



# Clandestine Drug Lab General Cleanup Guidance

**Minnesota Department of Health  
Minnesota Pollution Control Agency**

**April 3, 2007**



Minnesota Pollution Control Agency

## **Minnesota Department of Health (MDH) and Minnesota Pollution Control Agency (MPCA) Clandestine Drug Lab General Cleanup Guidance**

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**April 3, 2007 Version**

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## **ACKNOWLEDGEMENTS**

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The Minnesota Pollution Control Agency and Minnesota Department of Health, Public Health Laboratory have studied and continue to study contaminated materials from former meth lab structures in Minnesota. Financial support for the former meth lab distribution and cleaning effectiveness studies has been provided by the federal Environmental Protection Agency (EPA) Brownfield Grant Program.

The guidance was further developed by incorporating findings of these studies and discussion with other members of the National Alliance of Model State Drug Laws (NAMSDL) National Working Group on Cleanup and Remediation of Methamphetamine Laboratories.

As with earlier versions, Minnesota local public health personnel, state agency staff and private abatement contractors have provided comment, criticism and immeasurable assistance with each draft.

We thank everyone for their continuing efforts.

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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>

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## MDH/MPCA Clandestine Lab Contractors' Procedural Report

## I. INTRODUCTION

This document is designed to assist property owners, remediation contractors, and local authorities with their efforts to reduce exposure to contamination from former drug labs. The guidance is based on current information from a national working group on meth lab contamination remediation, other states' guidance documents, and the preliminary results of Minnesota research.

**NOTE:** *The first U.S. guidance for cleanup of clandestine drug labs was adopted by the State of Washington in 1996. Several states have followed with adaptations of this first document. Neither this nor any other guidance provides science-based advice for removal of all potential risk to human health. This document does provide best current practice for reducing exposures to toxic chemicals used in methamphetamine (meth) manufacture. The guidance will be revised as research and practice reveal a better understanding of meth chemicals, testing and remediation.*

Although meth is not the only drug manufactured in clandestine labs, meth labs are the most common and will be the focus of this document. Contractors working on remediation of non-meth labs may contact the Minnesota Department of Health (MDH) Meth Program for advice on remediation of those labs.

There are two specific areas of meth lab "cleanup" commonly called **removal** and **remediation**. **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 United States Drug Enforcement Administration (DEA) or paid by a local agency. This guidance addresses the **remediation** of residual contamination that exists after the bulk **removal** of chemicals and chemical wastes.

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 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* focuses on solid wastes and volatile solvents, and is based on the premise that management of volatile solvents will provide adequate management of other outdoor contaminants.

A companion document, *Clandestine Lab Contractors' Procedural Report (Contractors Report)*, can be used to document interior and exterior assessment and remediation activities, and can serve as a record of 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.

The *Contractors' Report*, this guidance and its *Appendices* can be found on the Minnesota Department of Health (MDH) website at:  
<http://www.health.state.mn.us/divs/eh/meth/lab/labcleanup.html#guidance>.

This guidance is effective as of April 3, 2007.

## II. PRE-REMEDATION CONSIDERATIONS

### A. Individual and Agency Roles and Responsibilities

Roles and responsibilities for property owners, remediation contractors, law enforcement, public health and other agencies are described in Minnesota statute effective, January 1, 2006. The following link is to the website for House File 1, Article 7, Meth Provisions:

<http://www.health.state.mn.us/divs/eh/meth/ordinance/methlegislation.html>.

**NOTE:** *Since the meth cleanup legislation became effective on January 1, 2006, there has been some confusion about the meaning, intent and letter of the law. According to that 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 we determine whether a property has been "affected by conditions or chemicals..." and therefore must be remediated.*

*The purpose of this note is to state that 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 have occurred. It is not sufficiently protective to require remediation only when a working lab has been discovered. The determination whether to sample or clean when there is no sign of cooking and all meth chemicals on site are unopened must be made on a case by case basis and made collaboratively by local law enforcement and public health.*

An effective meth lab remediation will involve a cooperative effort among law enforcement, local public health, the property owner and the contractor. The public health or other authority assuming oversight for meth lab remediation will be called the **local authority** (local authority) in this document. The parties involved and their responsibilities are as follows:

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.

There is no **timeline** for assessment or remediation mandated by this guidance. Most Minnesota counties have ordinances that require a contract must be signed or remediation completed within a certain number of days. The **local authority** will work within the timeframe declared by a local ordinance or on a case-by-case basis to assure speedy resolution.

The **property owner** is responsible for the cost of remediation. As with any contracted work, it is in the best interest of the property owner to use caution when hiring someone to provide this service. The property owner should understand the work plan and monitor progress on the site.

The meth legislation, effective 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. Several meth cooks have entered into repayment agreements with local authorities before and after the effective date of this law.

**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 contractor will document their work using the *Contractors Report* to the extent required by the local authority.

The local **Community Health Services Administrator** will maintain a list of current and former contaminated properties, including 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 new law also includes a provision for a **Revolving Cleanup Loan Fund** to expedite remediation of former lab sites. Loans will be made to cities and counties on a first-come, first-served basis and can be made only to entities with ordinances that specifically address meth lab remediation. Loans will come from the public facility authority fund and must be repaid.

More information about the loan process, eligibility and loan application is available from the **Department of Employment and Economic Development (DEED)**. Contact:

- Kathe Barrett, [kathe.barrett@state.mn.us](mailto:kathe.barrett@state.mn.us), 800-657-3858 or 651-205-4223

**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 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:

- MDH Website: <http://www.health.state.mn.us/divs/eh/meth>
- Larry Souther, [meth@health.state.mn.us](mailto:meth@health.state.mn.us), 651-201-4926
- Rick Kipp, [meth@health.state.mn.us](mailto:meth@health.state.mn.us), 651-201-4900

Regarding contamination in licensed food, beverage or lodging establishments:

- MDH Environmental Health Services Section, 651-201-4513 or 1-800-383-9808

Regarding contamination in grocery stores:

- Minnesota Dept. Agriculture, Dave Read, [david.read@state.mn.us](mailto:david.read@state.mn.us), 651-201-6596.

**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.

MPCA Methamphetamine Contacts:

- Kate Gaynor, [kate.gaynor@state.mn.us](mailto:kate.gaynor@state.mn.us), 651-296-4250
- Steve Lee, [stephen.lee@state.mn.us](mailto:stephen.lee@state.mn.us), 651-297-8610

**Minnesota Occupational Safety and Health Administration (OSHA)** provides guidance and enforcement of worker safety training, equipment, and practices. Information is available at: <http://www.doli.state.mn.us/mnosha.html>.

## **B. Meth Production Methods**

Most meth used illegally in Minnesota is imported from Mexico or the southwestern United States. Minnesota labs supply perhaps 15 to 20 percent of meth used in the state. Minnesota labs are typically “user labs,” small in comparison to the “super labs” of the southwest.

There are two methods for making meth in common practice in the U.S. today. Most Minnesota meth “cooks” 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 (See *Appendix A, Methamphetamine Manufacturing Process and Common Manufacturing Chemicals*).

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. Physical evidence at a lab may indicate only the most recent method used; therefore, all persons involved with a former meth lab must be aware of potential hazards created by each of the current meth cooking methods.

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, the precursor drugs (pseudoephedrine or ephedrine), meth in vapor and particle form, and 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 result from the manufacturing of meth. Acute exposure hazards come from direct contact with product or waste, and inhalation of product or wastes. 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.

**After the cooking process has stopped, most of the known hazards decrease.** 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. Semi-volatile or non-volatile production chemicals such as acids, bases, precursor chemicals, and products used or created in the manufacturing processes are more persistent.

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, and 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 also 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 are at greatest risk for 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, and the chemicals in the residue. The amount of residues 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 will vary with the method of methamphetamine manufacture.

This guidance is based on the presumption that all rooms and all structures on a meth manufacturer's property are considered potentially contaminated. Therefore, these are the standards set forth by this guidance:

- It is **mandatory** that **all structures containing** a meth lab or chemicals must be cleaned or pre-sampled to demonstrate that remediation is unnecessary.
- It is **mandatory** that **all occupancy structures** on a property where a meth lab, chemicals, paraphernalia or wastes are found must be cleaned or pre-sampled to demonstrate that remediation is unnecessary.
- It is **strongly recommended** that all structures on a property where meth labs or chemicals are found be cleaned or sampled. The local authority will make final decisions regarding need for remediation of non-occupancy structures.

