Kentucky Cleanup Guidance for Methamphetamine Contaminated Properties

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Revised January 2009

Energy & Environment Cabinet
Department for Environmental Protection
Division of Waste Management

To Protect and Enhance Kentucky's Environment

Kentucky
UNBRIDLED SPIRIT

ACKNOWLEDGEMENTS

This guidance is based on many other states' intensive studies, technical guidance documents and past experiences with clandestine drug lab cleanups over the last several years including the states of Minnesota, Tennessee, North Carolina, Colorado, Washington, Missouri and Indiana. The Kentucky Energy & Environment (EEC) would like to extend a special note of appreciation to the Minnesota Department of Health (MDH) and Minnesota Pollution Control Agency (MPCA) for their excellent guidance document entitled *Clandestine Drug Lab General Cleanup Guidance, April 2007,* which provided the basis for this document, and to the States of Tennessee and Colorado for sharing their valuable experiences and wealth of knowledge into the methamphetamine (meth) cleanup process.

Kentucky continues to work with The National Alliance for Model State Drug Laws (NAMSDL) which is a resource for governors, state legislators, attorneys general, drug and alcohol professionals, community leaders, the recovering community, and others striving for comprehensive, effective state drug and alcohol laws and policies.

EEC would also like to extend its gratitude for the contributions, guidance and invaluable input from the various state and local government agencies across the Commonwealth including the Kentucky State Police, Kentucky Dept. of Labor (KyOSH), the Department of Justice, the Governor's Office of Drug Control Policy, the Cabinet for Health and Family Services, local health department personnel, and the local law enforcement personnel and drug task forces.

NOTE

Missouri and Washington were the first states to develop meth lab cleanup guidance in the country in the mid-1990s, Since that time, as the meth lab problem has dramatically increased and spread across the country, numerous states have followed with adaptations of these first documents, making revisions based on their respective states' regulations, and also based on the most current understanding of meth lab cleanup. Neither this nor any other guidance provides science-based advice for removal of **all** potential risk to human health. This document does provide current information on methods for reducing exposures to toxic chemicals used in meth manufacture based on a number of studies and experience by other states on meth lab cleanup. The guidance may be revised as research and practice reveal a better understanding of meth chemicals, testing and decontamination.

The previous version of this guidance, entitled *"Kentucky Methamphetamine Lab Decontamination Guidance for Inhabitable Properties"* was originally introduced in November 2007 to assist in implementing HB 94, Kentucky's new meth cleanup law. Changes brought about by HB 765 during the 2008 Legislative Session required this guidance to be revised to address the establishment of a Tiered Response System for decontamination of meth lab properties, among other changes. As established in 401 KAR 100:001 through 040.

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I. INTRODUCTION

This document is designed to assist property owners, certified meth cleanup contractors, and state and local authorities with their efforts to reduce exposure to contamination from former drug labs in **inhabitable properties** as defined in KRS 224.01-410. The guidance is based on current information on meth lab contamination and cleanup, and has been compiled and assimilated from other states' regulations and guidance documents, and input from professionals inside and outside of Kentucky who have experience in the field of clandestine drug lab decontamination. This guidance addresses the changes to the current law brought about by passage of HB 765 during the 2008 Legislative Session.

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 decontamination of non-meth drug labs may contact the Kentucky Division of Waste Management (KDWM) at (502) 564-6716 for advice on decontamination of those labs.

Meth lab "cleanup" generally consists of two specific phases of work which can be termed **removal** and **decontamination. Removal** occurs when a meth lab is identified and seized by the Kentucky State Police (KSP) or local law enforcement, and bulk chemicals, containers, equipment and wastes used in the meth "cooking" process are inventoried, lab-packed and removed by specially-trained officers with KSP or local law enforcement. KSP coordinates the ultimate characterization and disposal of the waste materials in accordance with state and federal hazardous waste management regulations. This guidance addresses the **decontamination** of residual contamination that exists after the bulk **removal** of chemicals and chemical wastes.

The main focus of this guidance is decontamination and sampling of meth and other chemical residues within **"inhabitable properties"**. Kentucky's meth cleanup law, codified at KRS 224.01-410 (2) (a) defines an **inhabitable property** as "….any building or structure and any related curtilage, water, water system, or sewer system used as a clandestine meth drug lab that is intended to be primarily occupied by people, including a mobile home, that may be sold, leased, or rented for any length of time. "Inhabitable property shall not include a hotel, as defined in KRS 219.011." This guidance uses meth as a surrogate chemical for all other drug precursors or "**related hazardous materials or hazardous waste"** as referred to in the statute, and is based on the premise that removal of meth will provide adequate decontamination of the other contaminants. It is acknowledged that there may be reagent or precursor labs where chemicals other than meth may be present. In these cases, additional testing may be required. Contact KDWM for more information.

A companion document, ***Contractor's Certificate of Decontamination (CCD), DEP 5035; January 2009,*** shall be used to document interior and exterior assessment, decontamination, and post-decontamination sampling activities performed by the certified contractor, and will serve as a record of decontamination decisions and actions. A copy of the *CCD* must be submitted to KDWM, within sixty (60) days of completion of cleanup activities, as established in 401 KAR 100:040 Section 3(4).

II. BACKGROUND INFORMATION

A. Individual and Agency Roles and Responsibilities

Kentucky's meth cleanup law, known as HB 94, later codified as KRS 224.01-410, was passed during the 2007 Kentucky Legislative Session, and became effective on June 26, 2007. HB 765 which was passed during the 2008 Legislative Session amends the statute regarding decontamination requirements and standards. This guidance addresses these technical changes. The law defines the roles and responsibilities for state and local agencies in its implementation. The primary purpose of the law is to ensure that meth lab properties are properly decontaminated so they can be safely reoccupied by future buyers or tenants. This requires a strong, cooperative effort among law enforcement, the local health department, the various state agencies, the property owner and the certified meth lab cleanup contractor to achieve this goal. See Figure 1 for a flow chart describing the steps involved and agency roles in dealing with meth lab cleanup based on the new law. The parties involved and their responsibilities are as follows:

The **Kentucky State Police (KSP) or local city or county law enforcement** agency will complete the Clandestine Drug Lab Preliminary Assessment Tier Selection Criteria (TAS), DEP 1016; April, 2018, which will assign the appropriate tiered response cleanup level. KSP will notify the local health department the day they become aware of a property contaminated by its use as a clandestine meth drug lab.

