of in a properly permitted sanitary landfill or waste-to-energy facility. All furniture, carpeting, clothing, and personal property should be cut apart or otherwise rendered unattractive to scavenging.

The gloves, cartridge respirators, protective clothing and other Personal Protective Equipment, and cleaning materials used at a site may be disposed of as municipal solid waste.

Wash and rinse waters may be disposed to a municipal wastewater collection system or into a properly functioning septic system. Pump and dispose of septic tank contents at a permitted wastewater treatment or permitted sewage disposal facility after cleaning of the structure(s) is completed.

All structures that are to be demolished in lieu of cleaning should be carefully inspected for meth lab materials and hazardous materials. Normal demolition and disposal rules apply. In all cases, a property owner is responsible for assessment and proper removal and disposal of asbestos, lead, and mercury containing materials. For more details, see the "Pre-Demolition Environmental Checklist and Guide" on the MPCA website at: http://www.pca.state.mn.us/publications/w-sw4-20.pdf

O. Heating Ventilation and Air Cooling Forced Air System

If a meth lab is located in a structure with an HVAC system, HVAC systems should be shut down and remain off until cleaned.

- Fumes, dust, and other contaminants are expected to have collected in the vents, ductwork, filters, and on walls and ceilings near the ventilation ducts.
- HVAC systems can service several different areas in multi-unit structures (e.g., apartments, storage units), allowing contamination to be spread throughout the structure.
- Sampling should be conducted in all areas/rooms/units serviced by the HVAC system to determine the spread of contamination.

Contractors who specialize in cleaning ventilation systems—or who have experience cleaning ventilation systems in former meth labs—should be used to clean HVAC systems. These contractors have specialized tools and training to ensure thorough cleanup.

Not all ventilation system ducts can be cleaned. Some examples are:

- Ducts which are lined with fiberglass which, if damaged during cleaning, can release fiberglass into living areas.

- Flexible ductwork frequently has a porous inner surface and in most cases cannot be economically cleaned. For this reason, it should be discarded and then replaced after the remainder of the ventilation system is cleaned.

If it is determined that the HVAC system can be cleaned, it should be cleaned early in the remediation process and after the "once-over" cleaning has been conducted. After cleaning, the HVAC system should be sealed at all openings to prevent potential recontamination.

There are several techniques/tools used for cleaning ventilation systems, such as pneumatic or electrical agitators that agitate debris into an airborne state, brushes, air lances, air nozzles, power washers, or HEPA vacuuming followed by washing with detergent-water solutions.

Controlling moisture in ventilation systems is one of the most effective ways to prevent biological growth (such as mold). Therefore, if wet cleaning methods are used (with a detergent-water solution or power washing), ventilation systems need to be checked to ensure they have thoroughly dried.

Cleaning methods should be left to the discretion of ventilation contractors at each lab. Appendix D lists the steps commonly used by contractors. Experts agree, however, that no chemicals should be added to either break down meth or disinfect ducts.

The first few minutes of system restart after cleaning is usually when the greatest amount of dust is released. Therefore, after remediation is completed, restart the ventilation system with the windows open so that any dust that is released will have a chance to be moved out of the structure.

## P. Encapsulation

Walls, ceilings, floors, and woodwork must be coated with paint or polyurethane after cleaning to isolate remaining meth.

- Apply at least two coats of high quality paint or polyurethane.
- A primer coat will improve adhesion of the second coat of sealant.
- Paint should be sprayed and not brushed or rolled.
- The first coat must be allowed to cure per the product recommendation before applying second and third coats.
- Oil, urethane, and epoxy products may provide a superior encapsulation to latex products, but these products require more care and ventilation to apply than do latex products. Glossy latex paint may provide superior encapsulation to semi-gloss or flat latex.

Sealing of cement, raw wood, brick or other porous materials is required in living spaces and recommended in other locations.

## Q. Garages, Outbuildings, and Non-Occupancy Structures

Unoccupied structures on the property or portion of the property declared as a meth lab site must be remediated unless excluded based on sampling (see Section V, F). Unoccupied structures can, and often do, become occupied structures. A tool shed can easily become a child's play house when new tenants move in. Many times, it may be cheaper to demolish an unoccupied structure than to remediate the structure.

The contents of unoccupied structures must be handled in the same manner as an occupied structure.

Many unoccupied structures will present special problems such as:

- Dirt Floors: When there is a dirt floor in the building, remediation must be based on assessment. In some cases, it may be necessary to scrape and dispose of an inch or more of the dirt floor.
- Unfinished Surfaces: Because of the large amount of exposed or raw building materials in unoccupied structures, normal washing methods may not be the best option. In these cases:
  - Power wash surfaces if possible.
  - Hand wash surfaces that cannot be power washed but can be hand washed.
  - HEPA vacuum surfaces that cannot be washed.
  - Seal surfaces with an appropriate product for the type of building material.

## R. Confirmation of Interior Remediation

The local authority may inspect a property after remediation to verify cleaning and sealing of interior surfaces. The local authority may accept the Contractors Report and the appearance of new carpeting and fresh-appearing paint as evidence of carpet removal and wall/ceiling painting.

Post remediation sampling for methamphetamine is necessary to show that surfaces are ≤1.5 µg/100 $cm^2$. Local jurisdictions may consider third-party confirmation sampling of all remediation, at their discretion or according to local ordinance.

S. Burning a Meth-Contaminated Structure

Burning a meth-contaminated structure for fire service training in lieu of remediation is strongly discouraged. The safety of firefighters entering a former meth lab structure and the effectiveness of decontamination of firefighter equipment cannot be assured.

In all cases of a practice or training burn, the burn must be done in accordance with demolition and asbestos regulations.

A Department of Natural Resources (DNR) burn permit must be obtained prior to a training or practice burn.

## X. EXTERIOR EVALUATION AND REMEDIATION

This portion of the Guidance has been written and will be maintained by the Minnesota Pollution Control Agency. For assessment and remediation information related to the following topics, see http://www.pca.state.mn.us/cleanup/meth.html

A. Groundwater
B. Wells
C. Surface Water
D. Burn Pits, Burial Pits, and Other Disposal Sites
E. Media Assessment and Documentation
F. Contaminated Soil Disposal

## XI. FINAL REPORT AND CLEARANCE

The contractor must verify to the property owner and the local authority that the interior and exterior assessment and remediation work was completed according to MDH guidance and agreements with the local authority. That verification must be provided within five days from the completion of the work.