More information concerning the need for sampling or remediation of a particular structure or type of structure on a property where a meth labs, equipment or chemicals are discovered can be found in *Appendix C4, Indoor Sampling and Risk Decisions*.

## D. Meth Risk Decisions

The process of meth lab risk assessment is complicated by the fact that solid research information is not available regarding:

- impact on human health from exposures within a meth-contaminated structure,
- absorption by skin or distribution of meth throughout the body,
- levels of meth in air of former meth labs that may be harmful, or
- an established safe level for methamphetamine in the environment.

Information does exist on risk levels for many of the volatile solvents or other chemicals used in meth manufacture. However, much of this information is from high-level exposures in industrial settings.

A zero level of meth and other meth lab-related chemicals would provide the lowest risk to occupants of a former lab. The standard of *less than one microgram of meth per square foot of wipe sampled surface (<1 µg/ft<sup>2</sup>)* used in previous versions of this guidance was set to achieve that “zero meth” goal.

Due to lack of health effects information, this standard and standards used in other states are not health-based. Furthermore, research has shown that sampling for meth is not a reliable measure of the entire volume of meth in a structure. **Therefore, this guidance relies on a remediation process rather than achievement of a number that is not science-based.** The process will reduce risk by reducing exposure to contamination, through a combination of disposal, remediation and encapsulation activities described below.

When determining the level of risk acceptable for a given structure it is necessary to consider potential uses of the structure and the extent of expected human contact. Factors to be considered include, frequency, type of contact and the sensitivity of exposed populations. To reach the following **relative levels of risk** associated with **relative levels of exposure** to meth and other contaminants, the following actions should be taken:

### No residual risk

- Remove all structure contents.
- Demolish the structure.
- Dispose of contents and structure in a sanitary landfill.

### Minimal residual risk

- Remove all structure contents, including clothing and appliances.
- Remove carpeting, wallpaper and/or unpainted sheetrock (drywall).
- Remove suspended and attached ceiling tiles and/or ceiling texturizing.
- Dispose of all contents and structure's building materials (e.g., ceiling tiles, carpeting) in a sanitary landfill.
- HEPA (High-Efficiency Particulate Air) vacuum all remaining porous surfaces such as raw wood, brick and cement block.
- HEPA vacuum all wood floors and all floors beneath removed carpeting.
- Detergent wash all surfaces twice, rinsing with fresh water.
- Seal remaining contamination by spraying all surfaces with a special encapsulating coating such as those used for asbestos or lead.
- Clean HVAC systems and flush plumbing as directed in this guidance.

### Acceptable residual risk

- Remove carpeting, wallpaper and unpainted sheetrock (drywall).
- Remove suspended and attached ceiling tiles.
- Spray paint textured ceilings.
- Remove upholstered furniture, mattresses, paper items, and other porous contents.
- Remove clothing, toys, bedding, baby bottles and cups, and other personal items used by infants and small children.
- Dispose of those items in a sanitary landfill.
- (It is an option to HEPA vacuum, clean and sample *selected* high-value, hard-surface items.)
- (It is optional to wash all clothing - other than those of infants and small children - two times.)
- HEPA vacuum all remaining porous surfaces such as raw wood, brick and cement block.
- HEPA vacuum all wood floors and all floors beneath removed carpeting.
- Detergent wash all structure surfaces twice, rinsing with fresh water.
- Spray paint all structure surfaces with two coats of a high-quality paint, polyurethane or concrete/brick sealer.
- Clean HVAC systems and appliances, and flush plumbing as directed in this guidance.

**If a contractor completes remediation as described above, pre- or post-remediation sampling for meth is not required by this guidance.** Pre- or post-remediation sampling may be performed for reasons outlined in Appendix C4, *Indoor Sampling and Risk Decisions*.

## III. CHEMICAL SAMPLING and ANALYSIS

### A. Meth Sampling Options: Wipe Sampling and Micro-Vacuuming (See *Appendix C* for sampling procedures.)

**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.

**“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 does not calculate the concentration of meth within the material, this sampling method detects the presence of meth on some materials more reliably than wipe sampling, and is recommended by this guidance for the materials noted above.

### B. Directive Sampling Guidance

(*Sampling Protocols* can be found in *Appendices C1-3*. *Appendix C4, Indoor Sampling and Risk Decisions*, can be used to assist with sampling decisions and interpretation of results.)

Under this guidance, testing may include:

- wipe sampling for methamphetamine (optional except to rule out remediation),
- micro-vacuum sampling of porous materials (optional except to rule-out remediation),
- volatile organic compound monitoring in air (recommended), or
- surface pH evaluation (recommended).

Indoor chemical-specific testing is listed in **Table 1** below and described further in the following text. Lead and mercury testing should be limited to illicit drug laboratories where there is clear evidence or high suspicion of use of these metals. All areas tested should be photographed to document the location of the sampled area.

**Table 1: Sampling Levels and Their Meaning in This Guidance**

Chemical	Interpretation and/or Action Taken
Methamphetamine	<p>a) <b>1 µg/ft<sup>2</sup> or greater</b>: Full remediation of occupancy structures must be completed according to Guidance.</p> <p>b) <b>1 to &lt;10 µg/ft<sup>2</sup></b>: Modified cleaning or disposal of some household contents or some non-occupancy structures may be allowed and will be determined by the local authority</p> <p>c) <b>≥10 µg/ft<sup>2</sup></b>: Full remediation of all structures and contents required.</p> <p>See <i>Appendix C4</i> for further explanation of these levels and actions. See NOTE below regarding Meth screening levels.</p>
Corrosives	Clean to: <b>pH 6-8</b>
Volatile Organic Compounds (solvents)	Clean to: <b>&lt;1 ppm</b> total VOCs in air (Common error for Photoionization Detectors (PIDS) can be as much as +/- 5ppm)
Phosphorus / Iodine	Discard stained/affected material
Mercury / Lead	<p>Notify MDH or MPCA before proceeding with remediation or assessment:</p> <p>a. Mercury: Clean to <b>&lt; 0.3 µg/m<sup>3</sup></b> (0.036 ppb) in air. [IRIS Reference Concentration for Chronic Inhalation Exposure RfC]</p> <p>b. Lead: Clean to <b>&lt; 40 µg/ft<sup>2</sup></b> wipe sample. [EPA TSCA Section 403]</p>

**Methamphetamine Sampling:** To determine presence of meth, 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 best materials to sample as:

- ceiling fan blades; top surface if unclean, bottom surface if fan blades appear cleaned,
- enameled or painted metal, such as heat register vents and appliances,
- metal or enameled metal high in the room or,
- HVAC plenum, the cold air-return just before furnace.

Samples of vertical and horizontal surfaces in the same area will have varied results. Minnesota research has shown that levels of meth contamination are increasingly higher on vertical surfaces from floor to ceiling. When wipe sampling vertical or horizontal surfaces, wipe sampling is recommended to be done vertically higher within the room

In general, sampling of unclean horizontal surfaces such as counters, tables and floors will present higher levels of meth contamination due to spills of methamphetamine and precursor chemicals during cooking, packaging and use. In addition, horizontal surfaces are subject to fallout of meth attached to dust from meth cooking and its vapors.

It is recommended that if post-remediation samples are taken, sampling be performed after washing and sealing/painting of surfaces.

Porous materials such as concrete block, raw wood studs, brick and (when disposal is contested) high-value carpeting may be micro-vacuum sampled. This method does not *quantitatively* represent the mass of meth in the material but the results may be used *qualitatively* to indicate presence of meth.

***NOTE:** The current screening level of 10 µg/ft<sup>2</sup> is not a science-based number. Establishment of this discretionary level is an attempt to satisfy a number of issues and concerns that have arisen regarding remediation. For example, contractors have found that rigorous remediation according to the Guidance does not always result in reduction of meth levels to the cleanup standard of <1 µg/ft<sup>2</sup> that was used in previous versions of the document. Given the unknowns about risks associated with meth, and the unreliability of meth sampling, MDH does not wish to set a standard that is unachievable; or one that will result in unnecessary costs for property owners in order to achieve an uncertain benefit. This screening level should be viewed as a device to allow the local authority sufficient leeway to: 1) allow cleaning and salvage of items and materials that will not be readily available to children and that would otherwise have to be discarded; 2) distinguish between heavily contaminated former lab sites and those that may have been peripherally involved or used for smoking only, 3) to allow for differences in the use of a structure, e.g, residential vs. storage, and 4) to allow for other special circumstances within **the limits of safe practice.***

**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, for 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:** To our knowledge, neither mercury nor lead has been found in a Minnesota lab. Lead and mercury were (uncommonly) present at past lab operations, so 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.