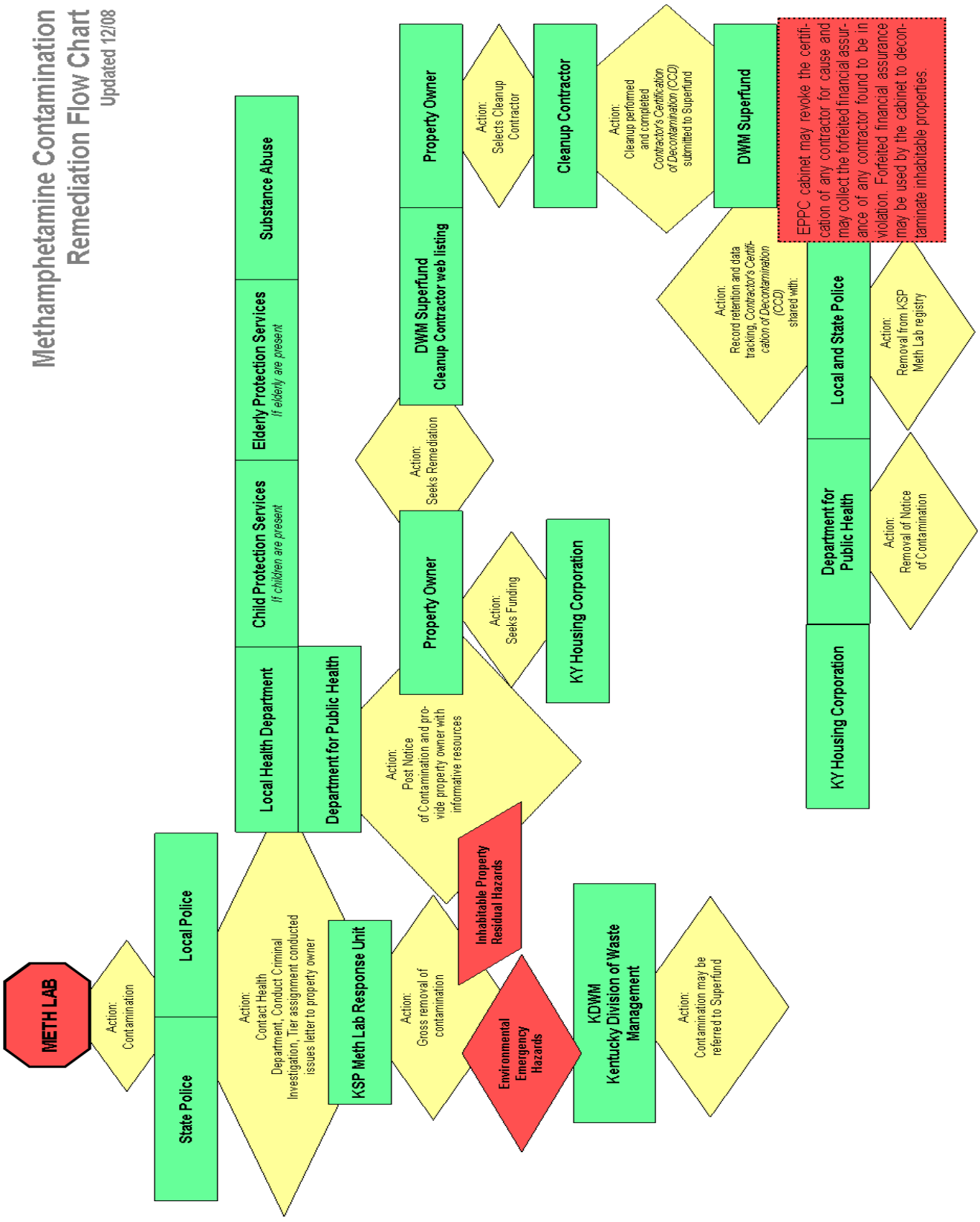
Once they receive notification from law enforcement, the **Cabinet for Health and Family Services (CHFS) or their staff in the local health department** for that county or area will request KSP or local law enforcement to post a **Notice of Meth Contamination** on each exterior door of the inhabitable property, except for multifamily housing units, as established in **902 KAR 47:200**. In that case, the notice is posted on each entrance door to that unit.* The Notice shall duly warn the public, owners and renters of the possible contamination of the property and the health hazards posed by the meth contamination, per the provisions of KRS Chapters 211 and 212. The Notice shall remain posted until the property has been decontaminated by a certified contractor in accordance with the law and this guidance document. The local health department shall remove the posting once a **Release Letter** is submitted by KDWM as noted below**.** At law enforcement's request, CHFS Child Protective Services may act as necessary to remove children from contaminated properties. CHFS staff also shall advise local public health officials, law enforcement personnel, property owners and citizens on the toxicity and health effects of meth, and provide treatment options available to those who have meth or other drug addiction problems.

**** Decontamination of the inhabitable property followed by sampling will be required whenever the local health department or law enforcement posts a "Notice of Meth Contamination" on the inhabitable property as required by the law.***

Kentucky's meth cleanup law states **"Only contractors certified by the Energy & Environment Cabinet (EEC) shall be authorized to conduct the decontamination services for inhabitable properties".** Information on how to become a **certified contractor** is available on the Kentucky Division of Waste Management (KDWM) meth decontamination webpage:

https://eec.ky.gov/Environmental-Protection/Waste/superfund/methamphetamine-lab-cleanup/Pages/certification.aspx

Figure 1. Flow Chart Showing Agency Roles and Steps in Meth Lab Cleanup



Certified contractors work *for* property owners and *with* state and local authorities to assess, sample, decontaminate, and dispose of wastes and materials removed from the property in accordance with the meth cleanup law, this guidance and all other state and federal laws. Certified contractors shall be knowledgeable of the law and its requirements, perform assessment and decontamination of the property according to this guidance, and shall document their decontamination activities through completion of the ***Contractor's Certificate of Decontamination (CCD), DEP 5035; January 2009*****.** The CCD shall be submitted to KDWM and the local health department within sixty (60) days following decontamination of a contaminated property. **In this document the certified contractor describes the specific cleanup actions completed, the post-decontamination samples collected, and self-certifies that the property was decontaminated to meet the requirements of the law.** The certified contractor shall follow the requirements provided in this guidance document for decontamination of contaminated properties or provide written justification for other equally protective actions that were taken.

Once KDWM receives the CCD, the agency shall review the document and if acceptable, shall issue a Release Letter to the property owner and the **local health department**. The meth cleanup law has no requirement for the property owner to decontaminate the property, and does not impose a mandatory deadline for assessment or decontamination of inhabitable properties. However, the local health department shall not remove the posting of the Notice of Meth Contamination from the property, until the property has met the decontamination standard as established in 401 KAR 101:040.

The property owner is responsible for all costs associated with assessment and decontamination of the property. (Please see information below on applying for funds from **Kentucky Housing Corporation** if eligibility requirements are met.) Decontamination shall be performed by a certified contractor selected by the property owner from the list available on KDWM's webpage. **If a certified contractor is not used to decontaminate the property, the Notice of Meth Contamination shall not be removed by the local health department.** The property owner shall be knowledgeable of the work plan and monitor progress on the site.

Even though the contractor shall be certified by KDWM, the agency shall not be liable or responsible in any way for any actions or omissions of the contractor in the performance of decontamination of the property. In order to become certified, the contractor shall provide proof of liability insurance, a surety bond and performance agreement for purposes of financial assurance. The owner may also wish to receive copies of these documents from the certified contractor as they select a company to perform decontamination services. It is recommended that the owner check references and obtain estimates in selecting the certified contractor.

The law includes a provision for the **Kentucky Housing Corporation (KHC)** to establish a program to assist persons and families of lower and moderate income to help defray costs of assessment and decontamination services. KHC has created such a fund that property owners can apply for if they meet financial and other eligibility requirements. A person shall not be eligible for the program if convicted of a felony or found to be responsible for contamination of the relevant property through meth production.

For information on how to apply for funding through KHC, and for other information on meth and cleanup issues, please refer to the KDWM webpage.

Discovery of possible meth lab properties. There may be instances where property owners, realtors, banks or other citizens discover chemical containers, strange odors of ammonia and other chemicals, evidence of spills, residues, and other materials indicative of a meth lab, but the property has not been reported to law enforcement and has not been posted as required by the law. In all cases, the person who discovers this material should evacuate the property, don't attempt to clean it, and contact the Kentucky State Police or local law enforcement. The property will need to be

investigated, assessed or decontaminated as necessary in accordance with this guidance and the law before it can be used.

B. Meth Production Methods

There are various methods for making meth in common practice in the U.S. today. Most Kentucky meth "cooks" use variations of the *anhydrous ammonia method* (also called the Birch Reduction method or "Nazi" method). Kentucky law enforcement have also reported discovery of many *Red P lab* operations using red phosphorous. Other methods that are used include the P2P or Amalgam method (See *Appendix A, Methamphetamine Manufacturing Processes and Common Manufacturing Chemicals).*

The physical evidence gathered and observations made by law enforcement during their initial entry at the scene, subsequent criminal investigation, and gross waste removal is the best information that is available concerning the type of meth lab and possible chemicals that have been released into the structure. This information shall be provided on the *Clandestine Drug Lab Preliminary Assessment Tier Selection Criteria, DEP 1016; April, 2018.* However, it should be noted that assessment or decontamination of labs cannot necessarily be based solely 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 shall be aware of potential hazards created by each of the meth cooking methods.

Although they have been found in the western U.S., Kentucky law enforcement has not yet seen many of the "Super Labs" where large volumes of meth are manufactured by several workers resulting in large volumes of chemical wastes. See *Section V.F. for Tier 4 response.* Seizure of a "Super Lab" or large capacity lab or discovery of new cooking methods or chemicals should be brought to the attention of KDWM immediately so agency staff can discuss whether this guidance is appropriate and sufficient for the situation.

C. Meth Lab Chemical Contamination

Cooking meth, regardless of method used, shall 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).* Airborne contaminants are absorbed into soft materials including rugs, furniture, drapes, walls and other surfaces and may also contaminate the heating, ventilation, and air conditioning (HVAC) system of the structure. Spills are common in meth labs, and may impact floors, walls, appliances, and other surfaces. Chemicals used in the cooking, which may be hazardous, may be dumped down the sinks, toilets or drains in the kitchen or bathrooms and leave contamination in the waste water system.

During active meth cooking, law enforcement has found that levels of chemicals including iodine, phosphine, and hydrochloric acid used in several of the methods, could exceed current occupational standards and large amounts of meth are also released into the air and have been found at levels up to 16,000 micrograms per 100 square centimeters on surfaces.