The final report must provide documentation of decisions made and work completed, including any receipts, laboratory reports, photographs, site maps, and diagrams required by the local authority.

The work at a site is not considered closed until the local authority has approved the final report.

If the work was not completed in accordance to the model guidance and agreements with the local authority, the contractor is liable to the property owner for additional remediation costs and attorney fees for six years after verification.

At the time that a clandestine lab is discovered, the local authority is required to "record with the county recorder or registrar of titles an affidavit with property owner name,

property description and a map showing the location, condition, and circumstances of the clandestine lab." A second affidavit may be filed when the remediation is complete.

Finally, before signing an agreement to sell or transfer the property, the seller must disclose in writing to the buyer that the property has been a meth lab or dump site and must disclose the status of the remediation.

# GLOSSARY

(As it pertains to Methamphetamine Guidance Documents)

**Absorption**: The process of taking in. For a person or an animal, absorption is the process of a substance getting into the body through the eyes, skin, stomach, intestines, or lungs.

**Acidic**: The condition of any media that contains a sufficient amount of acid substances to lower the pH below 7.0.

**Acute Effect**: An immediate response to a contaminant that may consist of shortness of breath, cough, chest pain, dizziness, lack of coordination, chemical irritation, and burns to the skin, eyes, mouth and nose, and in severe cases, death.

**Acute Exposure**: An exposure over a relatively short period of time (minutes, hours) that may result in health effects. An acute exposure to high levels of contaminants found in methamphetamine labs may cause acute effects, which can occur during or immediately after a drug bust, before the lab has been properly ventilated. Also, latent effects may occur following acute exposure.

**Adverse Health Effect**: A change in body functions or cell structure that might indicate or lead to disease or health problems.

**Air Hose**: Tubing used to transport air.

**Airborne Particulates**: Small particles of material suspended in air. Airborne Particulates are easily inhaled and absorbed by the respiratory system. Sources of Airborne Particulates include dust, combustion products associated with motor vehicle or non-road engine exhausts, emissions from industrial processes, combustion products from the burning of wood and coal, and reactions of gases in the atmosphere.

**Ambient Air**: Any unconfined portion of the atmosphere: open air, surrounding air.

**Amphetamines**: Amphetamines are stimulants or "uppers" – which can be manufactured in legal and illegal labs. Amphetamines stimulate the users' central nervous system with a sense of well-being and higher energy which results in fewer social inhibitions and feelings of cleverness, competence, and power. The term "amphetamine" refers to a large class of stimulants: amphetamines (black beauties, white bennies), dextroamphetamines (dexies, beans), and methamphetamines (crank, meth, crystal, speed). They can be taken orally, injected, smoked, or snorted. Chronic use can cause paranoia, picking at the skin, auditory and visual hallucinations, and extremely violent and erratic behavior. Amphetamines are addictive.

**Anhydrous Ammonia**: A chemical extensively used as farm fertilizer but is also an ingredient in the production of meth, which can cause severe chemical burns on the skin.

**Asbestos**: Material used for fireproofing, electrical insulation, building materials, brake linings, and chemical filters; the material is used to insulate homes and it can be very dangerous to your health if disturbed.

**Background Level**: An average or expected amount of a substance in a specific environment or, typical amounts of substances that occur naturally in an environment. Methamphetamine is not a naturally occurring substance and the background level in a residence should be zero if no manufacturing or smoking of the substance happened at the residence.

**BCA**: Minnesota Bureau of Criminal Apprehension

**Chronic Exposure**: Chronic exposure occurs over an extended period of time, such as months or years. A chronic health effect is one that usually appears after a lengthy period of time, possibly years. Not much is known about the chronic health effects from these labs. However, there is scientific evidence from animal and human toxicity studies that shows the chemicals used in the manufacture of this drug can cause a range of health effects. These include cancer, damage to the brain, liver and kidneys, birth defects, and reproductive problems, such as miscarriages.

**Clandestine Drug Lab Operation**: The unlawful manufacture or attempt to manufacture a controlled substance within any area of a structure such as a dwelling, building, motor vehicle, trailer, boat, or other appliance.

**Clandestine Drug Lab Site**: Any part(s) of a property such as a dwelling, building, motor vehicle, trailer, or appliance occupied or affected by conditions and/or chemicals, typically associated with a clandestine drug lab operation.

**Cleanup**: Proper removal or containment of substances hazardous to humans or the environment at a chemical investigation site. Cleanup refers to two specific parts: Gross removal occurs when a meth lab is identified and seized by law enforcement, and bulk chemicals, equipment and wastes are removed by a hazardous waste contractor under contract with the DEA or paid by a local agency. Remediation refers to the cleaning and containment of residual contamination that exists after the bulk removal of chemicals and chemical wastes.

**Concentration**: Amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

**Confined Space**: A space that is large enough and arranged so that an individual can physically enter and perform assigned work, and has limited or restricted means of entry or exit, and is not designed for human occupancy.

A Permit Required Confined Space:

- has or may have the potential to develop a hazardous atmosphere, or
- contains materials that could engulf entrants, or
- has a shape that may entrap entrants, or
- contains any serious safety or health hazards.

**Contaminant**: A substance that is either present in an environment where it does not belong or is present at levels that might cause adverse health effects.

**Controlled Substance**: A drug, substance, or immediate precursor in Schedule I.

**Cook**: A slang term for the process of manufacturing methamphetamine and other illegal substances or the person(s) responsible for manufacturing methamphetamine or other illegal substances.

**Corrosive**: A substance having the capability or tendency to deteriorate metals by oxidation or chemical action. Chemicals used in the manufacturing of methamphetamine may be corrosive in nature.

**DEA**: Drug Enforcement Agency.

**Dermal Contact**: Touching of/by the skin.

**Encapsulation**: Act of surrounding, protecting, or sheathing a building material, by applying paint or other sealant. This process is part of the remediation aspect of the cleanup.

