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This article was written in October 2004. The information was current at that time.  
Information about Colorado's specific regulations from 1/16/05 has been added.

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## **Meth House Dangers and Cleaning**

Last night on the TV news was a story about a young couple, with two small children, who had found their dream home. It almost turned to nightmare when the night before closing the house was raided and a meth lab discovered. Luckily, a clerical error allowed them to get out of the deal.

The buyer admitted to smelling unusual odors, but thought they were the results of several pets and the poor hygiene of the renters. It can be presumed that the seller, realtors, and the inspector (if an inspection was done) also smelled the tell tale aromas. With the raid coming so close to the closing, it seems as though lab equipment would have been present in the home. Stains from manufacturing may have been observed. If the couple had been forced to complete the sale, the nightmare might have been shared with seller, realtors and inspector. All could be held liable for cleanup that averages about \$10,000. Some buildings have become so contaminated that they had to be demolished. Worse, deaths have been reported from exposure to meth labs, small children being most vulnerable.

Denver police estimate there are 5000 undiscovered meth labs in the Denver area. This number grows all the time due to the ready availability of ingredients and ease of manufacture. Ingredients are common household products that can be bought at neighborhood stores. There are many recipes for meth and most ingredients have multiple substitutions.

### ***Toxic Homes***

There are several identified causes of sick building syndrome. Meth labs are only one. Others include: mold infestation; bacterial growth; toxic off gassing from building materials and defective building materials and processes.

Health effects from exposure to all of these sources can be very similar. The common health problems include: respiratory problems, skin and eye irritation, rash, headaches, nausea, dizziness, loss of coordination, damage to liver, kidney, and central nervous system.

Most homes contain toxic chemicals from cleaning products, carpets and paints. These include: benzene, methylene chloride, trichloroethane, and toluene. All are carcinogens.

### ***Testing***

Older recipes for methamphetamine left staining and chemical odors. New recipes make the manufacturing process odorless. Methamphetamine does not have a distinctive color or odor. Increasingly, the only way to detect residue of meth manufacture is chemical testing.

Home test kits are available that identify a full range of drug residue. Inspection

Perfection Inc offers an inexpensive, on the spot test for meth residue. A positive test for meth residue does not necessarily indicate manufacturing was done in the house. It does indicate that the finished product was present.

Testing for actual manufacturing chemicals is expensive and complex and should be done by a certified industrial hygienist specializing in meth labs. With many methods for manufacturing meth, there are potentially hundreds of compounds used in making the drug and that are formed in the process. Identifying these compound require the knowledge and resources of an industrial hygienist.

Most chemicals used are volatile organic compounds, explosives, acids, bases, metals and chemical salts. Carpeting, wallboard, ceiling tile, wood and fabric absorb these materials. Furniture and draperies can become contaminated. Residue can be drawn into the heating/cooling system and distributed throughout the house. Spilled chemicals can contaminate walls, floors and counters. Chemicals disposed of by dumping in the yard pollute the soil, poured down the drain they can damage a septic system and leach into groundwater. For every pound of meth produced, 5-6 pounds of waste are left. Suspected chemical dumping in soil and sewage system should be reported to your local health department.

### ***What to Look for***

Real estate agents are required by law to reveal any known defects including drug manufacturing residue. Agents are not required to discover all defects. In absence of strange smells and/or neighborhood rumors a real estate agent can't be reasonable expected to know about drug manufacturing in the building. A well-educated buyer is the best protection for all.

Older manufacturing techniques left behind odors that might include: cat urine, ether, ammonia, acetone, or other chemicals.

Dark stains on counters, in sinks or bathtub/shower were often left behind. Chemical supplies and equipment may be present. Often the equipment is made from what is handy. This might include plastic tubs or buckets and mason jars. Over-the-counter cold and asthma medications containing ephedrine or pseudoephedrine, red phosphorous, hydrochloric acid, drain cleaner, battery acid, lye, lantern fuel, and antifreeze are among the ingredients most commonly used. These compounds, or the packaging, are red flags.

### ***Cleaning a meth lab***

There have been no cleanup standards developed at this time for properties contaminated by meth labs. Some states have maximum allowable meth residue standards for real estate transactions and property rental, but do not specify cleaning procedures. Responses to contamination have ranged from complete tear down to doing nothing.