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 may result from chemical spills and skin contact. Headaches, dizziness, nausea, and other health effects may 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 shall move into air and shall be readily removed from the structure by ventilation. Semi-volatile or non-volatile chemicals used in production; such as acids, bases, precursor chemicals and products used or created in the manufacturing processes are more persistent.

Smoking meth indoors distributes meth throughout the structure and the structure's contents. Handling meth, precursors, 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 by the certified contractor shall include special attention to:

- **Accessibility of residues and frequency of direct contact**: The 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 may 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 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 are ingested into the body. Hand to eye behavior introduces 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 residue depends upon the amount of the residue, and the chemicals in the residue. The amount of residue depends upon the size and type of meth lab, the length of time it operated, methods of chemical storage and disposal, occurrence of chemical spills, as well as the physical characteristics of the structure in which the meth lab occurred. The chemicals in the residue vary based on the method of meth cooking.

D. Meth Risk Decisions and Cleanup Standards

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 the air of former meth labs that may be harmful,
- an established safe level for meth in the environment.

The decontamination standard set by Kentucky's meth cleanup law is 0.1 micrograms of meth per 100 square centimeters (0.1 µg/100 cm^2) of surface materials. See *Section V. Interior Decontamination Procedures* for the decontamination procedures for each tiered cleanup response.

When states originally established cleanup standards for meth, due to lack of health effects information and toxicity data, they were based primarily on the lowest level an analytical laboratory could reliably achieve. Many states currently use a cleanup standard ranging from 0.05 to 0.5 micrograms of methamphetamine per one hundred square centimeters (µg/100 cm^2) for meth in surface wipe

samples. However, a 2005 study by the Colorado Department for Public Health and the Environment found that the cleanup standards used by several states including Kentucky are protective of human health based on expected child and adult exposure.

Furthermore, research from the State of Minnesota has shown that sampling for meth may not be a reliable measure of the entire volume of meth in a structure. **Therefore, this guidance focuses heavily on a decontamination process that is practical and can be implemented coupled with the collection of post-decontamination samples to confirm that the standard has been achieved.** The goal of the overall cleanup process is to reduce risk to future occupants by reducing exposure to contamination, through a combination of cleaning, disposal, decontamination and encapsulation activities described in this guidance.

All contaminated properties that have been posted by the health department or law enforcement shall undergo decontamination actions based on the tiered response level that has been recommended for the property by law enforcement in the Clandestine Drug Lab Preliminary Assessment Tier Selection Criteria, DEP 1016; April, 2018. This is further discussed in *Section V. Interior Decontamination.*

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:

- All inhabitable properties containing a meth lab or chemicals shall be decontaminated following the procedures in this guidance.

- All non-occupied structures on a property where meth labs or chemicals are found shall be inspected. They shall be decontaminated if necessary. This includes outbuildings, detached garages, and sheds. These structures are likely locations of storage of chemicals and finished products.

III. CHEMICAL SAMPLING/DECONTAMINATION STANDARDS

A. Meth Wipe Sampling

(See *Appendix B.1.* for sampling procedures)

Meth wipe samples are typically collected by wiping a wall or other hard surface with a solvent dampened wipe. Gauze pads, sponges or 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. Meth wipe samples **may** be taken as part of the Preliminary Assessment conducted by the certified contractor to help determine site conditions before decontamination and to possibly help in guiding cleanup efforts. However, **wipe samples of the surfaces most likely to be contaminated, shall be taken following decontamination activities to demonstrate compliance with the decontamination standard of 0.1 µg meth per 100 square centimeters (0.1 µg/100 cm^2).** See *Appendix B.1* for required procedures for wipe sampling and refer to *Section VI. Post-Decontamination Sampling* of this guidance for specific meth sampling locations and analytical requirements. Several meth wipe sampling kits are available by a number of vendors, and are useful in screening areas to determine if additional decontamination may be necessary or if one should collect quantitative wipe samples to meet the standard. **However, results from wipe sample kits cannot be used for final post-decontamination sampling to meet the decontamination standard.**

B. Decontamination Standards

Indoor chemical-specific testing and screening recommendations and requirements are listed in **Table 1** below and described further in the following text. All areas tested must be photographed to document the location of the sampled area. Chemical screening shall be conducted during the assessment and decontamination.

Table 1: Decontamination Standards

Chemical	Decontamination Standard
**Methamphetamine	**0.1 µg/ 100 cm^2** (all surface materials)
Corrosives (Acids/Bases)	**pH 6-8**
Volatile Compounds	**< 1 ppm** total volatiles in air (PID or FID)
Lead*	Contact KDWM for standards and sampling requirements
Mercury*	Contact KDWM for standards and sampling requirements

*Testing for lead and mercury may only be necessary for P2P (Amalgam) labs.
**Testing that is required for all discovered meth labs.

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 and decontamination process may be conducted. See *Appendix B.2* for required sampling procedure.

Volatile Chemicals (VOCs): Commonly used VOCs (solvents) include but are not limited to Acetone, Benzene, Ether, Freon, Hexane, Isopropanol, Methanol, Toluene and Xylene. Ammonia also is a volatile inorganic compound that can be detected through screening. VOC screening should be conducted in all rooms of the structure, for the safety of workers as well as for assessment purposes and to verify decontamination. VOC screening can also be used to detect sources of residual organic vapor contamination, such as in heating vents, plumbing and sewers. See *Appendix B.2* for required sampling procedure.

Phosphorus and Iodine: Removal of stained materials is the best means of remediating contamination involving red phosphorus, iodine crystals, and tincture of iodine. Spray starch can be used as a screen for the presence of iodine residues. 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: P2P (Amalgam) meth labs involve the use of lead acetate and mercuric chloride. 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.

IV. PRE-DECONTAMINATION GUIDELINES

A. Certified Contractor Requirements

Decontamination of an inhabitable property in Kentucky shall be completed by a contractor certified by the Energy and Environment Cabinet. The certified contractor shall conduct meth lab assessment, sampling and decontamination using the procedures of this guidance, and in accordance with KRS 224.01-410. In addition to other requirements, the certified contractor is required to attend KyOSH-required HAZWOPER safety training. A number of states including Tennessee and Indiana, as well as private vendors offer meth lab cleanup training that would be beneficial in developing an understanding of the issues affecting meth lab sites and decontamination. See KDWM's webpage for links to other states' programs for information on upcoming training classes.

Once decontamination is completed, the certified contractor must perform the post-decontamination sampling to determine compliance with the decontamination standard. It is also the responsibility of the certified contractor to arrange for disposal of all waste materials, inspect the dumpster, truck, roll-off box or other container of structure contents and waste prior to the waste leaving the site. Inspection is done to ensure that no hazardous chemicals, containers of anhydrous ammonia, or biohazards (sharps, etc.) are improperly disposed. The certified contractor must also ensure that all furniture, clothing, carpeting, and other items disposed have been destroyed or rendered unusable to prevent scavenging of these items. All wastes must be disposed of in accordance with state and federal EPA and DOT regulations.

A *Contractor's Certificate of Decontamination (CCD)* must be submitted to the Kentucky Division of Waste Management by the certified contractor within sixty (60) days after decontamination services are performed on a property. The *CCD* report, documents the assessment, decontamination, actions taken at a site, and chemical screening results. Electronic version can be requested from KDWM.

KDWM reserves the right to conduct oversight, either with its own staff or a qualified contractor, of the meth lab decontamination activities performed by the certified contractor and to collect its own post-decontamination samples to verify that the decontamination standard was met.

The certified contractor and the property owner shall retain all records related to the decontamination of the inhabitable property for a period of at least five (5) years after the *CCD* has been issued. This includes the *CCD*, preliminary assessment findings, all data and laboratory analytical results of the post-decontamination sampling and quality assurance/quality control records, and field sampling logs.

B. Lab Site Entry

Once notified by the local health department, law enforcement shall post signs on the exterior doors of the property with *Notice of Meth Contamination* signs warning of possible chemical contamination. The notice will remain on the property until it has been decontaminated by a certified contractor in accordance with the law and this guidance document.

Before entering the site, the certified contractor shall carefully consider the hazard potential from exposure to chemical residues, confined spaces or other physical hazards, and proper personal protective equipment (PPE) to perform the decontamination. It is the contractor's responsibility to ensure that all personnel under their supervision have the necessary safety equipment and that their work activities are conducted safely in accordance with KyOSH regulations in 803 KAR 2:403, and 29

CFR 1926.50 to 1926.65, the construction industry standard and the federal HAZWOPER regulations for General Site Worker. Keep in mind many of the spaces that shall require entry and cleaning could meet the definition of a **Confined Space** per 803 KAR 2:200; and may require specialized training.