**EPA**: United States Environmental Protection Agency (USEPA).

**Exposure**: Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be acute or chronic.

**Exposure Pathway**: The route a substance takes from its source to the affected area. Or the route by which people can come into contact with a chemical.

**Flammable**: Ability of a substance to easily ignite or burn rapidly.

**Groundwater**: Water beneath the earth's surface in the spaces between soil particles and between rock surfaces.

**Hazard**: A source of potential harm from past, current, or future exposures.

**Hazardous Waste**: Potentially harmful substances that have been released or discarded into the environment.

**Hazardous Waste Operator (HAZWOPER) training**: A 40-hour course required by OSHA to enter and work within an area defined as a hazardous waste site. Cleanup contractors are required to obtain this training and update it annually prior to entering a lab.

**HVAC**: Heating, Ventilation and Air Conditioning system.

**HEPA**: High-Efficiency Particulate Air Filtration System.

I**ngestion**: The intake of a chemical through the digestive system.

**Inhalation**: The intake of a chemical through the respiratory system.

**Latent Health Effect**: A disease or an injury that happens as a result of exposures that occurred in the past.

**Licensed Facility:** Facility, residential or non-residential: hotel, motel, mobile home park, restaurant, grocery store, child or adult foster care facilities, etc.

**Methamphetamine (Meth)**: Methamphetamine is a member of the amphetamine family. It is highly addictive and is associated with more severe health effects than other amphetamines.

**MDH**: Minnesota Department of Health

**MPCA**: Minnesota Pollution Control Agency

**Neutralization**: The act of rendering a substance neutral (pH = 7.0).

**Non-porous**: Material that does not contain holes or pores, usually a hard surface.

**Non-volatile**: Substances that do not readily evaporate at normal temperatures and pressures.

**OSHA:** Occupational Safety and Health Agency

**Owner**: Any person, firm, or corporation who owns, in whole or in part, the land or structures, such as buildings, motor vehicle, trailer, boat or other appliance, at a clandestine drug lab site.

**Parts per million (ppm)**: A unit of concentration of a measured substance, which is equal to 1 mg/L of water.

**Personal Protection Equipment (PPE)**: Specific equipment used to protect the wearer from the hazards involved with the removal and remediation of methamphetamine and other chemicals found at a clandestine drug lab site.

**pH Paper**: Sampling device used to test acidity of a solution, powder, or residue.

**Photoionization Detector (PID)**: A device used for the detection of VOCs, which utilizes ultraviolet light to ionize gas molecules.

**Population**: A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

**Porous**: Material that contains holes or pores.

**Precursor**: A substance from which another substance is formed. In meth-related areas, precursors are any compounds or mixtures containing ephedrine or pseudoephedrine. Those two drugs are precursors to methamphetamine.

**Private, residential property**: Single family home, apartment or multiple family unit or dwelling.

**Public Health Nuisance**: Pursuant to Minnesota Statute 145A.02, Subdivision 17, any activity or failure to act that adversely affects the public health.

**'Red P' – Red Phosphorus**: Ingredient that can be used in the manufacture of meth; the strike plate on a book of matches is a frequently used source of red phosphorus.

**Release**: The spilling, leaking, or discharging of a hazardous substance into the air, soil, surface water, or ground water.

**Remediation**: The removal or neutralizing of residues and chemicals from a clandestine drug lab. Remediation may require some or all of the following steps: assessment, evaluation, testing, venting, detergent scrubbing, encapsulation, or demolition.

**Removal**: The act of elimination, transfer, or withdrawal of a substance from a location.

**Residues**: Contamination that remains at a site after cleanup has been completed. Contaminants may be left behind at a site if the concentrations are too low to cause harm, or if it is not cost-effective to remove all of the contaminants and the risks are deemed minimal.

**Respirator**: A device designed to protect the wearer from inhalation of harmful atmospheres or air containing harmful chemicals and particulates.

**Risk**: The probability that something may cause injury or harm.

**Route of Exposure**: Way people come into contact with a hazardous substance. Three common routes of environmental exposure are inhalation, ingestion, or dermal contact.

**Sample**: Taking a small piece or portion for analysis. Results of analysis of samples are used to infer the status of the whole.

**Semi-volatile**: Substances that slowly evaporate at normal temperatures and/or pressures.

**Septic System**: A small scale, typically private waste management system. Most often used for homes/facilities in rural areas, the system usually contains a settling tank and a drainfield, which may cause groundwater contamination if not working properly.

**Solvent**: A liquid capable of dissolving or dispersing another substance (for example, acetone, methanol, or mineral spirits). Exposure to solvents can irritate the skin, mucous membranes, respiratory tract, and cause adverse effects on the central nervous system.

**Source of Contamination**: The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A source of contamination may be the first part of an exposure pathway.

**Structure**: A dwelling, building, motor vehicle, trailer, boat, or other appliance.

- Non-occupied (Non-occupancy) Structure: A structure, where occupants will not be exposed to substances due to the open-aired design of the structure or the inability to stay for long durations within the structure. These structures include but are not limited to barns, pole barns, silos, and chicken coops.

- Occupied (Occupancy) Structure: A structure, where people live, work, or play. These structures include but are not limited to a residential structure, such as a house, apartment, hotel room, or manufactured home; a children's fort or playhouse; daycare center; nursing home; supermarket; or gas station. Any structure that is attached to an occupancy structure is considered part of that structure. Any structure that, in the future, might be converted to an occupancy structure should be cleaned as such.

**Substance**: A material of a particular kind or chemical constitution that is deemed harmful and usually subject to legal restriction.

**Surface Water**: Water on the surface of the earth, such as in lakes, rivers, streams, and ponds.

**Surrogate**: A chemical chosen to represent other chemicals. Examination of the surrogate chemical substitutes for examination of the other chemicals.

**Toxic Agent**: Chemical or physical (for example, radiation, heat, cold, microwaves) agents, which under certain circumstances of exposure, may cause adverse health effects to living organisms.

**Vapor**: The gaseous phase of a substance that is normally liquid or solid. Some hazardous substances can vaporize (become vapor) while in the soil or groundwater, filling air spaces in the soil or intruding into overlying buildings.