### C. Analytical Laboratory Requirements

On January 30, 2007, the MDH Environmental Laboratory Certification Program added ephedrine, pseudoephedrine and methamphetamine to their list of analytes which laboratories can become certified to analyze. An application form and other information related to certification and testing for methamphetamine is on the [program's website](#).

Remediation contractors are required to use an MDH-certified analytical lab to assure local authorities that the post-remediation data are reliable. Minimum requirements for certified laboratories analyzing methamphetamine are posted on a [meth-specific website](#). Laboratories applying for certification must ensure that the requirements on the [meth checklist](#) are included in the standard operating procedure and QA manual submitted with their application.

It is the responsibility of the contractor to assure that the laboratories they use obtain this certification. It is the responsibility of the local oversight authority to assure that record of this certification accompanies the laboratory data (wipe sample results) submitted with the contractor's final report.

Beginning July 1, 2007, all laboratories reporting data under this guidance shall be certified. The certification process requires approximately 60 days from the date the certification program receives the laboratory's completed application and documentation. Therefore, laboratories must apply for certification no later than May 1, 2007, in order to comply with this requirement.

## IV. CONTRACTOR REQUIREMENTS

### A. Contractor Training and Site Responsibilities

Minnesota law requires that a remediation contractor conduct meth lab assessment, sampling and remediation using the procedures of this guidance. The Project Manager, the Site Supervisor and workers will do a variety of tasks, each requiring different levels of training, expertise, and personal protective equipment.

*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 their website at: <http://www.health.state.mn.us/divs/eh/meth/lab/labcleanup.html#contractors> but cannot recommend or guarantee the work of any of these companies.*

The contractor's **Project Manager** must be specifically named for each site and must meet the training requirements listed in *Contractors Qualifications, Appendix B*. The Project Manager's site activities may be documented using the *Contractors' Report*. 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 must be performed by the **Project Manager** are these:

- 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\*\***" 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 three years.

\*\* 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.

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 must meet the training requirements listed in *Appendix B*.

The **Project Manager** or a qualified **Site Supervisor** must 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 texturized "popcorn" ceilings, or removing tile or other ceilings

The **Project Manager** or a qualified **Site Supervisor** do not need to remain on site during cleaning or painting but must inspect the site upon completion of either activity. If the local authority or another entity requires meth wipe sampling, the Project Manager or Site Supervisor must perform the sampling, unless a (qualified) third party conducts the sampling.

The **Project Manager** or a qualified **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. Inspection is to ensure that no hazardous chemicals, containers of anhydrous ammonia, or biohazards (sharps, etc.) are improperly disposed. 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 activities required to remediate a former meth lab site, the associated personnel requirements required to perform that activity, and recommendations for personal protective equipment (PPE) can also be found in *Appendix B*.

## **B. Owner-Assisted Remediation**

The **Property Owner** may assist with painting or other remediation or reconstruction tasks, after the professional contractor and crew have removed carpeting or other disposables and washed structural surfaces. 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 for 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*.

This guidance allows the owner to assist with remediation only under the following circumstances:

- Meth was the only drug known to be manufactured at the site; and
- The cooking method was red phosphorus or anhydrous ammonia; and
- No visual evidence of lab-related contamination, waste or biohazards remain; and
- No manufacturing-related fire occurred.

## **C. Lab Site Entry**

Most law enforcement agencies in Minnesota will post clan lab properties with signs warning of possible chemical contamination. Occupation of residential structures on properties where meth labs have been discovered will usually be prohibited until after assessment and/or remediation. There may be some circumstances when the local health authority will allow the occupants of a second home to remain in place, e.g., when law enforcement feels certain that the second structure was not involved in any way. (See *Appendix C.4, Regarding Posting of Structures and Removal of Inhabitants*.)

Before entering the site, the contractor should carefully consider the hazard potential from exposure to chemical residues, confined spaces or other physical hazards. A site entry plan is

required and should specify equipment needs and procedural planning when such hazards are believed to exist.

#### **D. Preliminary Assessment**

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

Site assessment information to be collected shall include but is not limited to:

- 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 site
- Record of:
  - 1) apparent hazardous chemical use or storage areas,
  - 2) apparent waste disposal areas,
  - 3) presumed cooking areas identified by visible contamination or by law enforcement reports mentioning location of labs or lab equipment,
  - 4) chemical stains, fire damage, other observable contamination/damage, and
  - 5) information about surfaces, furnishings, appliances, and other features
- Inspection of ventilation system
- Inspection of plumbing, septic system, 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 receptors 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. Contact numbers for these agencies can be found in Section II.A of this document.
- 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.
- Some Minnesota counties mandate demolition of other **vehicles**. 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.

**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. Pre-Remediation Sampling for Absence of Contamination

As stated earlier:

- All rooms and all structures on a meth manufacturer's property are considered potentially contaminated.
- It is **mandatory** that **all structures containing** a meth lab or chemicals must be cleaned or pre-sampled to demonstrate that remediation is unnecessary.
- It is **mandatory** that **all occupancy structures on a property** where a meth lab, chemicals, paraphernalia or wastes are found must be cleaned or pre-sampled to demonstrate that remediation is unnecessary.
- It is **strongly recommended** that all structures on a property where meth labs or chemicals are found be cleaned or sampled.
- **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.
- 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 and should be discarded. At the insistence of the property owner and discretion of the contractor and local authority, some items may be: (a) cleaned without sampling, (e.g., eye glasses, adults' clothing, major appliances) or (b) sampled, cleaned and re-sampled (e.g., high-cost, low contact large furniture items). Decisions must be based not only on cost-effectiveness but also potential future use of the items.

## **G. Contractor and Owner's Work Plan**

The Project Manager must 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 must 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

## V. INTERIOR REMEDIATION PROCEDURES

### 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.

- **Ventilation:** Ventilate structure for two days before cleaning.
- **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 not to 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, wallpaper and/or wallboard, suspended and attached ceiling tiles.
- **Optional Remediation:** If local authority agrees, pre-sample, HEPA vacuum, then clean selected high-value, hard-surface items.
- **Disposal:** Dispose all contaminated contents in a sanitary landfill.
- **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 (HVAC) 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:** Ventilate structure for two days after cleaning.

### B. 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 and/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.

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, 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.

### **C. 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 C3*). Initially, a sweep through the entire building should be made with an accurate record kept of all readings in every room. Additionally, each septic system drain (floor, tubs, sinks) should be tested with the PID to determine if any chemicals have accumulated in the drain trap.

### **D. Heating Ventilation and Air Cooling (HVAC) Forced Air System**

Assessment of HVAC system should be performed early in the remediation process. Depending on the assessment and the system, the following steps may be required:

- During the remediation of each room or area:
  - Remove and clean, or replace all vents.
  - Remove debris to arm's length.
  - HEPA-vacuum ductwork at least to arm's length.
  - Twice-wash and rinse ductwork at least to arm's length, with hot water and detergent.
- Remove and clean, or replace supply diffusers (based on cost efficiency).
- Replace all filters in the system at the end of the remediation process and after all dust disturbances have occurred.

### **E. Evaluation of Chemical Spills**

All food preparation counter-tops, stained materials, powders and liquids throughout the structure should be pH tested (see *Appendix C3*) 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 adsorbed with clay or another non-reactive material and packaged for proper waste disposal. pH paper should be used to check a surface after neutralization. Badly stained or contaminated materials should be removed and discarded.

### **F. Structure Contents and Furnishings**

Contents of a contaminated structure are presumed contaminated and recommended to be disposed. Decisions regarding alternatives to disposal should include the value of the item and potential for future human contact. (See *Appendix C.4* for more detail.)

**Table 2. Value and Contact Potential Evaluations**

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

Household contents and guidance for their disposition are listed below. The list is not exhaustive. Recommendations for household contents are divided into three categories: *Always Discard* and *Disposal Strongly Recommended* and *Disposal Recommended*.