The certified contractor shall always wear the appropriate personal protective equipment (PPE) including respiratory protection if needed, based on site conditions and air monitoring data, and based on the type of work they are performing. Monitoring/sampling equipment should include, but not be limited to:

- A photo-ionization detector (PID), flame ionization detector (FID) or similar device to check for the presence of organic vapors in the air. The instrument must be properly calibrated and maintained,
- pH paper,
- De-ionized water,
- Camera (for documentation),
- Ruler and masking tape or pre-fabricated 10 cm by 10 cm template,
- Sample collection supplies including gauze pads, methanol, sample containers and cooler.

One hazard that shall not be overlooked when assessing or decontaminating a meth lab is hypodermic needles. Needles can sometimes be mixed in with the trash and other wastes and can be found in furniture or intentionally hidden in unexpected places. The potential for transmission of blood-borne pathogens including HIV/AIDS or hepatitis through needle "sticks" can be a significant hazard for sites where "users" were present. Because of the possibility that the needles can penetrate personal protective equipment (PPE), extra caution should be taken by the certified contractor and their staff. Also, some labs may have "booby traps" in place to make it difficult for law enforcement or others to access parts of the property. Caution should be taken when entering or investigating any former meth lab property.

C. Preliminary Assessment

The certified contractor shall conduct a preliminary assessment of the property and all structures on the property. This information will be critical to how the property should be effectively and safely decontaminated. Pre-decontamination sampling is not required, but samples may be collected of suspected cooking areas, spills or stained locations, waste disposal areas, HVAC system, plumbing fixtures, and other locations to determine the most effective plan for decontamination of the property. Once the property is decontaminated, post-decontamination samples are required. The following shall be collected and documented in the *Contractor's Certificate of Decontamination (CCD), DEP 5035; January 2009:*

- Obtain copy of the KDWM *Clandestine Drug Lab Preliminary Assessment Tier Selection Criteria, DEP 1016; April, 2018,* available by open records request to KDWM.
- Property description (i.e., physical address, latitude and longitude, legal description, physical layout of the property, structural features, etc.)
- Photographic documentation of site
- During the initial walk-through the certified contractor shall note hazardous chemical use or storage areas, waste disposal areas, cooking areas, chemical stains, fire damage, and other observable damage
- Information about surfaces, furnishings, appliances, and other features
- Inspection of HVAC system
- Inspection of plumbing, septic system, sewer system
- Inspection of garages, barns, and other outbuildings on the property,
- 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.

D. Site-Type Considerations

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

- **Private occupancy structure,** e.g., single family home and attached garage, apartment or multiple dwelling
- **Mobile residence,** e.g., motor home, camper or manufactured home
- **Non-occupancy structure,** e.g., detached garage, barn, tool shed, etc.

The following special considerations apply to site type and use:

- Private (e.g., apartment building) **multiple dwellings** require careful assessment when determining how much of a structure must be posted and subsequently decontaminated. This is a case by case call made by the local health department, based on the factors of the meth lab site. Adjacent rooms and common areas of multiple dwellings are presumed contaminated and shall be decontaminated, or sampled to rule out need for cleaning.

- Based on contractors' past experiences with cleanups of mobile homes, campers and other **mobile residences,** these structures contain more porous and absorbent materials than fixed structures, and therefore, may be difficult and costly to decontaminate. Demolition shall be considered as a more cost-effective option, see the *Owners Certificate of Demolition, DEP 6085; January 2009.*

- Non-occupancy structures like detached garages, barns, and sheds shall be inspected by the certified contractor and shall be decontaminated if believed to be used for cooking or storage of meth or its precursors.

- Although the recommended decontamination measures would be similar to those contained in this guidance, Kentucky's meth cleanup law does not include meth labs found in hotels, motels, portable labs, or vehicles in its definition of inhabitable properties subject to decontamination, therefore this guidance does not address these potential meth lab scenarios. **Contact KDWM at (502) 564-6716 if these or other situations are found and not addressed in this guidance.**

V. INTERIOR DECONTAMINATION PROCEDURES

A. Introduction

Pursuant to KRS 224.01-410 (6) (a), the cabinet has established a reasonable, appropriate, and protective tiered response system to address the level of decontamination services required for a contaminated property based upon the degree of methamphetamine production and the degree of potential contamination resulting from methamphetamine production as indicated by the results of assessment by responding state or law enforcement.

During the initial meth lab "bust", law enforcement shall complete the form *Clandestine Drug Lab Preliminary Assessment & Tier Selection Criteria, DEP 1016; April, 2018.* Based on evidence at the scene and observations made as they do the initial investigation, law enforcement will first determine

if the property is a “contaminated property”. If they determine that it is a contaminated property, they will post a notice of meth contamination and will recommend the property be assigned to one of four cleanup response tiers. Decontamination requirements for each tier are provided below. If law enforcement determines that the property is not contaminated, the property will not be posted and decontamination will not be required. Based on the results of testing or other information concerning the extent of contamination, the certified contractor may later determine that an alternate tier would be more appropriate for the property. However, valid justification must be provided to KDWM in advance by the certified contractor to modify the recommended tier, pursuant to 401 KAR 101:030 Section 2(3).

- **Pursuant to KRS 224.01-410(7), all inhabitable properties that have been posted by law enforcement or the health department must undergo at least a Tier 1 cleanup response.**
- **Pre-decontamination sampling cannot be conducted in order to demonstrate compliance with the decontamination standard.**
- **KDWM reserves the right to provide oversight of the decontamination activities and to collect samples as necessary.**
- **Although the property owner may assist the certified contractor in providing technical information about the inhabitable property; due to health and safety reasons, the owner cannot perform decontamination of the property unless they are a certified contractor.**

B. General Cleanup Requirements

1. If suspicious items (containers with residues, tubing, odd containers of kitty litter or paraphernalia) are discovered that are apparently related to methamphetamine production, contact KSP or local law enforcement immediately. If law enforcement personnel do not remove them, these items must be containerized and removed by a hazardous materials specialist and properly disposed and documented. Also, law enforcement officials must be contacted if any firearms are encountered during cleanup.
2. Carefully segregate and properly dispose of any hypodermic needles or other sharps if found on the property. A container made of puncture resistant plastic is recommended.
3. Prior to the cleanup response, remove all ancillary volatile and semi-volatile chemical sources that may be located on the property not associated with the lab process, so they don’t interfere with the results of air monitoring.
4. All wastes and materials removed from the property shall be rendered unusable and disposed at a permitted contained landfill. The contractor shall obtain disposal receipts from the receiving landfill to verify proper disposal.
5. After completion of cleanup, confirmatory samples shall be collected to determine if the property meets the decontamination standard pursuant to 401 KAR 101:040 Section 12.
6. Document and photograph all phases of the cleanup action and complete and submit the Contractor’s Certificate of Decontamination (CCD) to KDWM within sixty (60) days of completion of cleanup activities.

C. Tier 1 Response. In addition to the General Cleanup Requirements in Section B, at a minimum a typical cleanup for a Tier 1 Response shall include the following:

1. Ventilate the property for a minimum of forty-eight (48) hours prior to cleanup. The goal of ventilating the property is to achieve non-detects during screening for indoor air quality prior to the cleanup response. Once non-detects are achieved, then there is no need for further confirmatory air monitoring after the cleanup is completed.
2. Conduct air monitoring inside the structure.
3. Replace air filters in HVAC system. The HVAC shall not be turned on until the system can be cleaned and tested.

4. If a minor spill is noted during the assessment, then the Certified Contractor should target that area for an appropriate and thorough cleaning or removal.
5. Where appropriate, test pH of surfaces with pH paper strips (pH range of 6 to 8 is acceptable) use spray starch (iodine indicator) or other screening methods to target areas of potential contamination that may need to be addressed.
6. Using appropriate PPE, the cleanup workers shall thoroughly clean any spill areas, and wash all hard surfaces with hot water and cleansers. This includes appliances, floors, walls, ceilings, countertops, cabinets, bathroom fixtures, and any surfaces that tend to collect dust such as range hoods, ceiling fans, windowsills, etc.
7. Commercially shampoo rugs, steam clean mattresses and cloth furniture, and have bed linens and drapes commercially laundered. Secure cleaning receipts for documentation purposes.
8. Articles of clothing and toys have the potential to be heavily contaminated with contaminants of concern (COC), therefore they shall not be reused. KDWM recommends that the certified contractor remove any clothing, children's toys or other items left behind by the meth lab operator or their families, render them unusable, properly dispose of them, and provide disposal receipts. This step shall be photo documented. Since removal and replacement of appliances is not anticipated with a Tier 1 Response, wash and clean all appliances thoroughly. For evaluating personal items and contents of the structure, see *Section L* of this guidance.
9. Please note all contaminated properties shall require at least a Tier 1 cleanup response.