**Ventilation**: To circulate air, typically replacing stale or noxious air with fresh air. This is a viable first step in the remediation process.

**Volatile**: Evaporating readily at normal temperatures and pressures. Volatile substances can be readily vaporized.

**Volatile Organic Compounds (VOCs)**: Organic compounds that evaporate readily into the air. VOCs include substances such as benzene and toluene, which can be used in the manufacturing of methamphetamine.

# APPENDIX A. METH MANUFACTURING PROCESSES AND COMMON MANUFACTURING CHEMICALS

In Minnesota, the majority of known methamphetamine labs have used the Anhydrous Ammonia method. (See Figure A, Methamphetamine Manufacturing Processes.) These labs are able to produce small quantities of meth in a short period of time, earning these operations the name 'user labs'. This process involves the extraction of ephedrine or pseudoephedrine from various pharmaceutical products with organic solvents. Once extracted, the ephedrine or pseudoephedrine is reduced using lithium or sodium metal in anhydrous ammonia to create methamphetamine base. Subsequent acidification with hydrochloric acid generates the desired methamphetamine-hydrochloride (HCl) product – a process referred to as 'salting out'.

Specific hazards presented by an anhydrous ammonia lab while cooking include flammability, irritation, toxicity, and oxygen deprivation created by the concentrated ammonia atmospheres. In addition, lithium and sodium metals are extremely corrosive and react violently with water resulting in a fire or explosion.

The other common method is the Red Phosphorous method (commonly called the 'Red P' method). This production method also uses extracted ephedrine or pseudoephedrine as their chemical precursor. However, in this method, the reduction of ephedrine or pseudoephedrine occurs through a series of chemical substitutions using hydriodic acid and red phosphorus. Due to the nature of this chemical process, the 'Red P' method often generates more side products and impurities that increase the production hazards. Like the anhydrous ammonia method, the final methamphetamine-HCl collection step involves a 'salting out' process with hydrogen chloride gas.

Specific hazards presented by a 'Red P' lab while cooking include the production of phosphine gas which is flammable, explosive, and a respiratory tract irritant, the risk of red phosphorus converting to yellow (or white) phosphorus which can ignite spontaneously in moist air, and the acutely corrosive atmospheres due to the use of acids and sodium hydroxide.

Since 2009, the 'Shake and Bake' or 'One Pot' method has been gaining popularity across the country. This method uses a 2 liter soda bottle to hold all of the chemicals. Ammonium Nitrate is mixed with the Pseudoephedrine in a solvent. Lithium is added. Then Sodium Hydroxide is added to cause the chemical reactions. Similar to the previous two methods the final step in the 'Shake and Bake' method involves a 'salting out' process with hydrogen chloride.

The ‘Shake and Bake’ method has a large risk of flash fires if the bottle is not burped correctly. Because the cook is in physical contact with the bottle, severe burns often occur.

The 'cooking' of methamphetamine (meth) can involve a large variety of chemical reagents depending on the specific method of manufacture. In general, the process involves precursor reagents, organic solvents, and reactive reagents that facilitate the conversion of the precursor into methamphetamine. The chemicals used are typically purchased, stolen, or illegally manufactured. Even though many of these chemicals are commonly found in households and can be 'safe' if used appropriately, their inherent dangers are exacerbated when used inappropriately or in combination with other chemicals during the meth production process. Improper storage and disposal of these chemicals and mixtures also creates hazards.

Exposures and health concerns are greatest during the cooking processes. The levels of airborne chemicals vary greatly with the different cooking methods, the specific chemicals used, the scale of the production, the size of the room or structure, and the ventilation of the cooking area. General concerns include the risk of fires or explosions due to usage of flammable solvents, respiratory difficulties from breathing toxic or corrosive vapors, and skin irritations from strongly acidic and basic solutions. Chronic exposure to methamphetamine production may cause long-term health problems. Drug paraphernalia such as needles present possible exposure to infectious agents such as HIV and Hepatitis B.

After the cooking process has stopped, most of the hazards decrease. In addition, proper removal of the production wastes and bulk chemical supplies eliminates many of the risks associated with clandestine methamphetamine labs. Volatile chemicals and solvents, such as ammonia, methanol, ether, or acetone, will move into air and will be readily removed from the structure by ventilation.

However, some residual contamination created from repeated 'cooks' can persist long after all production has ceased. Semi- or non-volatile production chemicals such as acids, bases, and other corrosives, precursor chemicals, and products used or created in the manufacturing processes are more persistent. These residual chemicals can be volatilized or aerosolized during the cooking process and deposit onto surfaces and into materials (such as carpeting, fabrics, and building structure materials). Methamphetamine can be found on most surfaces, building materials, and home furnishings of a clandestine lab.