**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.

• **Other Fabric Goods:**

▪ Fabric Goods: Washable

***Disposal Strongly Recommended.***

*Exceptions:* With approval of the local authority and with **reasonable assurance** that the work will be done, adult clothing and small washable fabric items such as curtains, rugs and linens can be machine-washed twice with hot water and detergent. After washing contaminated items, the washer should be run empty of clothing.

▪ Fabric Goods: Non-Washable, Such as Woolens, Rubber-Backed Draperies

***Always Discard.***

▪ Mattresses

***Disposal Strongly Recommended.***

*Exceptions:* (See Appendix C.4) 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.***

• **Kitchen Goods:**

▪ Dishes, Flatware, Other Hard Items, Including Glazed Ceramics, Metals and Glass

***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 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.

- Small Wooden, All Plastic Kitchen and Household Items  
***Always Discard.***

- **Furniture:**

- 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.
- 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.***

- **Books and Household Paper Items:**

***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, Tools, and Electronics:**

***Disposal Recommended.***

*Exceptions:* 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 with adequate ventilation. Stained items must be discarded.

**Remediation to clean an approved high-value item** should include aggressive HEPA vacuuming followed by extraction shampooing or extraction steam cleaning, washing, or other method approved by the local authority. After cleaning, micro-vacuum samples from an exposed horizontal surface of the piece must demonstrate **less than 10 µg meth per square foot (<10 µg/ft<sup>2</sup>)** of the exposed surface on items that have low contact potential for children, e.g., appliances, tools.

Following removal of room contents, **HEPA vacuuming** is mandatory to remove residual contaminated dust from floors under removed carpeting. HEPA vacuuming may also be useful to reduce contamination on and in raw wood, concrete and other porous surfaces but is very time-consuming and is not required.

## G. Structural Features and Surfaces

**Acoustic ceiling tiles**, suspended or attached, should be removed for disposal.

**“Popcorn” ceilings** may contain asbestos. The contractor must submit a sample 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/house/index.html>.

**Walls, floors, and ceilings** without “popcorn” texture must be double washed with hot water and detergent and rinsed with clean water to remove surface meth and prepare for painting or sealing. Washing must 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 **wooden counter or food preparation surface** must be removed and disposed. There are no exceptions.

To avoid disposal, hard and non-textured **food preparation surfaces and counters** (stone, tile) should be washed twice with hot water detergent followed by thorough rinsing. Counter-top grout should be ground down, regouted and sealed. A post-remediation sample indicating **greater than or equal to 1 µg meth per square foot ( $\geq 1 \mu\text{g}/\text{ft}^2$ )** on a counter surface will indicate need for disposal.

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, with wash water collected. The wet vac 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) cleaners may be most effective on these porous materials.

## H. 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 space and recommended in other locations.

## **I. Plumbing and Sanitary Sewer**

Meth chemicals put down the drain can be safety hazards in the plumbing system and environmental hazards in the wastewater treatment system. When corrosive or flammable chemicals have been dumped into a plumbing system, plumbing may contain concentrated chemicals in the traps of sinks and other drains. Attempting to pump out substances or remove the traps may result in chemical exposure and possible serious injury.

Sinks, bathtubs and toilets are frequently used for the disposal and dumping of lab chemicals. Visibly contaminated, stained or etched sinks, bathtubs and toilets should be discarded. Undamaged porcelain and stainless steel can otherwise be successfully cleaned.

Before cleaning plumbing fixtures, the Project Manager or Site Supervisor, equipped with chemical resistant protective disposable clothing, chemical-resistant gloves, and face-splash protection, should first thoroughly flush all plumbing traps with cold water. Every plumbing trap should then be checked with a PID or similar organic vapor meter (see *Appendix C3*). After flushing, collect substances in the trap to check pH using a long-handled tongs and cotton gauze.

Waste chemicals discarded in the sanitary sewer are typically flushed from the system within minutes or hours of the disposal. However, if the connection is on a very low flow line the chemicals could remain in the line longer. The city sewer department should be notified when city water systems may have been affected, and may want to assess conditions in the sewer lines or flush the line with water.

## **J. Garages, Outbuildings, and Non-Occupancy Structures**

In planning remediation of contamination in non-occupancy structures, consideration should be given to the structure's use, to potential for human exposure, and to the level of contamination within that structure. For example, a contaminated child's play house (or a structure used as a child's play house) should be cleaned and painted the same as a room in a residential structure. Meth contamination in a storage shed poses far less hazard to future occupants.

The following steps should be taken in non-occupancy structures:

- Ventilate structure before cleaning.
- Inspect for stains and meth lab materials.
- Discard porous low value contents.
- 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 an inch or more of dirt floor.
- Washing options:
  - Power-wash if possible (e.g., wiring or other obstacles may make power-washing impossible).
  - When power-washing is not possible, HEPA vacuum raw wood, cement, fiberglass or concrete block.
  - With mixed materials, do a combination of these.
- Spray paint or sealant on all surfaces.

Contents within outbuildings vary in degree of human contact and ease of cleaning. If a child is not exposed to the item, or if the item is made of metal or other non-porous, hard materials, the item may be able to be cleaned. For example, a child's bicycle, a hammock, or a set of coveralls in a barn used for meth cooking could be disposed, or thoroughly cleaned as described above. High-value, low contact, hard materials, e.g., a chain saw or lathe may be wiped clean with a solvent in a well-ventilated area or outdoors.

## **K. Confirmation of Interior Meth Reduction**

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.

Alternatively, a local authority may require wipe and/or micro-vacuum sampling to confirm a remediation. The local authority should choose sample locations and methods based on building material surface and porosity; location in the room and within the structure.

All remediation financed by use of the Revolving Loan Fund must be confirmed by third-party sampling (MN Stat. Sec. 446A.083, Subd. 6). Local jurisdictions may consider third-party confirmation sampling of all remediation, at their discretion or according to local ordinance.

## **L. Waste Characterization and Disposal**

All **meth-making chemical equipment or waste**, including precursor pharmaceuticals, drug cooking or use paraphernalia, non-empty containers of potential precursor chemicals, sludges, suspicious propane cylinders or fire extinguishers, and other potential evidence must be reported to the lead criminal investigator.

The contractor or property owner may prepare **household hazardous waste** for safe transport to the local household hazardous waste (HHW) program. The contractor or property owner 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. If drains to an ISTS do not empty into septic tank, call local oversight authority for determination of wastewater fate based on site location (e.g., near wetlands, waterways)."

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>.

## **M. Burning a Meth-Contaminated Structure**

Burning a meth-contaminated structure for fire service training in lieu of remediation is strongly discouraged. Safety of firefighter entry into a former meth lab structure and 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.

## **VI. 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

## **VII. FINAL REPORT and CLEARANCE**

After completion of interior and exterior assessment and remediation, the contractor must 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.

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 guidance, 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 function or cell structure that might indicate or lead to disease or health problems.

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

**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, resulting in 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.

**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 structure 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 and/or containment of substances hazardous to humans and/or the environment at a chemical investigation site. Cleanup refers to two specific parts: **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 so arranged 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 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 substance.

**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.

**Drug Enforcement Agency (DEA).**

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

**Encapsulation:** Act of surrounding, protecting and/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, and how people can come into contact.

**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.

**Heating, ventilation and air conditioning system (HVAC):**

**High-efficiency Particulate Air (HEPA) Filtration System.**

**Ingestion:** The act of swallowing.

**Inhalation:** The act of breathing.

**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.

**Minnesota Bureau Of Criminal Apprehension (BCA).**

**Minnesota Department of Health (MDH).**

**Minnesota Pollution Control Agency (MPCA).**

**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/or pressures.

**Occupational Safety and Health Agency (OSHA).**

**Owner:** Any person, firm, or corporation who owns, in whole or in part, the land and/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 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 or surface 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, and/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. Respirators are required upon initial entrance into a clandestine drug lab.

**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:** A portion or piece of a whole. For example, in a study of people, the sample is a number of people chosen from a population.

**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.

**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.

**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 occupants inhabit for an indeterminate amount of time as to where they would be exposed to substances. 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 substitute.