D. Tier 2 Response. In addition to the General Cleanup Requirements in Section B, at a minimum a typical cleanup for a Tier 2 Response shall include the following:

1. Where applicable/appropriate, follow all cleaning procedures described in Tier 1.
2. This Tier differs from Tier 1 Responses in that additional affected fixtures and materials may need to be removed, rendered unusable, and disposed of appropriately.
3. Ventilate property for a minimum of seventy-two (72) hours, or until non-detects are achieved via air monitoring.
4. Certified contractors shall perform removals, render items unusable, dispose of items, and provide disposal receipts.
5. If appliances and fixtures are etched, stained and contaminated to the point that successful cleaning is in doubt, the contractor shall render appliances and fixtures unusable and properly dispose of them.
6. Absorbent surfaces and materials (e.g. drop ceilings surrounding and proximal to the 'cook', mattresses, pillows, carpets, and clothing) shall be rendered unusable and removed.
7. All potential process-related stained surfaces and items shall be rendered unusable and removed.
8. The removed items are to be documented and manifested to permitted contained landfill facilities. Keep all disposal receipts.
9. All non-stained hard surfaces are to be double-washed with hot water and cleansers.
10. All washed hard surfaces shall be painted or sealed.
11. All other absorbent surfaces (e.g. – linens, drapes) are to be cleaned **twice**.
12. Cloth furniture is to be commercially steam cleaned **twice**.
13. Replace air filters in HVAC, and clean ventilation duct works.

E. Tier 3 Response. In addition to the General Cleanup Requirements in Section B, at a minimum a typical cleanup for a Tier 3 Response shall include the following:

1. Follow all cleaning responses in Tier 1 and 2. Be advised that contact with residual hazardous substances or waste is possible.

2. Ventilate property for a minimum of five (5) days, or until non-detects are achieved via air monitoring. Remove all potential VOC sources on the property.
3. Remove all porous and absorbent materials and render unusable.
4. Remove all stained materials including flooring and building materials and render unusable.
5. Remove all affected appliances and fixtures and render unusable.
6. If there is an on-site septic system, access the septic tank, and screen the septic tank for VOCs by using a Photoionization Detector (PID) and test the pH of the liquid in the tank. If the VOC and pH readings are indicative of impacts from meth lab waste, collect a sludge sample and determine if the waste is characteristically hazardous per the hazardous waste regulations in 401 KAR 31:030, If the waste is hazardous, pump septic system and dispose of sludge at a permitted hazardous waste disposal facility. Keep all disposal receipts or manifests.
7. Clean or remove grossly contaminated sub-floor or other framing materials prior to reconstruction. Do not remove any structural members of the building that would compromise structural integrity. In such cases, clean as well as possible.
8. All surfaces, not replaced, shall meet the decontamination standard after cleanup and painting or sealing.
9. Removed items are to be disposed at permitted contained landfill facilities documented by copies of disposal receipts.
10. If hazardous waste is present, it shall be manifested to permitted hazardous waste treatment and storage and disposal (TSD) facilities.
11. If releases of hazardous substances, pollutants or contaminants to the environment are documented either through observations of open dumping, presence of burn pits, outside cooking areas, etc. they shall be reported to KDWM immediately, and the effects of the releases shall be corrected pursuant to KRS 224.01-400 (18).

F. Tier 4 Response. Law enforcement agencies shall consult with KDWM prior to making this Cleanup Tier Recommendation. In addition to the General Cleanup Requirements in Section B, at a minimum a typical cleanup for a Tier 4 Response shall include the following:

1. Follow all cleaning responses in Tier 1, 2 and 3. Be advised that contact with residual hazardous substances or waste is possible.
2. In a Tier 4 Response, there could be significant environmental effects outside the structure due to large volumes of waste or hazardous materials dumped or released into the environment.
3. Please note that prior to any cleanup response for a Tier 4 scenario, releases to the environment shall be reported to KDWM immediately and the effects of the releases shall be corrected pursuant to KRS 224.01-400(18). If wastes are present in such quantities that regulatory oversight may be required, coordination with KDWM for the appropriate oversight of hazardous waste characterization, disposal, and cleanup activities shall be necessary prior to any cleanup response. KDWM does not foresee Tier 4 Responses being very common, but recognizes that the possibility exists.
4. In some cases the large amount of contamination inside the structure may render its cleanup uneconomical, and therefore demolition may be the most cost-effective option. The owner shall submit documentation of the property being demolished including the *Owner's Certificate of Demolition (OCD), DEP 6085; January 2009* and disposal receipts to the cabinet.

G. Decontamination Guidelines Additional discussion and guidance on the basic steps to decontaminate a former meth lab structure are listed below and described further in the following text. Please note that not all of the actions below shall be required based on the Tiered Response level for the property. Please refer to the appropriate tier for specific decontamination requirements.

- **Initial Ventilation**: Ventilate structure for at least two days before decontamination and during the cleanup process.
- **Air Quality**: Perform air sampling to determine proper PPE before and after decontamination.
- **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 dispose of upholstered furniture, curtains, mattresses, paper items, and other porous contents including clothing not to be cleaned.
- **Children's Belongings:** Remove and dispose of 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 Decontamination**: Under certain circumstances some selected high-value, hard-surface items including appliances may be reused following cleaning, HEPA vacuuming and sampling.
- **Disposal**: Dispose of 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 at the end of the decontamination process.
- **Encapsulation**: Encapsulate residual contaminants with two coats of sealant or paint. Paint should be sprayed and not brushed or rolled. Paint should be allowed to cure for the recommended time between coats.
- **Final Ventilation**: Ventilate structure for at least two days after cleaning.
- **Exterior (Outdoors) Evaluation**: Perform outdoor investigation including the septic system and contact KDWM if evidence of dumping or releases of hazardous substances are noted. See *VII Exterior Evaluation.*

H. Ventilation

Ventilation of the structure is recommended before, during and after the decontamination process except when ventilation may interfere with air sampling. Open all windows and use exhaust fans, blowers and/or negative air machines for a minimum of two (2) days for a Tier 1 Response to five (5) days for a Tier 3 Response, before and after cleaning. Take care that vented contaminants are not exhausted to air intakes of adjacent structures. **Do NOT operate the HVAC system until the entire structure is decontaminated in order to prevent spread of contaminants.** Also take care to provide adequate ventilation during sampling and painting. Respiratory protection may be necessary as part of PPE during decontamination; 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.

I. Indoor Air Quality Testing

Indoor ambient air should be screened before and after the decontamination process (or during the process as deemed necessary by the certified contractor) using a Photoionization Detector (PID), Flame Ionization Detector (FID) or similar instrument. Initially, a sweep through

the entire building shall be made with an accurate record kept of all readings in every room. VOC sampling shall be conducted in accordance with the procedures in *Appendix B.2.* This will also assist the certified contractor in determining the proper level of PPE for the workers. Additionally, each septic system drain (floor, tubs, sinks) shall be tested with the PID to determine if any chemicals have accumulated in the drain trap.

J. Heating Ventilation and Air Cooling (HVAC) System

Assessment of HVAC system shall be performed early in the decontamination process. **Do NOT operate the HVAC system until the entire structure is decontaminated in order to prevent spread of contaminants.** Depending on the recommended Tier Response level, assessment and the system, the following steps may be required:

- During the decontamination of each room or area:
  - Remove and clean, or replace all vents.
  - Thoroughly HEPA-vacuum the ductwork and clean the entire HVAC system. Flexible ductwork may be difficult to clean, and in some cases may promote mold growth if the water used during cleaning is not completely removed. Therefore, it is recommended that this ductwork be removed and replaced.
- Remove and clean, or replace supply diffusers.
- Replace all filters in the system at the end of the decontamination process and after all dust disturbances have occurred.