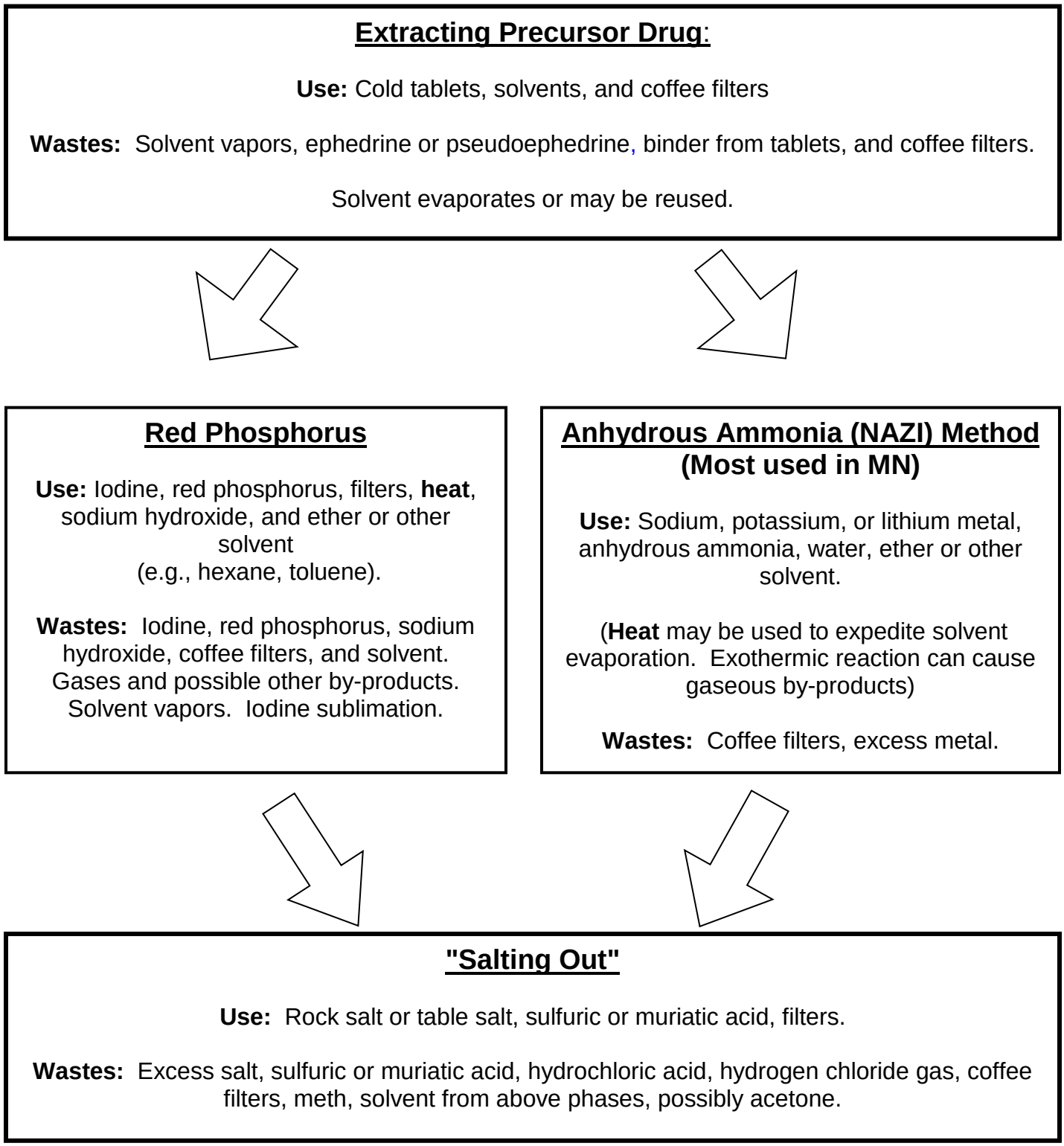
At this time, it is unknown if methamphetamine re-volatizes after initial deposition. Methamphetamine and other fine particle contaminates can be aerosolized and dispersed throughout the former lab.

Refer to the table Meth Production Chemicals Present in Active and Former Meth Labs (below) for comparison of active meth lab dangers to residual contaminants remaining after meth production ceases.

## Meth Production Chemicals Present in Active and Former Meth Labs

| | Chemical | Common Sources | Properties of Chemicals in Active Meth Labs | Residual Contamination in Former Meth Lab |
|---|---|---|---|---|
| **Precursor Reagents** | Pseudoephedrine | Cold Medicine | Irritant, stimulant | Yes |
| | Ephedrine | Cold Medicine | Irritant, stimulant | Yes |
| | | | | |
| **Extraction / Reaction Solvents** | Acetone | Fingernail polish remover | Volatile irritant, flammable | No |
| | Benzene | Thinners, lacquers | Volatile irritant, flammable | No |
| | Ethanol | Grain alcohol | Volatile irritant, flammable | No |
| | Ether | Starter fluid | Volatile irritant, flammable | No |
| | Freon | Refrigerant | Volatile irritant | No |
| | Hexane | Thinners, lacquers | Volatile irritant, flammable | No |
| | Isopropanol | Rubbing alcohol | Volatile irritant, flammable | No |
| | Methanol | Gasoline additives, Heet | Volatile irritant, flammable | No |
| | Petroleum Distillates | Mineral Salts | Volatile irritant, flammable | No |
| | Toluene | Toluol | Volatile irritant, flammable | No |
| | Trichloroethane | Gun cleaning solvent | Volatile irritant | No |
| | | | | |
| **Reaction Materials** | Sodium Hydroxide | Lye, Drain cleaner | Corrosive | Yes |
| | Hydrochloric Acid | Muriatic Acid, Concrete cleaner | Corrosive | Yes |
| | Sulfuric Acid | Battery Acid Drain cleaner | Corrosive | Yes |
| | **Red P Method Specific** | | | |
| | Iodine | Antiseptic, Tincture of Iodine | Inhalation irritant | Staining |
| | Red Phosphorus | Matchbook strikers, flares | Flammable and explosive | No |
| | Hydriodic Acid | | | Yes |
| | **Anhydrous Ammonia Method Specific** | | | |
| | Anhydrous Ammonia | Fertilizer | Corrosive | No |
| | Lithium Metal | Lithium batteries | Corrosive, Explosive with H2O | No |
| | Sodium Metal | | Corrosive, Explosive with H2O | No |
| | **Shake and Bake Specific** | | | |
| | Ammonium Nitrate | Cold Packs | Irritant, Oxidizing Agent | No |
| | | | | |
| **Production Side Products and Contaminants** | Solid Waste | | Misc. health hazards | No |
| | Solvent Mixtures | | Volatile irritant, flammable | No |
| | **Red P Method Specific** | | | |
| | Phosphine Gas | | Toxic gas, Explosive with air | No |
| | Phosphorous Acid | | Irritant | Yes |
| | Iodine Vapor | | Inhalation irritant | Staining |
| | Hydriodic Acid | | Corrosive | Yes |
| | **Anhydrous Ammonia Method Specific** | | | |
| | Ammonia Vapor | | Corrosive | No |
| | Lithium Hydroxide | | Corrosive | Yes |
| | Sodium Hydroxide | | Corrosive | Yes |

**Figure A: Methamphetamine Manufacturing Processes**



# APPENDIX B: CONTRACTOR QUALIFICATIONS AND INFORMATION

The Minnesota Department of Health (MDH) does not have the authority to qualify companies to conduct the cleanup of clandestine drug labs (CDLs). MDH does not license, permit, or recommend cleanup contractors. However, due to the hazardous materials associated with the manufacturing of methamphetamine, CDLs are considered to be hazardous waste sites per Code of Federal Regulations (CFR) 1910.120. It is the contractor's responsibility to know and follow the requirements set forth by CFR 1910.120 and all other applicable regulations. Any company contracted to remediate former CDLs shall meet the following requirements. This list of requirements is not an all-inclusive list and is a guide for the County and/or Local Authority and the property owners, who are not familiar with CFR 1910.120.