The cleanup standards below are general and not specific to any state. Colorado released

new cleanup standards on Jan. 16, 2000. Follow this link to the actual standards:  
<http://www.cdphe.state.co.us/op/regs/boardofhealth/101403methlabrules.pdf>

Most properties can be cleaned, but professional cleaning is expensive, averaging \$10,000. The Missouri Department of Health has issued guidelines that allow homeowners to do the cleaning themselves. The Colorado Department of Public Health and Environment recommends that only licensed professionals do cleaning. Most cleaning recommendations are the same for all meth related chemicals. They follow the pattern of:

1. Gathering Information.
2. Airing out.
3. Removal.
4. Detergent/water washing.
5. Sealing.

### ***Gathering Information***

If the police have raided the property, call them to see if chemicals were confiscated. Ask for contact information for the contractor they used to remove the materials. The contractor can tell you exactly what chemicals were present. You can also contact your local fire department and health department for help and guidance.

The Larimer County Sheriff's Department maintains a list of houses that have been raided for meth manufacturing: [www.larimer.co.us/sheriff/methstructures.htm](http://www.larimer.co.us/sheriff/methstructures.htm)

The Adams County Sheriff's office has a list of meth lab investigation on line: <http://www.nmtf.us/methlablocations/methlablocations.htm#investigations> (thanks to Betsy Moser, Broker Associate-GRI, ABR - ReAction Realty/Metro Brokers at the Arabian Horse Center for this tip)

The North Metro Drug Task Force has some addresses on its site: [www.nmtf.us](http://www.nmtf.us)

The health department makes a note on the title of know meth manufacturing houses. Cleaning can clear the title. The local police department may be able to help identify manufacturing houses.

In the Denver area, the Tri-County Health Department has good resources and offers testing. <http://www.tchd.org/methlab.htm>

The Colorado Department of Public Health and Environment has resources for cleaning meth labs: <http://www.cdphe.state.co.us/hm/methlab.pdf>

Below is the fact sheet on cleanup of meth labs provided by Colorado Department of public Health and Environment. <http://www.cdphe.state.co.us/hm/methlabfactsheet.pdf> followed by guidelines for outdoor cleanup.

## **Cleanup Of Methamphetamine Labs**

## ***Summary***

Typically after a methamphetamine (meth) lab is discovered by law enforcement, the bulk of any lab-related debris, such as chemicals and containers, is removed. However, contamination may be left on surfaces and in absorbent materials (e.g., carpets, furniture, sinks, drains and ventilation systems). Though often found in small amounts, meth lab contaminants may pose health threats to persons exposed to them. In response to increased concerns over the contamination left behind at meth labs, the Colorado Department of Public Health and Environment (the Department) put together guidance to assist local agencies, property owners, and the general public in addressing contamination at former meth labs. This guidance can be found on the Internet at <http://www.cdph.state.co.us/hm/methlab.pdf> and is summarized below.

## ***Authority to Require Cleanup***

There is no current state statute that specifically authorizes state or local agencies to require the decontamination of the interior of private properties contaminated by clandestine meth lab activities. However, local government agencies may use broad authorities given to them in nuisance statutes, regulations, ordinances and various local codes to require cleanup.

## ***Areas of Contamination***

Potential areas of contamination can be divided into primary and secondary areas.

Typical primary areas of contamination include:

- **Processing or "cooking" areas:** Significant contamination in these areas may be caused by spills, boil-overs, explosions, or by chemical fumes and gases created during the heating and distilling portions of the "cooking" process. Indoor areas affected may include floors, walls, ceilings, used glassware and containers, working surfaces, furniture, carpeting, draperies and other textile products, plumbing fixtures and drains, or heating and air-conditioning vents.

- **Disposal areas:** Indoor areas include sinks, toilets, bathtubs, floor drains, vents, vent fans and chimney flues. Outdoor areas may include soil, surface water, groundwater, dumpsters, sewer or storm systems, septic systems and cesspools.

- **Storage areas:** Contamination may be caused by leaks, spills or open containers.

Secondary areas of contamination may include:

- Locations where contamination has migrated, such as hallways or high-traffic areas.
- Common areas in multiple dwelling structures; adjacent apartments or rooms may also be contaminated.
- Common ventilation or plumbing systems in hotels and multiple dwellings.