K. Evaluation of Chemical Spills

All food preparation counter-tops, stained materials, powders and liquids throughout the structure shall be pH tested (see *Appendix B2)* to determine their corrosivity. An accurate record of findings should be made. Surface pH sampling shall be conducted in accordance with the procedures in *Appendix B.2.*

Acids shall be neutralized with sodium bicarbonate (baking soda); and bases with weakly acidic wash solutions (e.g., vinegar, citric or acetic acid). Solids shall be containerized for proper waste disposal. Liquids shall be adsorbed with clay or another non-reactive material and packaged for proper waste disposal. Litmus paper shall be used to check a surface after neutralization. Stained or visibly-contaminated materials shall be removed and disposed.

L. Structure Contents and Furnishings

As a rule, most **personal belongings** found in a former meth lab structure are presumed contaminated and shall be discarded. At the discretion of the property owner in consultation with the certified contractor, some items may be: (a) cleaned without sampling, (e.g., eye glasses, adults' clothing, major appliances) or (b) cleaned and sampled (e.g., high-cost, low contact large furniture and appliances, and other items). Decisions shall be based not only on cost-effectiveness and value of the item, but also on the potential future use of the items, and potential for contact. **Table 2** and the following text provide some guidance and recommendations for evaluating the contents of the structure.

Table 2. Evaluation of Personal Items

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

Household contents and guidance for their disposition are listed below. This list is not exhaustive. Recommendations for household contents are divided into three categories:
1) *Always Discard*, 2) *Disposal Strongly Recommended and 3) Disposal Recommended*.

Infants' and Small Children's Clothes, Toys, Furniture 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 in consultation with the contractor regarding decontamination options.

- **Other Fabric Goods:**

  - Fabric Goods: Washable
    Disposal Strongly Recommended.
    Exceptions: In a Tier 1 decontamination response, 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 shall be run once empty of clothing.

  - Fabric Goods: Non-Washable, Such as Woolens, Rubber-Backed Draperies
    Always Discard.

  - Mattresses
    ***Disposal Strongly Recommended*.**
    Exceptions: In a Tier 1 decontamination response the mattress may be steam cleaned.
  - Carpeting
    ***Disposal Strongly Recommended*.**
    Exceptions: In a Tier 1 decontamination response the carpet may be steam cleaned.

- **Kitchen Goods**:

  - Dishes, Flatware, Other Hard Items, Including Glazed Ceramics, Metals and Glass
    Disposal Recommended.
    Exceptions: In a Tier 1 decontamination response, 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: In a Tier 1 decontamination response, attempts can be made to wash large, **hard furniture items** (e.g., non-plastic, wooden, chrome or aluminum). These items shall 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 in consultation with the certified contractor.

- **Appliances, Tools, and Electronics:**
  Disposal Recommended.
  Exceptions: If the property owner in consultation with the certified contractor agrees, 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 shall be discarded.

  Decontamination to clean an approved high-value item shall include aggressive HEPA vacuuming followed by extraction shampooing, extraction steam cleaning, or washing.

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.

M. Structural Features and Surfaces

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

"Popcorn" ceilings may contain asbestos. In lieu of testing the material for asbestos, the certified contractor may presume it has some asbestos-containing material. If the ceiling is intact, the best option is to leave the ceiling in place and seal with a sprayed-on asbestos-encapsulating product. Sealing shall also satisfy meth decontamination requirements. More information on asbestos abatement can be found at: http://www.air.ky.gov/programs/asbestos/

Walls, floors, and ceilings without "popcorn" texture shall be washed with hot water and detergent and rinsed with clean water to remove surface meth and prepare for painting or sealing, per the selected Tier response. First clean the ceiling, next clean the walls, and finally clean the floors. Washing shall 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 onsite septic system. **DO NOT USE CHLORINE BLEACH DURING DECONTAMINATION.** Recent studies indicate that using chlorine bleaches can create chloroephedrine and other toxic chemical compounds when combined with iodine and meth, therefore non-bleach detergents shall be used.

Wall materials (dry wall, sheetrock) that are in the suspected cooking area that are stained or discolored shall be removed and replaced. Other walls not in the cooking area shall be washed as noted above.

Resilient **floor coverings** such as laminate or tile vinyl in the room(s) used for cooking shall be removed or replaced, or after cleaning, covered in place with new floor coverings. Ceramic or stone-tiled flooring in the room used for cooking shall be removed, cleaned, re-glazed, or have the grout stained using an epoxy-based stain.

Any **wooden counter or food preparation surface** shall be removed and disposed. There are no exceptions.

To avoid disposal, hard and non-textured **food preparation surfaces and counters** (stone, tile) shall be washed twice with hot water detergent followed by thorough rinsing. Counter-top grout shall be ground down, re-grouted and sealed. A post-decontamination sample indicating **greater than or equal to 0.1 µg meth per hundred square centimeters (< 0.1 µg/100 cm^2)** on a counter surface shall indicate need for additional cleaning and/or disposal.

Any **surface with stains or etching** shall 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 shall also be washed twice with hot detergent solution and water rinsed.** Sinks, bathtubs and toilets are frequently used for the disposal and dumping of lab chemicals. Visibly contaminated, stained or etched sinks, bathtubs and toilets shall be discarded. Undamaged porcelain and stainless steel can otherwise be successfully cleaned.

Painted and unpainted **cement and cement block** may be power washed, with wash water collected. The wet vacuum used for collection shall 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. Sealing of cement, raw wood, brick or other porous materials is required in living space and recommended in other locations.

Area Segregation As each room is decontaminated; it shall be sealed off with 4-mil plastic (at least) sheeting to prevent recontamination as the work continues on the rest of the structure. It is recommended to start cleaning the least contaminated rooms first. It is also recommended to do a preliminary cleaning of the floors first before cleaning ceilings to walls. Final cleaning of the floors should be done after the ceilings and walls have been washed. These practices may help to minimize potential tracking of contamination into already-cleaned rooms and can save time and money spent in re-cleaning areas.

N. Encapsulation

Walls, ceilings, floors, and woodwork shall be coated with paint or polyurethane after cleaning to isolate the remaining meth residue. Some studies show that meth can "wick" through paint. Apply at least two coats of high quality paint or polyurethane. A primer coat will improve adhesion of the second coat of sealant. Paint shall 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.

O. Plumbing and Sanitary Sewer

Meth chemicals poured down the drain during active cooking 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.

Before cleaning plumbing fixtures, the certified contractor, equipped with chemical resistant protective disposable clothing, chemical-resistant gloves, and face-splash protection, shall first thoroughly flush all plumbing traps with cold water. Every plumbing trap shall then be checked with a PID or similar organic vapor meter. After flushing, collect substances in the trap to check pH using a long-handled tongs and cotton gauze. For garbage disposals, the trap cannot be easily accessed and shall require removal for checking.

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. For meth lab sites with an on-site septic system, see *Section VII. Exterior Evaluation.*

P. Garages, Outbuildings, and Non-Occupancy Structures

Although KRS 224.01-410 only requires decontamination of inhabitable properties which are intended to be primarily occupied by people, it is strongly recommended when planning decontamination, that all garages, sheds, and other non-occupancy structures be assessed and decontaminated as necessary. Consideration shall be given to the structure's use, to potential for human exposure, and to the level of contamination within that structure. Meth contamination in a storage shed poses far less hazard to future occupants, therefore shall not require the same level of decontamination.

The following steps shall 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, decontamination shall 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 bicycle, a hammock, or a set of coveralls in a barn used for meth cooking may 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.

Q. Waste Characterization and Disposal

All **meth-making chemical equipment or waste**, including precursor pharmaceuticals, drug cooking or used paraphernalia, non-empty containers of potential precursor chemicals, sludges, suspicious propane cylinders or fire extinguishers, and other potential evidence shall be reported to KSP or the lead law enforcement agency if found on the property. The materials shall be properly characterized and disposed in accordance with state and federal regulations.

Contaminated structural materials, household furnishings and personal property may be handled as municipal solid waste. Materials may be disposed of in a properly permitted contained landfill. All furniture, carpeting, clothing, and personal property shall be cut apart or otherwise rendered unusable 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. Before disposing of contaminated material, check with municipal solid waste facility about requirements for proper disposal of 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 hazardous waste disposal facility after cleaning of the structure(s) is completed.