Note: The contractor's project manager and/or site supervisor and general site workers will do a variety of tasks, each requiring different levels of training, expertise, and personal protective equipment.

Project Manager and/or Site Supervisor shall have the following qualifications:

- A four-year degree in either a science or engineering discipline and/or a professional registration or certification as a Professional Engineer (PE), Certified Industrial Hygienist (CIH), Certified Safety Planner (CSP) or a Certified Hazardous Materials Manager (CHMM).
- The 40 Hour HAZWOPER training,
- The 8 Hour specialized supervisor training 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 procedures and techniques,
- Respiratory protection,
- Confined space entry,
- Meth-related training.

The project manager and/or site supervisor and/or someone under the direct supervision of the project manager, upon initial entry, shall wear the appropriate Personnel Protective Equipment (PPE) including a respirator or other breathing apparatus (forced air or self-contained), gloves, and a disposable chemical-resistant suit.

Monitoring/sampling equipment should include, but not be limited to:

- Photoionization detector (PID) or similar device,
- pH paper,

- De-ionized water,
- Camera (for documentation),
- Ruler and masking tape or pre-fabricated template,
- Sample collection supplies including gauze pads, methanol, sample containers, and cooler.

After initial assessment of the site, the site entry plan (when required by conditions such as presence of a confined space) or site safety plan shall state the appropriate PPE to be worn by all on-site employees. The project manager and/or site supervisor shall create a site-specific safety plan for each contracted remediation project. The company is required to have a safety and health program, a respiratory protection program, and a medical surveillance program.

General site workers shall have the following qualifications:

- The 24 Hour HAZWOPER training; however, if the action requires the use of a Self Contained Breathing Apparatus (SCBA), the worker shall be required to have taken the 40 Hour HAZWOPER training.
- Methamphetamine Right to Know Training delivered by the project manager and/or site supervisor.

The remediation contractor shall have a contract with a vendor for disposal of waste produced in the remediation process and shall identify a vendor to conduct the analysis of test samples (if applicable to the CDL site).

Finally, the company needs to understand the complexities of a CDL. Some of the complexities include: booby traps, handling lead and mercury contamination, HVAC, sanitary systems, and working at a crime scene.

The table below defines the activities required to remediate a former meth lab site, the associated personnel requirements required to perform such activities, and recommendations for PPE.

## Contractor Employee Training

| Former Meth Lab Remediation Activity | Training required for Project Manager and Site Supervisor | Training required for worker | PPE recommended |
|---|---|---|---|
| Gross Chemical Removal, including site search for containers of chemicals or ammonia to remove | (This activity is done under DEA contract with HW contractors and is outside of the scope of MDH Cleanup Guidance) | | |

| Former Meth Lab Remediation Activity | Training required for Project Manager and Site Supervisor | Training required for worker | PPE recommended |
|---|---|---|---|
| Preliminary site assessment | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene<br>e) Confined Space | | a) cartridge respirator<br>b) disposable chemical-resistant suit<br>c) gloves |
| Meth site investigation, meth sampling; no containers or ammonia present | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene<br>e) Confined Space | | a) cartridge respirator<br>b) disposable chemical-resistant suit<br>c) gloves |
| Prepare project work plan, site health and safety plan, emergency plan | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene<br>e) Confined Space | | |
| Disruptive actions, e.g., carpet, sheetrock, wallpaper, or furniture removal, sanding wood, HEPA vacuuming, ceiling scraping, etc. | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene | a) cartridge respirator<br>b) disposable chemical-resistant suit<br>c) gloves<br>d) for carpet removal, thick leather gloves and boots to prevent needle punctures. |
| Minimally disruptive actions, e.g., furniture removal, clothing removal, contents removal, etc. | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene | a) Meth RTK delivered by project manager or site supervisor | a) disposable chemical-resistant suit<br>b) gloves |
| Wet washing areas, washing clothes, washing contents, etc. | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene | a) Meth RTK delivered by project manager or site supervisor | a) disposable chemical-resistant suit<br>b) gloves |
| Painting/encapsulating | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene | a) Meth RTK delivered by project manager or site supervisor<br>b) Any job or machine specific training for specific painting tasks | a) PPE appropriate to the painting tasks |
| Vent/furnace cleaning | a) OSHA 40 hour<br>b) Meth class<br>c) Sharps/pathogen<br>d) Hygiene | a) Meth RTK delivered by project manager or site supervisor<br>b) Any job or machine specific training for duct cleaning tasks | a) PPE appropriate to duct cleaning tasks |
| Final remodeling | | a) Any job or machine specific training for tasks including lead and asbestos, if applicable | a) PPE appropriate to the remodeling tasks including lead and asbestos, if applicable |

Training Requirements Descriptions:

- OSHA 40 hour = OSHA Hazardous Waste Operations and Emergency Response OSHA 24 hour = OSHA Hazardous Waste Operations and Emergency Response (29 CFR 1910.120 and 29 CFR 1926.65)
- Meth RTK = Meth Lab Right-to-Know training for workers and owners – Hazard Communication/ Employee Right to Know (29 CFR 1910.1200 and 29 CFR 1926.59). Meth Lab Right-to-Know training should include but is not limited to:

  a. Recognition, potential for harm, and handling of common meth chemicals, biological and physical hazards;

  b. Sharps and pathogen briefing; and

  c. Worksite hygiene.