**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.

## Appendices

- Appendix A**      **Methamphetamine Manufacturing Process and Common Manufacturing Chemicals**
- Appendix B**      **Contractor Qualifications, Equipment Needs and Right-To-Know Information**
- Appendix C**      **Sampling Protocols and Guidance**
- C.1    Methamphetamine Wipe Sampling Procedure
  - C.2    Vacuum Sampling to Determine Presence of Meth
  - C.3    pH and VOC Sampling Procedures
  - C.4    Indoor Sampling and Risk Decisions
- Appendix D**      **Laboratory On-Site Inspection List**
- Appendix E**      **Soil, Burn Pile and Burial Pit Screening**  
<http://www.pca.state.mn.us/cleanup/meth.html>

## Appendix A

### Methamphetamine Manufacturing 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 and/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/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.

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 on surfaces and in 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 to vapor after the initial deposition. Methamphetamine and other fine particle contaminants can be aerosolized and dispersed throughout the former lab.**

Refer to **Table A, 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.

Regarding **Table A**:

- The former meth lab environment is much less hazardous than the active lab environment. As indicated in the last column, the solvents have dissipated and the reactive materials have been mostly reduced or depleted; existence of either is far less in the former meth lab than in an active meth lab.
- Not all the chemicals listed in Table A will be found in every meth lab. Reaction materials used depend upon the method of production. The solvent(s) used in each cooking process may vary due to availability, cook's preference, etc.

**Table A. Meth Production Chemicals Present in Active and Former Meth Labs**

	<u>Chemical</u>	<u>Common Sources</u>	<u>Properties of Chemicals in Active Meth Labs</u>	<u>Presence of Residual Contamination in Former Meth Lab</u>
<b>Precursor Reagents</b>	Pseudoephedrine	Cold Medicine	Irritant, stimulant	Yes
	Ephedrine	Cold Medicine	Irritant, stimulant	Yes
<b>Extraction / Reaction Solvents</b>	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
<b>Reaction Materials</b>	Sodium Hydroxide	Lye, Drain cleaner	Corrosive	Yes
	Hydrochloric Acid	Muriatic Acid, Concrete cleaner	Corrosive	Yes
	Sulfuric Acid	Battery Acid Drain cleaner	Corrosive	Yes
	<b>Red P Method Specific</b>			
	Iodine	Antiseptic, Tincture of Iodine	Inhalation irritant	Staining
	Red Phosphorus	Matchbook strikers, flares	Flammable and explosive	No
	Hydriodic Acid			Yes
	<b>Anhydrous Ammonia Method Specific</b>			
	Anhydrous Ammonia	Fertilizer	Corrosive	No
	Lithium Metal	Lithium batteries	Corrosive, Explosive with H2O	No
Sodium Metal		Corrosive, Explosive with H2O	No	
<b>Production Side Products and Contaminants</b>	Solid Waste		Misc. health hazards	No
	Solvent Mixtures		Volatile irritant, flammable	No
	<b>Red P Method Specific</b>			
	Phosphine Gas		Toxic gas, Explosive with air	No
	Phosphorous Acid		Irritant	Yes
	Iodine Vapor		Inhalation irritant	Staining
	Hydriodic Acid		Corrosive	Yes
	<b>Anhydrous Ammonia Method Specific</b>			
	Ammonia Vapor		Corrosive	No
	Lithium Hydroxide		Corrosive	Yes
Sodium Hydroxide		Corrosive	Yes	

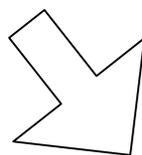
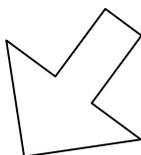
## Figure A: Methamphetamine Manufacturing Processes

### Extracting Precursor Drug:

**Use:** Cold tablets, solvents and coffee filters

**Wastes:** Solvent vapors, ephedrine or pseudoephedrine, binder from tablets, and coffee filters.

Solvent evaporates or may be reused.



### Red Phosphorus

**Use:** Iodine, red phosphorus, filters, heat, sodium hydroxide, and ether or other solvent (e.g., hexane, toluene).

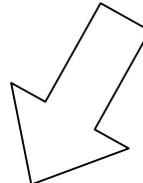
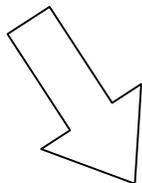
**Wastes:** Iodine, red phosphorus, sodium hydroxide, coffee filters, and solvent. Gases and possible other by-products. Solvent vapors. Iodine sublimation.

### Anhydrous Ammonia (NAZI) Method (Most used in MN)

**Use:** Sodium, potassium, or lithium metal, anhydrous ammonia, water, ether or other solvent.

(Heat may be used to expedite solvent evaporation. Exothermic reaction can cause gaseous by-products)

**Wastes:** Coffee filters, excess metal.



### “Salting Out”

**Use:** Rock salt or table salt, sulfuric or muriatic acid, filters.

**Wastes:** Excess salt, sulfuric or muriatic acid, hydrochloric acid, hydrogen chloride gas, coffee filters, meth, solvent from above phases, possibly acetone.

## **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), etc.
- 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 procedure 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 contain, but not be limited to:

- a 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 require the 40 Hour HAZWOPER training.
- Methamphetamine Right to Know 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.

**Table B: Contractor Employee Training**

<b>Former Meth Lab Remediation Activity</b>	<b>Training required for Project Manager and Site Supervisor</b>	<b>Training required for worker</b>	<b>PPE recommended for worker</b>
Gross Chemical Removal, including site search for containers of chemicals and/or ammonia to remove	(This activity is done under DEA contract with HW contractors and is outside of the scope of MDH Cleanup Guidance)		
Preliminary site assessment	a) OSHA 40 hour b) Meth class c) Sharps/pathogen d) Hygiene e) Confined Space		a) cartridge respirator b) disposable chemical-resistant suit c) gloves
Meth site investigation, meth sampling; no containers or ammonia present	a) OSHA 40 hour b) Meth class c) Sharps/pathogen d) Hygiene e) Confined Space	n/a	a) cartridge respirator b) disposable chemical-resistant suit c) gloves
Prepare project work plan, site health and safety plan, emergency plan	a) OSHA 40 hour b) Meth class c) Sharps/pathogen d) Hygiene e) Confined Space	n/a	n/a

<b>Former Meth Lab Remediation Activity</b>	<b>Training required for Project Manager and Site Supervisor</b>	<b>Training required for worker</b>	<b>PPE recommended</b>
Disruptive actions, e.g., carpet, sheetrock, wallpaper, or furniture removal, sanding wood, HEPA vacuuming, ceiling scraping,	a) OSHA 40 hour b) Meth class c) Sharps/pathogen d) Hygiene	a) OSHA 40 hour b) Meth class c) Sharps/pathogen d) Hygiene	a) cartridge respirator b) disposable chemical-resistant suit c) gloves 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 b) Meth class c) Sharps/pathogen d) Hygiene	a) Meth RTK delivered by project manager or site supervisor	a) disposable chemical-resistant suit b) gloves
Wet washing areas, washing clothes, washing contents, etc.	a) OSHA 40 hour b) Meth class c) Sharps/pathogen d) Hygiene	a) Meth RTK delivered by project manager or site supervisor	a) disposable chemical-resistant suit b) gloves
Painting/encapsulating	a) OSHA 40 hour b) Meth class c) Sharps/pathogen d) Hygiene	a) Meth RTK delivered by project manager or site supervisor 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 b) Meth class c) Sharps/pathogen d) Hygiene	a) Meth RTK delivered by project manager or site supervisor 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:

- a. 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)
- b. 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:
  - Recognition, potential for harm, and handling of common meth chemicals, biological and physical hazards;
  - Sharps and pathogen briefing; and
  - 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.

- c. Sharps/pathogen = Blood borne Pathogens instruction (29 CFR 1910.1030)
- d. Hygiene = instruction on how to avoid contact with contamination and how to wash following work and prior to eating etc.
- e. Confined Space = training requirement according to 29 CFR 1910.146

## **Right-to-Know Information for Post-Remediation or Single Job Workers (e.g., Plumber or Septic Worker) At a Clandestine Lab Site**

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**

Common meth lab chemicals include:

- 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 that may have been dumped into drains and remain in traps.

All workers should wear 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. Also 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.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 6" x 6" 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. (Recommended: 3-inch by 3-inch general use gauze sponge, e.g., 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:

1. Sampler puts on clean pair of gloves.
2. Sampler attaches template or measures with a ruler and marks by using tape a pre-designated sampling location or area. (Sampler should avoid touching the area within tape/template as to not disturb 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.
3. Replaces gloves with a clean pair of gloves.
4. 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.
5. 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.
6. Insert the wipe into the sample collection container.
7. 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.
8. 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: pH and VOC Sampling Procedures

### A. pH Testing 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.

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.