## ***Cleanup Procedures for Structures***

In most situations, cleanup/decontamination of structures that have been used as meth labs will involve one or more of the following measures:

- **Airing-Out:** Solvents and other chemicals may have soaked into the walls or furnishings and slowly volatilize back into the air. Proper ventilation may safely reduce contamination and decrease odor.
  - **Removal:** Visibly contaminated (etched or stained) sinks, bathtubs, and toilets are difficult to clean and may need to be removed and replaced. Absorbent materials, such as carpeting, drapes, furnishings, wallpaper, clothing, etc., can absorb vapors and may collect dust and powder from the chemicals involved in the manufacturing process. Some absorbent materials can be washed or cleaned if they exhibit little to no odor or staining, but many stained materials or those with odors often have to be disposed of.
  - **Detergent-Water Washing:** Nonporous and semi-porous surfaces (such as floors, counters, tiles, walls and ceilings) should be thoroughly cleaned with a detergent-water solution or steam cleaned. Methanol or isopropyl alcohol may also be used for cleaning, but should only be used in a well-ventilated area.
- Cleaning of porous materials that are not discarded will usually consist of vacuuming using a machine equipped with a HEPA filtration system, followed by hot water detergent scrubbing. Non-washable materials, such as lined curtains, that are not heavily contaminated may be steam-cleaned.
- **Ventilation System:** All air filters in the ventilation system should be replaced, vents should be removed and cleaned, the system's ductwork should be cleaned, and surfaces near inlets and outlets should be cleaned.
  - **Encapsulation or Sealing:** Interior surfaces (e.g., walls, wood flooring, ceilings, and paneling) should be painted with an oil-based paint, epoxy, or other material suitable to create a physical barrier capable of preventing volatilization of contaminants.
  - **Plumbing:** If staining is noted around sinks, toilets or tubs, or if a strong chemical odor is coming from household plumbing, the plumbing system should be flushed with generous amounts of water to reduce the concentration of residual chemicals.
  - **Personal Belongings:** If residents of the structure need to remove personal items, they should do so only after the items have been properly decontaminated. As with household furnishings, personal items that are visibly stained are hard to clean and may need to be discarded. Items such as clothing that are not visibly stained can be laundered one or more times to remove any residual chemicals. Non-porous and semi-porous items should be decontaminated using a detergent-water wash, or similar cleaning method, as

described above.

### ***Post Cleanup Assessment and Re-occupancy of Structures***

It is recommended that testing be conducted after cleanup has been completed to demonstrate that the structure is safe for re-occupancy. Based upon information currently available, a cleanup level for methamphetamine of 0.5 ug/fton a wipe sample appears to be the most conservative approach to determine the adequacy of cleanup. Other compounds may also be tested for, as deemed necessary based on the preliminary assessment of the structure.

### ***CLEANUP PROCEDURES FOR SOIL, GROUNDWATER AND SURFACE WATER***

If areas of potential outdoor contamination are identified or suspected, further investigation of outdoor contamination may be necessary. Small areas of outdoor contamination may be dealt with by removal or treatment of contaminated soils or water (i.e., small areas of ponded water). Contaminated soil or water removed from the site must be characterized to determine if it contains a characteristic or listed hazardous waste, and must be disposed at an appropriately licensed solid or hazardous waste disposal facility. Analysis should be based on the lab site chemical inventory and manufacturing method used. If large areas of soil, surface water or groundwater contamination are present, characterization and cleanup of these areas should be conducted by a professional environmental contractor, in consultation with the Department's Hazardous Materials and Waste Management Division.

In general, characterization and remediation of soil, surface water or groundwater impacts would include the following:

#### ***Source Identification***

It is important to tie site characterization to the chemical storage and waste disposal information gathered on the site to ensure that assessment efforts look for potential contaminants in the places they are likely to be. This type of information can be gathered from observations made by law enforcement or hazmat personnel, or by conducting a site tour to note the property's condition, looking for evidence of contamination such as stained soil or stressed (dead or dying) vegetation.