- Meth class = Meth specific contractor training – 8 hour class on meth hazards, meth components, meth sharps and pathogens, meth hygiene, etc. This class may be in conjunction with 8 hour refresher training; may be a certification class from another state; or may be a meth-specific class delivered in Minnesota, so long as the class covers the required topics and is delivered by a trainer with meth lab experience.
- Sharps/pathogen = Blood borne Pathogens instruction (29 CFR 1910.1030)
- Hygiene = instruction on how to avoid contact with contamination and how to wash following work and prior to eating etc.
- Confined Space = training requirement according to 29 CFR 1910.146

The following right-to-know information is recommended for Post-Remediation or Single Job Workers (e.g., Plumber or Septic Worker) at a Clandestine Lab Site:

## Right-to-Know Information

The property you are entering was either the site of a drug lab where methamphetamine (meth) or another illegal drug was made, or the dumping or storage of drug-making chemicals has contaminated the property. All of the health risks from exposure to former labs and lab chemicals are not known. However, law enforcement personnel will have removed chemical containers and drug-making equipment from the site before you are allowed to enter.

We are required to provide you with the following information before you begin working:

- Information about potential for harm at former meth lab sites.
- Information about chemicals that may have been used on the site.
- Information about handling potentially contaminated material.
- A warning about any biological and/or physical hazards (including used needles or chemical containers) that you might find on the property.
- Information about proper worksite hygiene.

Potential for Harm:

Former meth lab sites are classified as hazardous waste sites. Exposure to meth residues and meth-making chemicals can cause irritation of the eyes, nose, throat, and mouth; tightness in the chest and lungs; muscle pain; headache; dizziness; nausea and vomiting; and visual disturbances. In addition to chemical exposures, unsanitary conditions that breed bacteria and unsafe physical conditions are also a common meth lab hazard and concern.

Law enforcement staff and cleanup contractors will have removed obvious hazards before you begin working. If you begin to feel unwell or experience any symptoms on the site, you should leave immediately and report your symptoms to the site manager.

Common Meth Lab Chemicals:

- Solvents such as acetone, ether, freon, hexane, methanol, toluene, trichloroethane, white gas, and xylene
- Corrosives (acids and bases) such as anhydrous ammonia, hydrochloric acid, phosphine, sodium hydroxide (lye), and sulfuric acid (drain cleaner).
- Metal and Salts such as iodine, lithium metal, red phosphorus, yellow phosphorus, and sodium metal.

If you find any of these chemicals with original packaging or unmarked containers, or find propane tanks (often used to hold anhydrous ammonia) or any other suspicious material, leave them alone and report immediately to the site manager.

Handling Potentially Contaminated Material:

Depending on the job you are doing at the site (e.g., painting, flushing plumbing or pumping the septic tank) there may be different ways of protecting yourself. For example, plumbers can wear protective goggles and gloves to protect themselves from acids and other chemicals which may be hazardous that may have been dumped into drains and remain in traps.

All workers should gloves whenever possible. Also wear work boots, long sleeves and long pants. Follow the hygiene instructions at the end of this fact sheet. Any debris that you remove from the site should be handled carefully and disposed as soon as possible.

Biological and Physical Hazards:

Needles and glassware are common hazards at meth labs and these items are often found in unexpected places such as heating ducts. Heavy protective gloves are recommended whenever your job requires putting your hand into an area that you cannot see. Any needles or razor blades found on the site should be immediately reported to the site manager. In addition, report any needle sticks or accidental cuts. Any worker whose task puts them in contact with dangerous wiring, a possible trip-wire or other booby trap material, a confined space or other physical hazard should report that hazard right away and remove themselves from the danger.

Worksite Hygiene:

Workers at a meth lab site should wear protective gloves, footwear and clothing as described above. You should never smoke, eat, or drink on the site unless the site manager approves those activities. Wash your hands, face, and other exposed skin frequently. Always wash just before or after you leave the site. Notify the site manager immediately if you become ill or are injured. Ask the site manager if they recommend any decontamination when you leave the site. They may recommend that you wash your boots or remove outer clothing before entering your vehicle.

I have read and understand the document and have received the proper training by the project manager or site supervisor and am clear on the potential for harm that might occur during my on-site time.

Worker's
Signature: _____ Date: _____

Site Manager's
Signature: _____ Date: _____

# APPENDIX C: SAMPLING

Appendix C.1: Methamphetamine Wipe Sampling Procedure

**Wipe Sampling: Short Version**

- Use one 3" x 3" general use gauze sponge (sampling wipe) per sample.
- Wear a new pair of nitrile gloves for each sampling.
- Limit handling of wipers to avoid contamination.
- Wet the individual gauze wipe with 2 mL of methanol just before sampling.
- Wipe in a tight Z pattern within a measured 10 cm by 10 cm area.
- Because methanol will evaporate to dryness, lessening the ability to pickup meth, wipe sample the area within 5 seconds.
- Place the wipe back into the jar and close the lid immediately after wiping.

Sampling is performed to establish the presence of methamphetamine. Samples should be taken using methanol-dampened wipes. Wipes can be filters, gauze pads, or swabs. The recommended method uses a 3-inch by 3-inch general use gauze sponge such as the Kendall Versalon sterile, all-purpose sponge.

Water-dampened wipes are not approved by this guidance due to the lack of meth capture by water-dampened samples. The sampler should have clean hands and must wear gloves during each sampling event as to avoid contaminating samples. The sampling area should be a relatively dry surface. Post-remediation sampling should be performed after washing and painting or sealing of walls and surfaces.

Procedure includes:

- Put on a clean pair of gloves.
- Attach a template or measure with a ruler and mark, by using tape, a pre-designated sampling location or area. (Sampler should avoid touching the area within tape/template to avoid disturbing the sampling area.) The sampler can either mark one sample at a time, or mark off all areas to be sampled within the structure at once. Photograph sample sites with an identifying reference point.
- Replaces gloves with a clean pair of gloves.
- Either soak the sampling wipe (filter or gauze pad) with 2mL methanol or take the wipe out of a pre-soaked container. Use dampened wipe within 5 seconds of applying methanol to ensure that the wipe is damp. A dry wipe will not capture a representative meth sample.