### B. 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.4: Indoor Sampling and Risk Decisions

<b>Meth Sampling in This Guidance</b>	
<p><b>Neither pre- nor post-remediation meth sampling is required</b> when a contaminated property is remediated according to this Guidance. After several months' practical application of the January 1, 2006, document, it has become clear that some pre- or post-remediation sampling is being performed at most sites. The purpose of this Appendix is to assist with sampling decisions and the application of sampling results.</p>	
<b>Some Common Reasons Sampling May Be Performed</b>	
<ul style="list-style-type: none"> <li>• Sampling is required in order to access the Revolving Loan Fund; by a bank, mortgage holder or other private entity; or by a county or municipal ordinance or authority.</li> <li>• A property owner or other party wishes to prove that meth residue is not present, or that meth is present at low levels, in order to avoid remediation of a structure and/or disposal of household items.</li> <li>• Parties wish to obtain estimates of meth residue levels in a structure or area, in order to focus remediation planning, or to make safety decisions regarding people working on a site before or during remediation.</li> <li>• Parties wish to compare pre- and post-remediation samples to show reduction of meth residue levels.</li> <li>• Parties wish to establish a record of baseline conditions after remediation.</li> </ul>	
<b>Sampling Levels and Their Meaning in This Guidance</b>	
<b>Chemical</b>	<b>Interpretation and/or Action Taken</b>
<p>Methamphetamine</p> <div style="border: 1px solid blue; padding: 5px; margin-top: 10px;"> <p><b>NOTE:</b> See <i>Glossary</i> for definitions of occupancy and non-occupancy structures.</p> </div>	<ol style="list-style-type: none"> <li>1) Any level of methamphetamine at 1 µg/ ft<sup>2</sup> or greater means that remediation of an occupancy structure must be completed according to Guidance.</li> <li>2) Modified remediation/disposal of some household contents or some non-occupancy structures may be allowed and will be determined by the local authority with levels at: 1 to &lt;10 µg/ ft<sup>2</sup>.  The reason for adding this intermediate level is to enable the local authority: a) to allow remediation and salvaging of some household contents that would otherwise have to be discarded, b) distinguish between heavily contaminated lab sites and those that may have been peripherally involved, c) to allow for discretionary difference in remediation of occupancy and non-occupancy structures and d) to allow for special circumstances within the limits of safe practice.</li> <li>3) Full remediation of structure and contents is required at levels: ≥10 µg/ ft<sup>2</sup>.</li> </ol>
Corrosives	Clean to: pH 6-8
Volatile Organic Compounds (solvents)	Clean to: <1 ppm total VOCs in air
Phosphorus / Iodine	Discard visibly stained material
Mercury / Lead	<p>Notify MDH or MPCA before proceeding with remediation or assessment:</p> <ol style="list-style-type: none"> <li>1) Mercury: Clean to &lt; 0.3 µg/m<sup>3</sup> (0.036 ppb) in air. [IRIS Reference Concentration for Chronic Inhalation Exposure RfC]</li> <li>2) Lead: Clean to &lt; 40 µg/ft<sup>2</sup> wipe sample. [EPA TSCA Section 403]</li> </ol>

## Sampling Decisions and Limitations

Recommendations in this Guidance are based on research showing that meth moves easily throughout a structure where it is made. Therefore, a structure where meth is discovered is presumed to be contaminated throughout, though levels of contamination will vary. Decisions about taking samples, interpreting the results, and applying this information to a remediation plan are based on several factors:

- **Material To Be Sampled:** A wipe sample from a porcelain-coated appliance is not comparable to a sample from an adjoining, unpainted, concrete-block wall because residue is much more easily removed from the porcelain than from the concrete. Concrete sample levels will suggest less contamination than exists.
- **Site History:** Reliable information about the length of time a site has been accessible to meth cooking (e.g., cook has occupied hotel room for only one night) or areas of a property that have been accessible by the meth cook can provide important guidance for remediation planning.
- **Potential Site Use:** Remediation strategies will be different for a family home vs. a pole barn.
- **Proximity To Cooking Location:** Levels may be highest in cooking areas. However, it is important to note that **meth cooking areas often vary over time and may not be easily identified.**

MDH staff are available to provide technical advice and assistance regarding sampling and remediation situations and decisions. Call 651-201-4896 or 651-201-4922 or email: [meth@state.mn.us](mailto:meth@state.mn.us)

### Deciding Which Structures on a Property Will Be Remediated or Sampled

Situation	Action/Requirement/Screening Level
<p><b>Scenario A:</b> A lab and/or equipment and/or chemical residues <b>are found</b> in a <b>non-occupancy structure</b>.</p> <p>However, lab and/or equipment and/or chemicals <b>are not found</b> in <b>occupancy structures</b> on the same property.</p>	<p><b>Scenario A:</b> <b>Option Number 1:</b> Complete remediation of non-occupancy structure where lab, equipment or chemical residues were found <b>and</b> of all unsampled occupancy structures.</p> <p>Note: If low levels of meth (1 to &lt;10 µg/ft<sup>2</sup>) are found in non-occupancy structures, remediation may be somewhat modified at the discretion of the local authority, e.g., a shed may be power washed but not painted.</p> <p><b>Option Number 2:</b> Perform remediation of non-occupancy structures where lab, equipment or chemical residues were found <b>and</b> sample all occupancy structures to determine what level of remediation (including none) is required.</p>
<p><b>Scenario B:</b> Lab and/or equipment and/or chemical residues <b>are found</b> in an <b>occupancy structure</b>.</p> <p>Lab and/or equipment and/or chemical residues <b>are not found</b> in <b>non-occupancy structures</b> such as a shed or detached garage.</p>	<p><b>Scenario B:</b> Complete remediation, of occupancy structure(s) where lab, equipment or chemical residues were found.</p> <p>Remediation of non-occupancy structures is <u>not always</u> required if neither lab nor chemicals are found. Garages or other buildings attached to an occupancy structure are considered “occupancy structures.” Remediation or assessment is recommended for any vehicle or structure that could be occupied for long periods, especially by children. The local authority, in consultation with the contractor, may require sampling of any non-occupancy structures on a property where odors or anecdotal information suggest meth-making activities have occurred in the structure, or according to their best professional judgment.</p>

## Regarding Posting of Structures and Removal of Inhabitants

We assign three levels of certainty regarding potential for harm to human inhabitants of occupancy structures: 1) Contamination Known, 2) Contamination Likely, and 3) Contamination Unlikely. Recommendations for removal of residents and posting of occupancy structures are these:

- 1) **Contamination known:** Active lab, chemical storage or dumping on-site, or signs of previous cooking are found in the structure. Structure must be posted and residents removed until remediation is complete.
- 2) **Contamination likely:** Lab found in vehicle or other building. Chemicals, staining or equipment found in home and/or there is reason to believe that cooking or storage may have occurred in the past at different locations and/or residents are not believed to be reliable reporters. At discretion of local authority, structure is posted and residents removed until sampling is performed or remediation complete.
- 3) **Contamination unlikely:** Lab is found in another location on property, e.g., second home. No chemicals or evidence of cooking in occupancy structure are found. Residents are informed they may stay until sampling results indicate the need for remediation. **Immediate sampling is required in such a case.**