R. Demolition

All structures that are to be demolished in lieu of cleaning shall be carefully inspected for meth lab materials and hazardous materials. Normal demolition and disposal rules apply. Property owners who choose to demolish the dwelling, in lieu of decontamination, shall notify the cabinet, in writing, of their intent to demolish an inhabitable property ten (10) days before the demolition activities begin. An owner shall submit the *Owner's Certificate of Demolition, DEP 6085; January 2008*, with the proper documents, including pre-demolition photographs, post-demolition photographs, and waste disposal

receipts, to the cabinet within sixty (60) days of demolition. An owner shall render all furnishings unusable prior to disposal. All solid waste generated during demolition activities shall be disposed of at a permitted contained landfill. The landfill or other disposal facility shall not allow any contaminated interior building materials to be salvaged or reused. An owner shall not be required to hire a certified contractor for the purposes of demolition of an inhabitable property. In all cases a property owner is responsible for assessment, testing and proper removal and disposal of asbestos, lead, and mercury containing materials and other building materials in accordance with state and federal regulations, including the solid waste regulations in 401 KAR Chapters 47-48.

S. Burning a Meth-Contaminated Structure

Burning a meth-contaminated structure in lieu of decontamination is prohibited, unless prior approval has been granted. Approval shall be obtained from the Kentucky Division for Air Quality prior to a training or practice burn. 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 shall be done in accordance with demolition and asbestos regulations.

VI. POST-DECONTAMINATION SAMPLING

A. General Sampling Issues

Post-decontamination samples shall be taken after washing and sealing/painting of surfaces. The certified contractor may take wipe samples after washing of surfaces only if the decontamination standard has been achieved. However, the sealing/painting step helps to provide an additional layer of protection. Some studies have shown that elevated levels of meth may "wick" through the paint, but if the double washing is done, it is anticipated that the main meth mass shall be removed before painting or sealing.

B. Sampling Protocols

Each room and space in the inhabitable property shall be sampled. Procedures for meth wipe sampling are provided in *Appendix B.1.* In all cases, a representative number of discrete samples shall be biased and collected in the areas of suspected cooking, observed chemical spills, or waste storage areas identified during the Preliminary Assessment of the inhabitable property. **Table 3** lists the minimum number of composite samples that shall be required for post-decontamination sampling. All samples shall be collected from cleaned surfaces and not new materials. If a wall or material identified below is removed and replaced as part of the decontamination, the contractor can designate another location for sampling and document in the *Contractor's Certificate of Decontamination, DEP 5035; January 2009.*

Table 3
Post-Decontamination Sampling Protocols

Area	Sampling Protocol
Each Room	(4) ten cm x ten cm samples for total of 400 sq. cm consisting of : (1) sample from location at or near center of floor* (1) sample from location at or near center of ceiling (1) sample from location at or near center of (2) walls (**Samples can make up one (1) composite sample** for each room) + the following samples

Kitchen	(4) ten cm x ten cm samples for total of 400 sq. cm consisting of: (1) sample from countertop (1) sample from stovetop (1) Range hood above stovetop (if present). If not present from a cabinet above the stovetop (1) Floor in front of the stovetop (**Samples can make up one composite sample**)
Bathroom(s)	(4) ten cm x ten cm samples for total of 400 sq. cm consisting of: (1) sample from countertop (1) sample from sink (1) sample from toilet (1) sample from shower or bathtub (**Samples can make up one composite sample**)
HVAC System	(4) ten cm x ten cm samples for total of 400 sq. cm at four (4) different locations in the ventilation system. Must sample cold air returns or plenums. (**Samples can make up one composite sample)**
Appliances (Cleaned)	One (1) ten cm x ten cm sample from exposed surface of each cleaned appliance. If multiple appliances are present, up to four (4) wipes can be combined into **one composite sample** representing 400 sq. cm.

*** If the flooring is carpeting that has only been cleaned and not removed, the floor sample can be taken from the lowest point on one wall nearest the cooking area, or just above the baseboard in non-cooking rooms.**

All samples collected and analyzed shall be below the decontamination standard of **0.1 µg/ 100cm^2.** In addition to the samples noted in **Table 3**, the certified contractor shall also collect quality assurance and quality control wipe samples and field blanks in accordance with standard sampling and analytical practices. The contractor shall log all samples collected at the site and any QA/QC samples on a chain of custody form, maintain proper temperature and maintain records of sample shipment to the laboratory.

C. Analytical Laboratory Requirements

Certified contractors shall be required to use an EPA or otherwise nationally-accredited analytical laboratory to ensure that all analytical data are reliable and reproducible. For methamphetamine analyses, the laboratory must utilize Method 8270C-Modified, "Semi-volatile Organic Compounds by Liquid Chromatography or Gas Chromatography/Mass Spectroscopy", from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", U.S. EPA SW-846, Third Edition (Nov. 1986), Revision 3 (Dec. 1996), or other accredited laboratory methods to achieve a detection limit of at least 0.1 µg/ 100 cm^2, and include all quality assurance/quality control documentation required by the method. Many laboratories are certified in other states to analyze for meth and other precursors or are using updated methods and equipment that are equivalent to Method 8270. Data from these laboratories shall be accepted. For all other waste or chemical analyses requiring an off-site environmental laboratory, EPA SW-846 methods must be utilized. **It is the responsibility of the certified contractor to ensure that the laboratory used is an accredited laboratory and is capable of performing the required analyses.**

VII. EXTERIOR EVALUATION

A. Septic System Evaluation

Large volumes of meth lab wastes can pose a problem if they are flushed and end up in a septic system. It is believed that the microorganisms present in the septic system can biologically break down many of the chemicals, however if a meth lab operated for a long period of time, under extreme pH conditions, it could cause damage to the operation of the system. If there is evidence that meth lab wastes may have been disposed into the septic system, field screening of the septic tank must be performed by the certified contractor. Evidence of waste disposal may include the following: witness statements; stained or etched sinks, bathtubs, toilets; chemical odors coming from plumbing or septic tank; or visual observations of unusual conditions within the tank (dead tank); or stressed or dead vegetation in a drain field; or if identified on Tier Assessment form.

Initial field screening during a Tier 3 response selection shall include monitoring the septic tank for VOCs using a PID or FID; and testing the pH of the liquid in the septic tank using pH paper or pH meter. Additional screening or testing shall be performed according to the Tier response level. Samples shall be collected of the septic wastes in the tank for toxicity characteristic leaching procedure (TCLP) and other waste characterization parameters to determine if the wastes are hazardous, and arrangements shall need to be made with an approved waste handling contractor, transporter, and disposal facility to have the septic tank contents pumped out and properly disposed in accordance with state and federal regulations. **Do not remove or dispose of the tank contents until proper testing has been done.**

B. Evaluation of other Potential Releases

KDWM shall be contacted immediately if evidence of a release of a hazardous substance related to meth lab activity is observed to the environment outside the inhabitable property, i.e., soil staining, spills, chemical containers with wastes or residues, evidence of burning or burying of meth wastes, suspected water well contamination, stream contamination, or similar condition, this shall be documented in the *Contractor's Certificate of Decontamination, DEP 5035, January 2009,* that shall be submitted to KDWM. All releases to the environment will need to be addressed in accordance with Kentucky statutes and regulations.

VIII. CERTIFICATE OF DECONTAMINATION

Once the certified contractor submits the *CCD,* KDWM will review the CCD and upon approval will issue a release letter to the property owner, local health department, and KSP meth coordinator. Please use the *Contractor's Certificate of Decontamination, DEP 5035, January 2009,* report format. Contact KDWM for an electronic version of this report. The health department shall remove the posting of the Notice of Meth Contamination from the inhabitable property.

The certified contractor shall retain all records of the decontamination activities for at least five (5) years following completion of the work. The property owner shall retain all records of the decontamination activities as long as they hold title of the property. This provides valuable documentation of the cleanup for future property transfers. It is the responsibility of the property owner to comply with all real estate disclosure laws regarding environmental contamination on their property including meth labs and subsequent decontamination activities.

References

Colorado Department of Public Health and Environment
www.cdphe.state.co.us/hm/methlab

Indiana Department of Environmental Management
www.idem/programs/land/drug_lab/#newrule

KCI, The Anti-Meth Site
www.kci.org/meth

Minnesota Department of Health
www.health.state.mn.us/divs/eh/meth

Missouri
www.dhss.state.mo.us/ResourceMaterial/meth

National Jewish Medical and Research Center
www.nationaljewish.org/news/meth

North Carolina
www.epi.state.nc.us/epi/oii/pdf/methguidelines

Tennessee Department of Environment and Conservation
www.state.tn.us/environment/dsf/meth

Washington State Department of Health
www.doh.wa.gov/dhp/ts/CDL.HTM

The National Alliance for Model State Drug Laws (NAMSDL)
http://www.namsdl.org/home.htm

Glossary

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

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

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

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

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

Air Hose: Tubing used to transport air.

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 user's 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 highly 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.