- Horizontally wipe the surface within the marking/template side to side in an overlapping "Z" pattern. Wipe so that the entire selected surface area is covered. End with an upward, scooping motion. Avoid wiping the marking tape or template. Fold the wipe so the sampled side is folded in.
- Insert the wipe into the sample collection container.
- Record the exact location, including the room and the approximate height (from the floor), date and time of the sample on the sample container, the chain of custody form and sampling notebook.
- Discard gloves and marking tape and proceed to the next sampling location.

## Appendix C.2: Vacuum Sampling to Determine Presence of Methamphetamine

Contaminant of Concern: Methamphetamine
Typical Sample Materials: Carpet, drapes, texturized upholstered furniture, porous stone (brick or cinderblock), raw wood, or any surface with accumulated dust particles.

Equipment needed:

- Area sampling pumps capable of at least 20 L/min flow rate (e.g., SKC Carpet Sampling Pump Kit).
- 37 mm cassettes equipped with glass fiber filters and backup pads.
- Flexible tubing to connect the pump to the filter cassettes.
- Small piece of tubing (1 to 2 in.) with one end cut at a 45-degree angle to be used as the "vacuum nozzle".
- Primary flow meter (e.g., SKC DC-Lite) for pump calibration.
- Field rotameter for convenient calibration checks.

General Method:

Pumps should be calibrated to approximately 20 L/min (with exact calibration flow rate recorded) before the sampling project begins. Confirmation of the calibration can be periodically checked between samples and must be confirmed at the end of the sampling project. The calibration should be performed while the tubing and type of filter cassette to be used during sampling are attached to the pump. If desired, an in-line field rotameter can be used throughout the sampling process to monitor the flow rate.

The sampling area should be measured and delineated (typically 4" x 4" or 6" x 6"). In general, visibly soiled, dusty, or heavily used areas are good choices for sampling. Perform a minimum of two passes at right angles to each other while sampling for one

minute. During the sampling of softer materials, press the angled tubing nozzle firmly onto the sampling surface to agitate particles.

Avoid plugging the nozzle of the tubing as this restricts the flow and could damage the pump. Typical causes of plugging are pressing the nozzle too firmly into the sample without sufficient movement (causing a seal between the surface and the nozzle) and sucking up large, loose particles that either block the nozzle opening or buildup at the inlet to the filter cartridge.

Immediately after an individual sample has been collected, the pump should be turned off such that no extraneous material will be collected. The filter cassette should be disconnected, sealed, and labeled to prepare for transport back to the lab where chemical analysis can be completed. After all sampling has been completed, the pump exterior should be decontaminated (e.g., wiped with a 10% bleach solution). The short angled nozzle piece should be discarded. Inspect the collection hose between the filter and pump and discard if visibly contaminated.

## Appendix C.3: Litmus (pH) Sampling Procedures

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.

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.

For vertical surfaces, a Whatman 40 ashless filter paper or equivalent filter paper 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 filter paper shall then be placed into a clean sample container and covered with deionized water. The filter and water shall stand 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.

Litmus (pH) testing shall be conducted on at least three locations in each room within the areas with visible contamination and within areas known to store or handle chemicals used for the clandestine drug laboratory in the residually contaminated portion of the real property

## Appendix C.4: VOC sampling and testing procedures

A properly calibrated photoionization detector (PID) or flame ionization detector (FID) capable of detecting volatile organic carbons (VOCs) shall be used for testing.

The background concentration of VOCs shall be obtained by testing three exterior areas outside the limits of the residually contaminated portion of the real property and in areas with no known or suspected sources of VOCs. All VOC readings shall be recorded for each sample location.

At least three locations in each room of the residually contaminated portion of the real property 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

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.

## Appendix C.5: Sampling Septic Systems

Below are the recommended steps for wastewater sampling activities.

1. Prior to sampling, sufficiently excavate the septic tank to determine whether the tank consists of one or two chambers.
2. Remove access cover from the first (or only) chamber and locate outlet baffle.
3. Move any floating surface matter away from the insertion point of the Sludge Judge®. Do not collect any matter in the Sludge Judge®.
    a. For sampling locations in tanks with one chamber, collect samples from the baffle on the outlet end of the chamber.
    b. For sampling locations in tanks with two chambers, collect samples from the baffle on the outlet end of chamber one.
4. Follow instructions for correct usage of a Sludge Judge®.
5. Insert the Sludge Judge® into the tank, lowering it until you hit the bottom.
6. Trap the sample inside the Sludge Judge®.
7. Remove the Sludge Judge® and fill two 40ml vials.
8. Samples may be taken with or without preservative in the vial. Sampling procedure is determined by the sampler's confidence and ability to maintain sample integrity.
9. Place sample containers in cooler with enough ice or ice packs to maintain a temperature of 4° C.
10. Replace access cover.

# APPENDIX D: HVAC CLEANING

At a minimum, ventilation contractors should take the following steps when dealing with ventilations systems constructed of non-porous materials.

1. Perform a walk-through of the structure prior to initiation of the project to establish a specific plan for decontamination of the ventilation system.
2. Follow health and safety procedures, in accordance with OSHA requirements, to protect workers and others in the vicinity of the structure during the decontamination process.
3. Place protective coverings in areas where work is being performed, including plastic or drop cloths around each area where the duct is penetrated.
4. Shut off and lock out all air handler units before working on each air conveyance system.
5. Perform a visual inspection of the interior ductwork surfaces and internal components.
6. Draw a negative pressure on the entire ductwork, using HEPA exhausted vacuum filters, throughout the cleaning process.
7. Remove and clean all return air grills.
8. Beginning with the outside air intake and return air ducts, clean the ventilation system using pneumatic or electrical agitators to agitate debris into an airborne state. Additional equipment may also be used in the cleaning process, such as brushes, air lances, air nozzles, and power washers. Controlled containment practices shall be used to ensure that debris is not dispersed outside the air conveyance system during cleaning.
9. Open and inspect air handling units, and clean all components.
10. Remove and clean all supply diffusers.
11. Clean the supply ductwork using the techniques described in item 8 above.
12. Reinstall diffusers and grilles after cleaning is complete.
13. Seal shut access points used for agitation purposes.
14. Bag and label all debris, including any filters, and properly dispose of at a landfill.

*Recognizing that there are varying types of forced-air systems, it should be noted that the above steps may need to be modified based on the type of system being cleaned.