### Deciding Which Floors/Levels/Areas of a Structure Will Be Remediated or Sampled

Situation	Action/Requirement/Screening Level
<p><b>Scenario A:</b> There is strong evidence or belief that meth-making and related activities were restricted to a somewhat segregated area of a building, e.g., basement apartment or storage area of a multiple dwelling. The property owner does not wish to pay for full remediation of whole structure, so pre-remediation sampling is performed with these results:</p> <ul style="list-style-type: none"> <li>▪ Basement: Meth levels range from <b>100 to 200 µg/ft<sup>2</sup></b></li> <li>▪ 1st Floor: Levels lower but still <b>≥10 µg/ft<sup>2</sup></b></li> <li>▪ 2nd Floor: No meth detected.</li> </ul>	<p>Any level of methamphetamine at <b>1 µg/ft<sup>2</sup> or greater</b> means that remediation of the <b>structure</b> must be completed. Procedures include: ventilation; air sampling; chemical spill remediation; disposal of porous and contaminated material; structural remediation, flushing of plumbing, HVAC cleaning, and painting of structural surfaces. Required in this case:</p> <ul style="list-style-type: none"> <li>▪ Basement: Full remediation and disposal.</li> <li>▪ 1<sup>st</sup> floor: Full remediation and disposal.</li> <li>▪ 2<sup>nd</sup> Floor: Full structural (e.g., washing and painting) remediation is required. The local authority will determine handling of household contents (e.g. high-cost, low-contact items) on a case-by-case basis.</li> </ul>
<p><b>Scenario B:</b> There is strong evidence or belief that meth making was restricted to a <u>separate, unattached building</u> on the same property as a home.</p> <p>The Guidance requires that all occupancy structures be sampled or remediated, so pre-remediation sampling is performed in the home with the following results:</p> <ul style="list-style-type: none"> <li>▪ Basement: No meth detected.</li> <li>▪ 1st Floor: Low levels (<b>&lt;5 µg/ft<sup>2</sup></b>) found in two of three samples.</li> <li>▪ 2nd Floor: Low levels (<b>&lt;2 µg/ft<sup>2</sup></b>) found in two of three samples.</li> </ul>	<p><b>Recommendations for the occupancy structure:</b></p> <p>Low levels in all samples <b>may</b> indicate meth smoking and not meth-making may have occurred. Although any level of meth at <b>1 µg/ft<sup>2</sup> or greater</b> means that remediation of the structure must be completed, the absence of levels greater than <b>10 µg/ft<sup>2</sup></b> means that remediation of contents can be modified with the approval of the local authority and in consultation with the contractor.</p> <p>Other conditions, including the general state of repair, hygiene and biological contamination, as well as reliability of the occupants (e.g., likelihood that they will wash clothing if allowed to remove it) should be taken into consideration.</p>

## Sampling and Remediation of Rooms, Objects and Materials

To Be Sampled	Requirements/Recommendations	Interpretation / Exceptions
<b>Structural Materials</b>		
<b>Room</b>	<p><b>BEST: Methanol wipe sample</b> of a hard, impermeable and “nonporous” unwashed surface (e.g., ceiling fan blade, refrigerator top, water heater, or; enameled wall, high in the room.</p> <p><b>DEFAULT:</b> Micro-vacuum sample.</p>	<ol style="list-style-type: none"> <li>1) Sampling may indicate the presence of meth and will provide qualitative information about meth levels but will not give total mass of meth residue in any sampled material.</li> <li>2) As no health-based standard exists, sampling will not tell whether detected meth residue is or isn’t hazardous to an occupant of the structure.</li> <li>3) A wipe sample of porous materials such as concrete block, brick, raw wood, cement or textured ceiling material does not accurately indicate that there is no contamination in the room.</li> <li>4) Wipe samples taken from hard surfaces such as metal, and enameled finishes will provide a more accurate indication of meth present in the structure.</li> <li>5) <b>Post-remediation samples should be taken after surfaces are sealed or painted.</b></li> </ol>
<b>Painted drywall or plaster</b>	Take a methanol wipe sample at chest height on wall.	
<b>Unpainted sheetrock</b>	Avoid sampling. Take sample from ceiling fan, appliance, doorframe, etc.	
<b>Brick, cement, raw wood</b>	<b>AVOID SAMPLING.</b> If location provides only these materials, micro-vacuum sampling of these porous, hard materials is recommended.	
<b>Food Preparation Countertops</b>	<p>Food preparation surfaces and counter tops made of wood or other soft or porous materials must be removed and discarded.</p> <p>Hard, non-textured food preparation surfaces and counters made of granite or ceramic tile, etc. can be remediated and sampled, if they are not stained with chemicals.</p>	
<b>“Popcorn” Ceilings</b>	<p>“Popcorn” ceilings should be submitted for asbestos testing by a <i>Certified Asbestos Inspector</i>. If asbestos is present (or testing is not conducted) 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.</p> <p>See: <a href="http://www.health.state.mn.us/divs/eh/asbestos/house/index.html">http://www.health.state.mn.us/divs/eh/asbestos/house/index.html</a> for additional information about asbestos remediation and inspector certification.</p>	

To Be Sampled	Requirements/Recommendations	Interpretation / Exceptions
<b>Household Contents</b>		
<b>Fabric Goods, including Rugs and Carpeting</b>	<p>Disposal of fabric items is strongly recommended. If the property owner wishes to sample a fabric item, a piece of the material must be cut from the item and sent to a lab for analysis.</p> <p>All fabric items, including curtains, carpeting, mattresses, and upholstery <b>should be discarded</b>.</p> <p>All fabric items belonging to or used by infants and small children <b>must be discarded</b>.</p>	<p>At the discretion of the local authority, adults' clothing and other small, washable fabric items may be twice-washed with hot water and detergent, and used <b>without sampling</b>.</p> <p>If pre-remediation meth samples in a structure or level of a structure are between 1 to &lt;10 µg/ft<sup>2</sup>, salvaging of some large items (e.g. clean mattresses) <u>may</u> be approved by the local authority.</p> <p>Remediation to clear an approved, high-value, low-contact fabric item should include:</p> <ol style="list-style-type: none"> <li>1) Aggressive HEPA vacuuming</li> <li>2) Extraction shampooing, extraction steam cleaning, washing, or other method approved.</li> <li>3) Cut-sample analysis showing &lt;10 µg/ft<sup>2</sup></li> </ol>
<b>Large, Hard Furniture Items</b>	<p>Large, hard furniture items (e.g., non-plastic, sealed (not raw) wooden, chrome or aluminum) are presumed contaminated and can be disposed. Optionally, they can be cleaned and sampled, if approved by the local authority.</p>	<p>To clean and sample hard furniture items, do the following:</p> <ol style="list-style-type: none"> <li>1) Twice-wash with detergent and hot water followed by thorough rinsing.</li> <li>2) After cleaning, sample surfaces that are commonly touched, such as a dresser drawer face or chair seat using methanol-dampened wipes.</li> <li>3) A post-remediation meth wipe must reveal &lt;10 µg/ft<sup>2</sup> or a lower level, as required by the local authority and depending on potential use.</li> </ol>
<b>Leather or Fabric Upholstered Furniture</b>	<p>Leather or upholstered furniture should be discarded. Irreplaceable/costly items may be stripped of padding and upholstery and cleaned as hard furniture.</p>	
<b>Plastic Furniture</b>	<p>Plastic furniture should be discarded.</p>	
<b>Appliances and Tools</b>	<p>Stained items should be discarded.</p>	<p>At the discretion of the local authority, high-value, low-contact appliances and tools can be washed twice with a hot detergent solution and clean rinse water, or cleaned by alcohol wiping with adequate ventilation.</p>

To Be Sampled	Requirements/Recommendations	Interpretation / Exceptions
Dishes, flatware, other hard items, including glazed ceramics, metals and glass.	Structure contents are considered contaminated and should be discarded, particularly in a structure where cooking has occurred.	If meth sampling in the structure reveals low levels and the local authority approves, dishes, flatware, non-teflon (i.e., soft-coated, non-stick) pots and pans, and other hard, non-porous household items, including glazed ceramics, metals and glass may be twice-washed and rinsed using hot water. Any item that shows evidence of use for meth cooking (e.g. acid etching, chemical staining) must be discarded.
Other Contents	For technical advice, call 651-201-4896 or 651-201-4922 or email: <a href="mailto:meth@state.mn.us">meth@state.mn.us</a> .	
Special Sampling Rules and Requirements		
To Be Sampled	VOC Sampling Requirements	Interpretation / Alternatives / Exceptions
Indoor Air	Indoor ambient air should be sampled using a Photoionization Detector (PID) before and after the remediation.	Readings <b>greater than 1 ppm</b> total VOCs should trigger the following steps/actions: 1) increased ventilation 2) possible use of PPE 3) repeated flushing (plumbing) 4) assessment to discover source of contamination 5) removal or remediation of source.
Plumbing	After plumbing is flushed, each plumbing trap and septic system drain should be tested using the PID.	
To Be Sampled	pH Sampling Requirements	Interpretation / Alternatives / Exceptions
Food Preparation Countertops	<p><b>pH testing</b> of all food preparation surfaces and chemical spills is required.</p> <p>To reach the acceptable range (<b>pH 6-8</b>):</p> 1) Remove excess material: a) Solids can be scooped up and packaged for disposal b) Liquids can be adsorbed with clay or another non-reactive material and packaged. 2) Wash affected and adjoining surfaces: a) Neutralize acids with sodium bicarbonate (baking soda). b) Treat bases with weakly acidic wash solutions (e.g., vinegar, citric or acetic acid). 3) Resample after neutralization. 4) Discard badly stained or contaminated materials.	
Stained Materials, Powders, and Liquids		
Recap: Meth Sampling Rule Of Thumb		
< 1 µg/ft <sup>2</sup>	<b>Range of Action: No Action Required.</b>	
1 to <10 µg/ft <sup>2</sup>	<b>Range of Action:</b> <ul style="list-style-type: none"> <li>▪ Full Remediation of Occupancy Structures Required</li> <li>▪ Modified Remediation May Be Allowed in Non-Occupancy Structures</li> <li>▪ Modified Remediation/Disposal of Contents May Be Allowed</li> </ul>	
>10 µg/ft <sup>2</sup>	<b>Range of Action: Full-Remediation of Structure and Contents Required</b>	