It is important to evaluate both natural features and manmade structures, such as drainage systems, local topography, utilities, surface water bodies, easements and locations of buildings, because these features can influence the migration of contaminants and restrict access to portions of the site during remedial efforts. This information is used in conjunction with information regarding the subsurface characteristics at the site to evaluate contaminant migration pathways. The amount of information that may need to be gathered will depend largely upon the characteristics of the release and the local hydrogeology. Relatively immobile contaminants (such as metals) that may have been

released onto the ground surface will require considerably less subsurface data collection than a release involving relatively mobile contaminants (such as solvents). The subsurface characteristics will need to be defined to the degree necessary to provide a clear understanding of potential migration pathways for the purpose of defining the extent of contamination.

### ***Sampling And Analytical Methods***

All samples must be collected using professionally accepted equipment and methods. These are described in either ASTM Phase II environmental site assessment documents or EPA site investigation guidance documents. All samples must be prepared and analyzed in strict accordance with the methods described in EPA's "Test Methods for Evaluating Solid Waste (SW- 846)" or other method approved by the Hazardous Materials and Waste Management Division. The SW-846 Manual is available online at <http://www.epa.gov/epaoswer/hazwaste/test/sw846.htm>. In a limited number of instances, the Division has established alternate procedures that vary from those set forth in SW-846 (e.g., sample preservation and analysis of indoor air samples).

### ***Remediation***

The results of the site characterization effort and the desired cleanup goals will define the level of remediation that may be required. Outdoor contamination may be dealt with using one or more of the following measures:

- 1) waste removal,
- 2) site controls (e.g., fencing),
- 3) drainage control,
- 4) monitoring, and
- 5) removal or treatment of contaminated soil or water (i.e., surface water or groundwater).

### ***Soil Cleanup Levels***

The Hazardous Material and Waste Management Division has established soil cleanup levels for a limited number of chemical compounds associated with meth labs, as provided in Table 3. For compounds that do not have established cleanup levels, a property owner may propose the use of an appropriate cleanup level for soil, using either background concentration, the method detection limit, or a risk-based concentration calculated in accordance with the Division's "Proposed Soil Remediation Objectives Policy Document."

### ***Groundwater Cleanup Levels***

Cleanup standards for groundwater may be found in Water Quality Control Commission's Regulation No. 41 "The Basic Standards for Ground Water." A list of State groundwater standards for select compounds associated with meth labs is provided in Table 3. For those contaminants for which State standards have not been established, the facility may chose to:

- Use EPA's Clean Water Act maximum contaminant levels (MCL) or maximum contaminant level goals (MCLG),
- Calculate a health-based drinking water standard using an MCL-equivalent methodology, or
- Calculate a health-based standard using the Water Quality Control Commission's policy 96-2 "Human Health-Based Water Quality Criteria and Standards".

### ***Surface Water Cleanup Levels***

In the event that activities have resulted in the contamination of surface water, the remediation goal should be the most stringent of one of the following cleanup levels:

- The appropriate surface water standard, as established by the Department's Water Quality Control Division, for that surface water body. This applies only to those surface water bodies, primarily rivers and interconnected ponds and lakes, for which water quality standards have been established.
- A health-based concentration that is protective of human health using a drinking water exposure scenario (unrestricted use designation).
- A concentration that is protective of aquatic life or other wildlife found in the area.

### ***CONTACTS FOR ADDITIONAL INFORMATION***

To report a known or suspected meth lab, contact your local law enforcement agency or drug task force.

For general questions regarding meth lab cleanup, call the Hazardous Materials and Waste Management Division's Customer Technical Assistance line at 303-692-3320 or toll-free at 1-888-569-1831 ext 3320. This number should also be called if you suspect that there may be potential environmental contamination from a meth lab (i.e., disposal to surface waters or dumped on the ground).

Suspected disposal down the sanitary sewer should be reported to the local wastewater treatment authority. The public works department or other city offices can assist in determining how to contact the local wastewater treatment authority.

For questions regarding health effects of meth lab-related chemicals or by-products, please contact the Department's Disease Control and Environmental Epidemiology Division at 303-692-2700.

### ***For More Information***

Colorado Department of  
Public Health & Environment  
Hazardous Materials and  
Waste Management Division  
4300 Cherry Creek Drive South  
Denver, Colorado 80246-1530

Customer Technical Assistance (303) 692-3320  
(888) 569-1831 ext. 3320 toll-free  
Division Website <http://www.cdphe.state.co.us/hm/>  
E-mail [comments.hmwmd@state.co.us](mailto:comments.hmwmd@state.co.us)