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 phases: **Removal** occurs when a meth lab is identified and seized by law enforcement, and bulk chemicals, equipment and wastes are removed and disposed of by a hazardous waste contractor. **Decontamination** refers to the cleaning, containment and disposal of residual contamination that exists at an **inhabitable property** 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: As defined in 803 KAR 2:200, it is a space having the following characteristics:

- Limited means for exit and entry; and
- Ventilation of the space is lacking or inadequate, allowing for the potential accumulation of toxic air contaminants, flammable or explosive agents, and/or depletion of oxygen.

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.

Curtilage: A legal term denoting the enclosed land surrounding a house or dwelling.

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

DEA: **Drug Enforcement Agency**

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 decontamination aspect of the cleanup.

EPA: **United States Environmental Protection Agency (U.S. EPA).**

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.

FID (Flame Ionization Detector): One of several methods for detecting and quantifying primarily hydrocarbon gases. Flame ionization utilizes a hydrogen flame to ionize and detect gases that are essentially flammable; however the process is far less sensitive to oxygen containing compounds due to the reduced carbon atoms.

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: Any discarded material or material intended to be discarded or substance or combination of such substances intended to be discarded, in any form which because of its quantity, concentration or physical, chemical or infectious characteristics may cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

Hazardous Waste Operator (HAZWOPER) training: A 40-hour course required by OSHA under the General Site Worker standard per 803 KAR 2:403 and 29 CFR 1926.50 through 1926.66 for workers to enter and work within an area defined as a hazardous waste site or uncontrolled hazardous waste site. Certified contractors and their workers who are performing decontamination services are required to obtain this training including the required field experience working under a supervisor prior to entering a lab, and to attend a “refresher” training annually.

Home Owner: Means the title holder of the inhabitable property where a notice of methamphetamine contamination has been posted.

HVAC: **Heating, ventilation and air conditioning system**.

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

Hotel: As defined in KRS 219.011, it refers to every building or structure kept, used, maintained, advertised, or held out to the public as a place where sleeping accommodations are furnished to the public, and includes motels, tourist homes, and similar establishments, but excludes boarding houses and rooming houses.

Ingestion: The act of swallowing.

Inhabitable Property: Any building or structure and any related curtilage, water, water system, or sewer system used as a clandestine methamphetamine drug lab that is intended to be primarily occupied by people, including a mobile home, which may be sold, leased, or rented for any length of time. “Inhabitable property” shall not include a hotel, as defined in KRS 219.011.

Inhalation: The act of breathing.

Land Owner: Means the deed holder of the land.

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

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.

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.

OSHA: **Occupational Safety and Health Agency**

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

PPE (Personal Protection Equipment): Specific equipment used to protect the wearer from the hazards involved with the removal and decontamination 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.

PID (Photoionization detector): A device used for the detection of certain VOCs, based on their ionization potential, 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 meth.

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.

Related hazardous material or hazardous waste: Any hazardous waste as defined in this chapter or hazardous material as defined in KRS 174.405 that is related to the clandestine production of methamphetamine.

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

Remediation: See Decontamination.

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.

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 drain field, 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, or other constructed or pre-fabricated enclosure.

Non-occupied (Non-occupancy) Structure: A structure not intended for primary occupancy by people. These structures include but are not limited to detached garages, barns, pole barns, sheds, outbuildings, 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, or manufactured home and any structure on the property that has a similar potential for exposure including child playhouses, etc. Any structure that is attached to an occupancy structure such as an attached garage 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 Material: Any porous or non-porous substance common to the interior of a building or structure, including but not limited to ceilings and walls, window coverings, floor and floor coverings, counters, furniture, heating and cooling duct work, and any other surface to which inhabitants of the building or structure may be exposed.

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 required first step in the decontamination process.

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

Volatile Compounds (VCs): Compounds that are in most cases ***organic*** in composition and evaporate readily into the air. Volatile Organic Compounds **(VOCs)** include substances such as benzene and toluene, which can be used in the manufacturing of meth. Ammonia is also considered a volatile compound but is a Volatile ***inorganic compound****.*

Appendices

Appendix A **Methamphetamine Manufacturing Processes and Common Manufacturing Chemicals**

Appendix B **Sampling Protocols and Guidance**

B.1 Methamphetamine Wipe Sampling Procedure

B.2 pH and VOC Sampling Procedures

Appendix A
Methamphetamine Manufacturing and Common Manufacturing Chemicals

In Kentucky, the majority of known meth labs have used the Anhydrous Ammonia also known as the Birch or Nazi 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.

Another meth cooking method that is not that common, but can be found is the Amalgam or P2P method, which primarily uses phenyl-2-propanone (P2P) and methylamine along with lead acetate and mercuric chloride. Other chemicals used in this method include aluminum, hydrochloric acid, isopropyl alcohol, methanol, ethanol, acetone, benzene, chloroform and ether. Elevated levels of lead and mercury can be present following this type of lab.

The "cooking" of 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 meth. 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, and 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 meth production may cause long-term health problems. Drug paraphernalia such as needles present possible exposure to infectious agents such as HIV and Hepatitis B and other blood-borne pathogens.

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 meth 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). Meth can be found on most surfaces, building materials, and home furnishings of a clandestine lab.

Research done by National Jewish Hospital suggest that re-volatilization of meth may occur after the initial deposition. Meth and other fine particle contaminates can be aerosolized and dispersed throughout the former lab.

Refer to **Table A, Meth Production Chemicals Present in Active and Former Meth Labs** (next page) 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

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

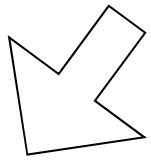
Figure A: Methamphetamine Manufacturing Processes

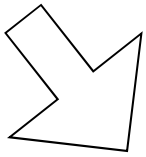
Extracting Precursor Drug:

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 (Red P) Method

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

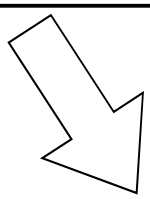
Wastes: Iodine, red phosphorus, sodium hydroxide, coffee filters, and solvent gases and possible other by-products. Solvent vapors, Iodine sublimation

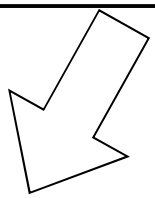
Anhydrous Ammonia (Nazi) Method

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.1:
Methamphetamine Surface Wipe Sampling Procedure

Wipe Sampling: Short Version

- Use one 3" x 3" general use sterile gauze pad (sampling wipe) per sample.
- Wear a new pair of nitrile gloves for each sampling.
- Wet the individual gauze wipe with 2 mL of methanol just before sampling.
- Wipe in a concentric square pattern within a measured 10 cm by 10 cm area.
- Because methanol will evaporate to dryness, lessening the ability to pick up meth, wipe sample the area within 5 seconds.
- Place the wipe back into the Teflon-lined jar and close the lid immediately after wiping.

Wipe sampling is performed to establish the presence of meth on non-porous surfaces. Samples shall be taken using methanol-dampened wipes. Wipe material can be sterile filters, gauze pads or swabs and can be obtained pre-prepared from an environmental laboratory.

Water-dampened wipes shall not be approved by this guidance due to the lack of meth capture by water-dampened samples. The sampler shall have clean hands and shall wear gloves during each sampling event to prevent the introduction of contamination or cross contaminating sample areas. The sampling area shall be a relatively dry surface. Post-decontamination wipe sampling shall be performed after washing and painting or sealing of walls and surfaces.

Procedure includes:

1. Sampler dons a clean pair of latex or other chemically-protective gloves.
2. Sampler attaches 10 centimeter (cm) by 10 (cm) template or measures with a ruler and marks by using tape, a pre-designated sampling location or area. Sampler shall 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. Sampler dons a clean pair of gloves to begin sampling.
4. Either soak the sampling wipe (filter or gauze pad) with 2 mL 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 shall not capture a representative meth sample.
5. Applying firm pressure, wipe the surface area within the template/taped area by starting at the outside edge working towards the center of the surface area by wiping in concentric squares of decreasing size until the area inside the template has been wiped. Avoid wiping the marking tape or template. Fold the wipe so the sampled side is folded in.
6. Insert the wipe into the sample jar and close the lid tightly.
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. Properly dispose of gloves and marking tape and proceed to the next sampling location.

Appendix B.2:
pH and VOC Sampling Procedures

A. pH Testing Procedures:

Surface 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.

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.

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.

Note: Due to other potential sources of organic vapors in the home from common household cleaners or building materials, it may be difficult to determine definitively whether any positive readings with a PID or FID are a result of residual vapors of solvents from the meth lab cooking.