## Appendix D: Laboratory On-Site Inspection Checklist



Minnesota Department of Health  
 Environmental Laboratory Certification Program  
[www.health.state.mn.us/divs/phl/cert/index.html](http://www.health.state.mn.us/divs/phl/cert/index.html)

Analyte(s): Methamphetamine, Pseudoephedrine and Ephedrine  
 Matrix: Swab  
 Technology: Liquid or Gas Chromatography/Mass Spectrometry  
 Method: Performance-based

Criteria	Y	N	Remarks
<b>Sample Size for Preparation</b>			
Swabs: Gauze sponges 3"X 3" - 4 ply, rayon/polyester blend or equivalent. Note: sponges must hold (absorb) solvent and sponge matrix does not interfere with mass spectral identification.			
<b>Sample Preparation</b>			
Swabs: Gauze sponges are prewetted or wetted in the field. Methanol is the primary solvent.			
Isotopically labeled (e.g. D <sub>9</sub> ) internal standards for methamphetamine and pseudoephedrine or ephedrine are added after sample collection or prior to the beginning of sample processing.			
Sample preparation procedures (e.g. extraction, mixing, filtering) are defined and identical for all samples and quality control.			
<b>Holding Time</b>			
Samples are extracted within 14 days.			
Samples are analyzed within 40 days of extraction.			
<b>Method Validation-Initial Demonstration of Capability</b>			
Each analyst has performed an initial demonstration of capability			
<b>Detection Limits</b>			
Detection limit is established according to criteria in regulation [40 CFR 136, Appendix B].			
<b>Reporting Limits</b>			
Reporting limits are established for each analyte of interest.			
<b>Equipment and Equipment Maintenance</b>			
Instrument is maintained per manufacturer's recommendations. Maintenance logbooks are up to date.			
<b>Reagents and Standards, Expiration Check</b>			
The standards are prepared in accordance with the laboratory's standard operating procedures and quality assurance manual.			

Criteria	Y	N	Remarks
Reagents and standards are appropriately labeled in accordance with the requirements in Minnesota Rules, Chapter 4740 (e.g. contents, date of preparation, date of expiration, identification of the preparer).			
Reagents and standards are discarded prior to expiration.			
<b>Pre-calibration Requirements</b>			
<p><b>For GC/MS:</b> specific information is provided as to how the instrument is set up. This information must include, at a minimum:</p> <ol style="list-style-type: none"> <li>1) If samples are analyzed by GC/MS the mass spec tune meets acceptance criteria of 8270C method (if DFTPP is used) or the acceptance criteria as defined by the laboratory.</li> <li>2) The mass spec tune meets acceptance criteria prior to analysis and every 12 hours.</li> <li>3) Analyte retention times and respective acceptance windows are determined for all compounds.</li> <li>4) Target ions and their relative intensities are defined for each analyte.</li> </ol> <p>This information must be the same for all calibration curve, samples, and QC (i.e. the electron multiplier voltage for the calibration curve must be the same as that of the samples).</p>			
<p><b>For LC/MS, LC/MS/MS or LC/MS<sup>nth</sup>:</b> specific information is provided as to how the instrument is set up. This information must include, at a minimum:</p> <ol style="list-style-type: none"> <li>1) The laboratory documents the mass spectral tune results.</li> <li>2) Analyte retention times and respective acceptance windows are determined for all compounds.</li> <li>3) Molecular, primary fragment, secondary fragment, etc. ions (if applicable) are defined for each analyte.</li> <li>4) Molecular, primary fragment, secondary fragment, etc. ions and expected primary/secondary fragment ion ratios (if applicable) are defined along with acceptance criteria.</li> </ol> <p>This information must be the same for all calibration curve, samples, and QC (i.e. the electron multiplier voltage for the calibration curve must be the same as that of the samples).</p>			
<b>Initial Calibration Requirements and Linear Range</b>			
The calibration curve is constructed of at least five standards. Concentrations of the standards are recorded.			
The lowest standard in the curve is at or below the reporting limit of the compounds.			
The criteria for acceptance of the initial calibration curve is defined.			
Acceptance criteria for internal standard abundances are defined.			

Criteria	Y	N	Remarks
<b>Calibration Verification Requirements</b>			
<p>At least two continuing calibration verification (CCV) standards will be analyzed prior to sample analysis. One of the CCV standard mixes must be at or below the report level of the analytes of interest. Acceptance limits and abundance criteria must be documented for the CCV standards. Continuing calibration verification must occur prior to batch analysis and every 12 hours.</p>			
<b>Procedure</b>			
<p>Retention times of the target compounds are within 0.06 relative retention time units of the measured standard reference compounds.</p>			
<p><b>For GC/MS:</b></p> <p>1) All ions present in the standard mass spectrum at a relative intensity greater than 10 percent must be present in the sample spectrum.</p> <p>2) The relative intensities of the ions in (1) above must agree within <math>\pm 20</math> percent between the standard and sample spectrum.</p>			
<p><b>For LC/MS, LC/MS/MS or LC/MS<sup>nth</sup>:</b></p> <p>1) All ions (e.g. molecular, primary fragment, secondary fragment, etc.) monitored in the standard mass spectrum must be present in the sample spectrum.</p> <p>2) The relative intensities of the ion ratios (e.g. primary/secondary fragment ion ratio) in (1) above must agree within <math>\pm 30</math> percent between the standard and sample spectrum.</p>			
<b>QC Accuracy</b>			
<p>A Quality Control Sample (QCS) or solution of target analytes of known concentration obtained from a second source or from a different lot number from the calibration solutions is analyzed with each calibration curve or quarterly (whichever is more frequent). Acceptance limits are defined for the QCS.</p>			
<p>Midlevel continuing calibration check standard containing each compound is analyzed every batch or every 20 samples, whichever is most frequent</p>			
<p>When the values for external reference standards fall outside the acceptance range established by in-house limits, appropriate corrective action is taken.</p>			
<b>QC Precision</b>			
<p>An LCS and LCSD (spike two clean gauze sponges with a known amount of the compounds and analyze each separately) are analyzed per batch or every 20 samples, whichever is most frequent.</p>			
<p>Acceptance criteria for laboratory control spikes are defined.</p>			

<b>Criteria</b>	<b>Y</b>	<b>N</b>	<b>Remarks</b>
Spiking concentration is reasonable to the concentrations present in the calibration curve.			
At least one duplicate is run as part of every analysis set.			
At least ten percent of all samples are run in duplicate. Acceptance limits are defined for the duplicate samples.			
<b>QC Blanks</b>			
At least one method blank is included in each preparation batch. Acceptance limits are defined for the method blank.			
<b>Calculations</b>			
Quantitation is based on the internal standard technique.			
All samples are diluted and re-analyzed if the measured concentration is above the highest calibration level.			
Because pseudoephedrine and ephedrine are stereo isomers they are reported as an isomeric pair.			
<b>Report to Client</b>			
Reports to the client include the date the sample was analyzed.			
Reports to the client include a reference to the method used.			
Reports to the client include the unique sample identification used by the laboratory.			
Reports to the client include the units of measurement.			
Reports to the client indicate any deviation from the specified procedures.			
<b>Laboratory Documentation</b>			
Because this is a PBMS method, the laboratory must have a specific corrective action policy for each area of the analysis when the laboratory's defined criteria are not met.			
The laboratory's actual practice conforms to the current standard operating procedure on file.			